First : Accumulative quizzes on algebra

Total mark 12

Quiz 1 on lesson 1 – unit 1

Choose the correct answer from those given :

(1) If $A=\begin{pmatrix} 1 & 1 & x-1 \\ 1 & 3 & 5 \\ -1 & 5 & 6 \end{pmatrix}$ is a symmetric matrix , then $x=$ ....

(a) -1 (b) zero (c) 4 (d) 6

(2) If $A=\begin{pmatrix} 2 & -3 \\ -1 & 4 \end{pmatrix}$, $B=\begin{pmatrix} 2 & -1 \\ \frac{1}{2}k & 4 \end{pmatrix}$ where $A=B^t$, then $k=$ ....

(a) -2 (b) $-\frac{3}{2}$ (c) 8 (d) -6

(3) If $A=\begin{pmatrix} 1 & 5 \\ 3 & 2 \\ -1 & 7 \end{pmatrix}$, then $a_{12}+a_{32}=$ ....

(a) 8 (b) 12 (c) zero (d) 10

(4) If $\begin{pmatrix} 1 & x & 2 \\ -1 & 6 & 5 \end{pmatrix}=\begin{pmatrix} 1 & -1 \\ -3 & 6 \\ 2 & y \end{pmatrix}^t$, then $x\,y=$ ....

(a) -15 (b) -2 (c) 2 (d) 15

(5) If $\begin{pmatrix} 1+i & 1-i \\ \sin x & 1 \end{pmatrix}=\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $a\,b\,c\,d=1$, $0<x<\frac{\pi}{2}$, then $x=$ ....

(a) $\frac{\pi}{12}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{3}$

(6) If $A=\begin{pmatrix} \sin 30^\circ & 1 \\ \tan^2 60^\circ & \cot 45^\circ \end{pmatrix}$, $B=\begin{pmatrix} m-\cos 60^\circ & 1 \\ s+\sec^2 45^\circ & n+\cos^2 90^\circ \end{pmatrix}$ and $A=B$

, then $m+s-n=$ ....

(a) 2 (b) -1 (c) -2 (d) 1

(7) If $\begin{pmatrix} 1+i & 1-i \\ i & -i \end{pmatrix}=\begin{pmatrix} a & b \\ c & d \end{pmatrix}$, then the equation whose roots a^2 , $2\,d$ is ....

(a) $x^2-4=0$ (b) $x^2+4=0$

(c) $x^2-2=0$ (d) $x^2+2=0$

(8) If $X = \begin{pmatrix} a-b & 1 \\ 3 & b-2 \end{pmatrix}$, $Y = \begin{pmatrix} a-6 & 6 \\ 2 & 4-a \end{pmatrix}$ and $2X = Y^t$, then $a + 2b =$ ....

(a) 4 (b) 8 (c) 10 (d) 12

(9) The matrix $\begin{pmatrix} 3 & 2 & 1 \end{pmatrix}$ of order ....

(a) 2×1 (b) 1×3 (c) 3×2 (d) 3×1

(10) If $\begin{pmatrix} a & b \\ c & d \end{pmatrix} = 3\,I$ where I is the unit matrix , then $a + b + c + d =$ ....

(a) 5 (b) 6 (c) 7 (d) 8

(11) If the matrix A of order 2×2 and $a_{xy} = \frac{x}{y}$, then $a_{11} \times a_{12} \times a_{21} \times a_{22} =$ ....

(a) 4 (b) 2 (c) 1 (d) $\frac{1}{2}$

(12) If $A = \begin{pmatrix} x & 2 & 3 \\ z & y & n \\ -3 & 5 & m \end{pmatrix}$, which of the following sufficient to find the value of x ?

(a) $A = A^t$ X (b) $A = -A^t$

(c) A is a diagonal matrix X (d) nothing of the previous.

$\begin{pmatrix} -x & -2 & 3 \\ -2 & -y & -5 \\ -3 & -n & -m \end{pmatrix}$

$-x = x$

$2x = 0$ $x = 0$

Quiz 2 till lesson 2 – unit 1

Total mark 12

Choose the correct answer from those given :

(1) If the matrix A is of order 2×3 , then the number of its elements equals ....

(a) 3 (b) 2 (c) 5 (d) 6

(2) If $A + A^t = O$, then A is a .... matrix.

(a) row (b) column (c) symmetric (d) skew

(3) If $\begin{pmatrix} x \\ 6 \end{pmatrix} - \begin{pmatrix} 1 \\ y \end{pmatrix} = \begin{pmatrix} 3 \\ 5 \end{pmatrix}$, then $x + y =$ ....

(a) 1 (b) 4 (c) 5 (d) 3

(4) $\begin{pmatrix} -5 & -2 \\ 4 & 7 \end{pmatrix} + \begin{pmatrix} 6 & -4 \\ 2 & -6 \end{pmatrix}^t = \cdots\cdots\cdots$

(a) O　　(b) $\begin{pmatrix} 1 & -4 \\ 0 & 1 \end{pmatrix}$　　(c) $\begin{pmatrix} 11 & 0 \\ 0 & 1 \end{pmatrix}$　　(d) I

(5) For any square matrix $B \neq O$, the matrix $A = B - B^t$ is $\cdots\cdots\cdots$

(a) symmetric.　　(b) skew symmetric.

(c) zero　　(d) unit matrix.

(6) If the matrix A is symmetric and skew symmetric in the same time , then $\cdots\cdots\cdots$

(a) $A = O$　　(b) $A = I$

(c) A is a diagonal matrix.　　(d) A is a row matrix.

(7) If A is a matrix of order 2×2 where $a_{yz} = y - 2Z$, B is a matrix of order 2×2 where $b_{yz} = z - y$, then $A + B = \cdots\cdots\cdots$

(a) $\begin{pmatrix} 1 & 1 \\ 2 & 2 \end{pmatrix}$　　(b) $\begin{pmatrix} -1 & -1 \\ -2 & -2 \end{pmatrix}$　　(c) $\begin{pmatrix} -1 & -2 \\ -1 & -2 \end{pmatrix}$　　(d) $\begin{pmatrix} 1 & 2 \\ 1 & 2 \end{pmatrix}$

(8) If $\begin{pmatrix} a & b & c \\ d & e & f \\ x & y & z \end{pmatrix}$ is a skew symmetric , then $\frac{a+b+c+f}{d+x+y+z} = \cdots\cdots\cdots$

(a) 1　　(b) zero　　(c) -1　　(d) e

(9) If A is a symmetric , which of the following could be a rule to find the elements of the matrix A ?

(a) $a_{yz} = 2y - z$　　(b) $a_{yz} = y + z$　　(c) $a_{yz} = y^z$　　(d) $a_{yz} = 3y + 2z$

(10) If $\begin{pmatrix} 4 & 2x-1 \\ 1 & 3 \end{pmatrix} = \begin{pmatrix} 4 & 1 \\ 5 & 3 \end{pmatrix}^t$, then $x = \cdots\cdots\cdots$

(a) 1　　(b) 2　　(c) 3　　(d) 5

(11) If $X + \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix}^t = O$, then $X = \cdots\cdots\cdots$

(a) $\begin{pmatrix} -2 & 3 \\ -1 & 0 \end{pmatrix}$　　(b) $\begin{pmatrix} 2 & 3 \\ 1 & 0 \end{pmatrix}$　　(c) $\begin{pmatrix} -2 & -1 \\ 3 & 0 \end{pmatrix}$　　(d) I

(12) $(X^t)^t - X = \cdots\cdots\cdots$

(a) O　　(b) X　　(c) 2 X　　(d) zero

Total mark 12

Quiz 3 till lesson 3 – unit 1

Choose the correct answer from those given :

(1) If A , B are two matrices where AB = $\begin{pmatrix} 2 & -1 \\ 3 & 5 \end{pmatrix}$, then $B^t A^t$ = ...

(a) $\begin{pmatrix} 2 & 3 \\ -1 & 5 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & -1 \\ 3 & 5 \end{pmatrix}$ (c) $\begin{pmatrix} 5 & -1 \\ 3 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 5 & 3 \\ -1 & 2 \end{pmatrix}$

(2) If A is a matrix of order 2 × 3 , B^t is a matrix of order 1 × 3 , then the matrix AB is of order ....

(a) 3 × 1 (b) 2 × 1 (c) 1 × 2 (d) 3 × 3

(3) If $\begin{pmatrix} 4 & 1 \\ 3 & 1 \end{pmatrix}\begin{pmatrix} 1 & -1 \\ -3 & X \end{pmatrix}$ = I , then X = ...

(a) 3 (b) – 3 (c) zero (d) 4

(4) If $\begin{pmatrix} 2 & X \\ 0 & -1 \end{pmatrix} = \begin{pmatrix} y & -4 \\ 0 & -1 \end{pmatrix}$, then X + y = ...

(a) 2 (b) – 2 (c) 6 (d) – 6

(5) If A = $\begin{pmatrix} 4 & 0 \\ 3 & -4 \end{pmatrix}$, then A^{60} = ...

(a) $2^{30}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $2^{60}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(c) $2^{90}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (d) $2^{120}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

(6) If $\begin{pmatrix} 3^X & 2X + y \\ X + y & 3^y \end{pmatrix} = \begin{pmatrix} 25 & b \\ a & 5 \end{pmatrix}$, then $\frac{b}{a}$ = ...

(a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) 15 (d) 5

(7) If A is a matrix of order 2 × 2 and A + A^t = I , then the sum of the elements of A equals ....

(a) 4 (b) 2 (c) 1 (d) zero

(8) $\begin{pmatrix} 2 & 0 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 0 & 1 \\ 0 & 2 \end{pmatrix} =$ ....

(a) $\begin{pmatrix} 0 & 0 \\ 1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 0 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 2 \\ 0 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 2 \\ 0 & 0 \end{pmatrix}$

(9) If A , B are symmetric matrices , then the matrix $(A\ B\ A)$ is ....

(a) symmetric. (b) skew symmetric.

(c) diagonal. (d) zero matrix.

(10) If O is a zero matrix of order 2×2 , then the number of its elements is = ...

(a) zero (b) $\varnothing$ (c) 2 (d) 4

(11) If $A = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 3 \end{pmatrix}$, then BA = ...

(a) (-4) (b) (4) (c) $\begin{pmatrix} 2 & 3 \\ -4 & -6 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & -4 \\ 3 & -6 \end{pmatrix}$

(12) If $A = \begin{pmatrix} 2 & -1 \\ 3 & 1 \end{pmatrix}$, then $A^2 =$ ....

(a) $\begin{pmatrix} 4 & 1 \\ 9 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 4 & 9 \\ 1 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & -3 \\ 9 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & -3 \\ 9 & -2 \end{pmatrix}$

Total mark

Quiz 4 till lesson 4 – unit 1

12

Choose the correct answer from those given :

(1) The value of the determinant $\begin{vmatrix} 2 & 0 & 0 \\ -1 & 3 & 0 \\ 4 & 2 & 5 \end{vmatrix}$ equals ....

(a) 10 (b) 30 (c) 15 (d) 5

(2) If $A = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 5 \end{pmatrix}$, then $(BA)^t =$ ....

(a) $\begin{pmatrix} 4 & -1 \end{pmatrix}$ (b) $\begin{pmatrix} 14 \\ -14 \end{pmatrix}$ (c) $\begin{pmatrix} 4 \\ -10 \end{pmatrix}$ (d) (-6)

(3) If A (3 , 5) , B (2 , 0) and C (– 3 , 3)

, then the area of Δ ABC equals .... square units.

(a) 28 (b) 14 (c) 7 (d) 2

(4) The solution set of the equation : $\begin{vmatrix} x^2 & -2 \\ 2 & 1 \end{vmatrix}$ = zero in $\mathbb{C}$ is ....

(a) $\varnothing$ (b) $\{-2 , 2\}$ (c) $\{-2i , 2i\}$ (d) $\{-i , i\}$

(5) If $\begin{vmatrix} x & y \\ z & \ell \end{vmatrix} = 4$, then $\begin{vmatrix} x-y & 4y \\ z-\ell & 4\ell \end{vmatrix} =$ ....

(a) 1 (b) 10 (c) 12 (d) 16

(6) If $A = \begin{pmatrix} x & f \\ e & y \end{pmatrix}$ is a skew symmetrix matrix , then $2f + 3e =$ ....

(a) f (b) $x + y$ (c) $e + y$ (d) x

(7) If $A = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$ and $A^{25} = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, then $a + b + c + d =$ ....

(a) 25 (b) 26 (c) 27 (d) 28

(8) If $\begin{vmatrix} 3+\sin\theta & 1-\cos\theta \\ 4 & \sin\theta \end{vmatrix}$ = zero , then the value of $\theta =$ ....

(a) π (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{4}$

(9) If $A^t B^t = \begin{pmatrix} 3 & -6 \\ 2 & 5 \end{pmatrix}$, then $B \times A =$ ....

(a) $\begin{pmatrix} -1 & -6 \\ 3 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 5 \\ 3 & 4 \end{pmatrix}$ (c) $\begin{pmatrix} 3 & 2 \\ -6 & 5 \end{pmatrix}$ (d) $\begin{pmatrix} 3 & -6 \\ 2 & 5 \end{pmatrix}$

(10) If $A = \begin{pmatrix} 2 & 3 \end{pmatrix}$, $B = \begin{pmatrix} x & 0 \\ 1 & y \end{pmatrix}$, $A \times B = \begin{pmatrix} 9 & 6 \end{pmatrix}$, then $x + y =$ ....

(a) 3 (b) 5 (c) 7 (d) 9

(11) If $\begin{vmatrix} x & -1 \\ 2 & x \end{vmatrix} + \begin{vmatrix} 1 & 3 \\ 2 & x \end{vmatrix} = 2$, then $x =$ ....

(a) 3 or – 2 (b) – 3 or 2 (c) 3 or 2 (d) – 3 or – 2

(12) If $\begin{vmatrix} 3 & 1 \\ 1 & 0 \end{vmatrix} \times \begin{pmatrix} x & 2y \\ 0 & z \end{pmatrix} + I = \begin{pmatrix} 3 & 0 \\ 1 & 2 \end{pmatrix}^t$, then $x \times y \times z =$ ....

(a) 1 (b) – 1 (c) 2 (d) 4

Total mark 12

Quiz 5 till lesson 5 – unit 1

Choose the correct answer from those given :

(**1**) If $A = \begin{pmatrix} 1 & -2 \\ 3 & 2 \end{pmatrix}$, then $A^2 =$ ....

(a) $\begin{pmatrix} 1 & 4 \\ 9 & 4 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & -4 \\ 6 & 4 \end{pmatrix}$ (c) $\begin{pmatrix} 5 & -6 \\ 9 & -2 \end{pmatrix}$ (d) $\begin{pmatrix} -5 & -6 \\ 9 & -2 \end{pmatrix}$

(**2**) If $A = \begin{pmatrix} 2 & 1 \\ 5 & 3 \end{pmatrix}$, then $A^{-1} =$ ....

(a) $\begin{pmatrix} 3 & 5 \\ 1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} -2 & 1 \\ 5 & -3 \end{pmatrix}$ (c) $\begin{pmatrix} -2 & 5 \\ 1 & -3 \end{pmatrix}$ (d) $\begin{pmatrix} 3 & -1 \\ -5 & 2 \end{pmatrix}$

(**3**) The values of X which make the matrix $\begin{pmatrix} X & 4 \\ 2 & X-2 \end{pmatrix}$ has no multiplicative inverse are ....

(a) 4 , – 2 (b) – 4 , 2 (c) – 4 , – 2 (d) 4 , 2

(**4**) The area of the triangle whose vertices are A (4 , 5) , B (6 , – 1) and C (1 , 6) equals .... square units.

(a) 16 (b) 8 (c) 32 (d) 24

(**5**) If $A = \begin{pmatrix} -1 & 4 \\ -2 & 3 \end{pmatrix}$ and $A = A^{-1} \times B$, then B = ...

(a) $\begin{pmatrix} -7 & 4 \\ -4 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} -7 & 8 \\ -4 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 7 & -8 \\ 4 & -1 \end{pmatrix}$ (d) $\begin{pmatrix} 7 & -8 \\ 4 & 4 \end{pmatrix}$

(**6**) If $\begin{vmatrix} 2k-1 & 2 \\ 3 & k+1 \end{vmatrix} = 2k^2 + 1$, then the value of k = ...

(a) 2 (b) 4 (c) 6 (d) 8

(**7**) If A is a square matrix of order 2 × 2 and $|2A| = 8$, then $|3A| =$ ....

(a) 9 (b) 12 (c) 18 (d) 24

(8) If A is a square matrix , then the matrix $(A + A^t)$ is ....

(a) symmetric. (b) skew symmetric.

(c) zero (d) diagonal.

(9) If $A = \begin{pmatrix} -1 & -2 \\ 1 & k \end{pmatrix}$ and $A^3 = -A$, then k = ... where $k \in \mathbb{Z}$

(a) 1 (b) – 1 (c) zero (d) 3

(10) If $\begin{pmatrix} 2 & 1 \\ 3 & -1 \end{pmatrix}\begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 9 \\ 6 \end{pmatrix}$, then a + b = ...

(a) 3 (b) 4 (c) 5 (d) 6

(11) If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 6$ and $\begin{vmatrix} a\,k & k\,c \\ b & d \end{vmatrix} = -24$, then k = ...

(a) 4 (b) 3 (c) – 3 (d) – 4

(12) If $\begin{vmatrix} a & 5 \\ 5 & b \end{vmatrix} = 0$, $\begin{vmatrix} b & 2 \\ 2 & c \end{vmatrix} = 0$, $\begin{vmatrix} a & 1 \\ 1 & c \end{vmatrix} = 0$, then $\begin{vmatrix} a & 0 & 0 \\ -1 & b & 0 \\ 2 & 5 & c \end{vmatrix} =$ ....

(a) ± 10 (b) ± 50 (c) ± 100 (d) ± 20

Total mark

12

Quiz 6 till lesson 1 – unit 2

Choose the correct answer from those given :

(1) The point that belongs to the S.S. of the inequality : $y < 2x + 3$ is ....

(a) (– 1 , 1) (b) (– 1 , – 1) (c) (0 , 3) (d) (– 3 , – 3)

(2) If $A = \begin{pmatrix} 3 & 2 \end{pmatrix}$, $B = \begin{pmatrix} -1 \\ 5 \end{pmatrix}$, then the only possible operation of the following is ....

(a) A + B (b) $A^t + B^t$ (c) A B (d) $A\,B^t$

(3) If $\begin{vmatrix} x & 1 & 3 \\ 0 & 2x & 5 \\ 0 & 0 & x \end{vmatrix} = 8x$, then the S.S. is ....

(a) $\{2 , -2\}$ (b) $\{0 , -2 , 2\}$ (c) $\left\{\frac{1}{2} , \frac{-1}{2}\right\}$ (d) $\left\{0 , \frac{-1}{2} , \frac{1}{2}\right\}$

(4) If $A = \begin{pmatrix} 2 & 6 \\ 1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} 6 & -9 \\ \frac{-3}{2} & 3 \end{pmatrix}$, then AB = ...

(a) I (b) 2 I (c) $\frac{1}{2}$ I (d) 3 I

(5) When solving the two equations : $a\,X + b\,y = 4$, $c\,X + d\,y = 2$, the multiplicative inverse of the matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ found to be equals $\begin{pmatrix} -1 & 3 \\ 1 & -2 \end{pmatrix}$, then $X + y =$ ....

(a) 2 (b) 3 (c) – 4 (d) 2

(6) If $A = \begin{pmatrix} X & 2 \\ y & -2 \end{pmatrix}$, $A \times A^{-1} = A^2$, then $X \times y =$ ....

(a) – 3 (b) – 2 (c) 2 (d) 3

(7) If L , M are the roots of the equation : $X^2 - 4X - 10 = 0$, then the value of the determinant $\begin{vmatrix} 2L & -1 \\ 3 & M \end{vmatrix}$ equals ....

(a) – 17 (b) – 12 (c) – 8 (d) – 6

(8) If $X + \begin{pmatrix} 2 & 5 \\ 0 & 7 \end{pmatrix} = 0$, then X = ...

(a) $\begin{pmatrix} 2 & -5 \\ 0 & -7 \end{pmatrix}$ (b) $\begin{pmatrix} -2 & -5 \\ 0 & -7 \end{pmatrix}$ (c) $\begin{pmatrix} -2 & 5 \\ 0 & 7 \end{pmatrix}$ (d) $\begin{pmatrix} -2 & 0 \\ 5 & 7 \end{pmatrix}$

(9) The point which belongs to the solution set of the inequalities $X \geq 2$, $y < 2$, $X + y > 3$ is ....

(a) (3 , 1) (b) (3 , 2) (c) (2 , 2) (d) (2 , 1)

(10) The area of the triangle with the vertices (1 , 6) , (0 , 10) , (0 , 0) equals .... square unit.

(a) 5 (b) 10 (c) 15 (d) 20

(11) If $\begin{vmatrix} \sin\theta & 0 & 0 \\ 2 & \csc\theta & 0 \\ 1 & 3 & X \end{vmatrix} + \begin{vmatrix} \sin\theta & \cos\theta \\ -\cos\theta & \sin\theta \end{vmatrix} = 0$, then $X =$ ....

(a) 1 (b) – 1 (c) zero (d) 2 sin θ

(12) The solution set of the inequality : $X + 5 \leq 3X + 1 < 2X + 2$ in $\mathbb{R}$ is ....

(a) $\mathbb{R} - [1 , 2[$ (b) $]1 , 2]$ (c) $\varnothing$ (d) $\{1 , 2\}$

Total mark 12

Quiz 7 till lesson 2 – unit 2

Choose the correct answer from those given :

(1) The point that belongs to the S.S. of the inequalities : $x > 2$, $y > 1$, $x + y \geq 3$ is ....

(a) (3 , 1) (b) (1 , 2) (c) (3 , 2) (d) (1 , 3)

(2) If $\begin{vmatrix} 2x & 2 \\ 4 & 3 \end{vmatrix} = 10$, then $x =$ ....

(a) 2 (b) 3 (c) 4 (d) 5

(3) If A is a matrix of order 1×3 , B^t is a matrix of order 1×3 , then we can perform the operation ....

(a) $A + B$ (b) $B^t + A^t$ (c) $A B^t$ (d) AB

(4) If the matrix $\begin{pmatrix} x & 1 \\ 6 & 3 \end{pmatrix}$ has no multiplicative inverse , then $x =$ ....

(a) – 2 (b) zero (c) 2 (d) 3

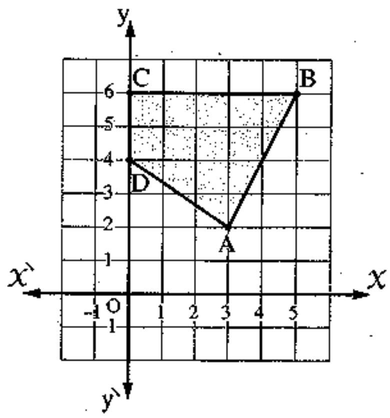
(5) If the area of the triangle with the vertices (k , 0) , (4 , 0) , (0 , 2) is 4 square units , then k = ...

(a) zero or – 8 (b) – 4 or 4 (c) zero or 8 (d) 8 or – 8

(6) If A is a square matrix and $A^2 = I$, then $A^{-1} =$ ....

(a) 0 (b) A (c) 2 A (d) A + I

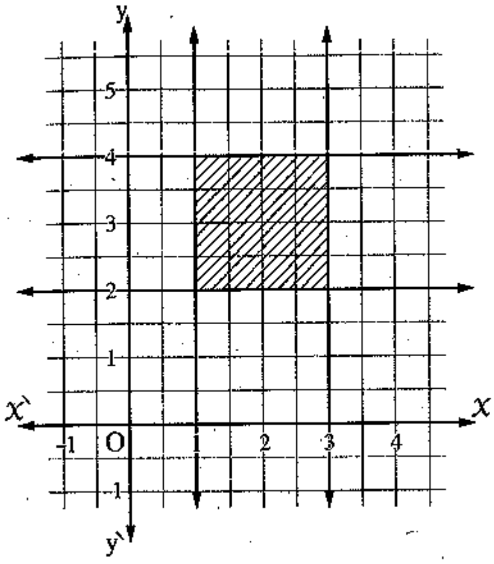
(7) The given figure represents the region of solution of system of inequalities , then the minimum value of the objective function $P = 3x + 2y$ is ....



(a) 6 (b) 8

(c) 12 (d) 13

(8) The shaded region in the given figure represents the solution set of the inequalities ....



(a) $x > 1$, $y > 2$

(b) $1 < x < 3$, $2 < y < 4$

(c) $1 \leq x \leq 3$, $2 \leq y \leq 4$

(d) $x + y \geq 3$, $x - y \leq 7$

(9) If the matrix $A = \begin{pmatrix} 0 & x - 1 \\ x^2 - 1 & 0 \end{pmatrix}$ is skew symmetric , then $x \in$ ....

(a) $\{-1 , 2\}$ (b) $\{0 , -1\}$ (c) $\{1 , -2\}$ (d) $\{0 , 1\}$

(10) If $\begin{vmatrix} x & 12 \\ 3 & x \end{vmatrix} = \begin{vmatrix} 2 & 1 \\ 10 & 5 \end{vmatrix}$, then $x =$ ....

(a) 2 (b) 5 (c) 6 (d) ± 6

(11) If twice the number x is not less than 3 times the number y , then ....

(a) $2x < 3y$ (b) $2x \leq 3y$ (c) $2x > 3y$ (d) $2x \geq 3y$

(12) The point that belongs to the region of solution of the inequalities : $x \geq 1$, $x + y \geq 5$, $y \geq 2$ and makes the objective function $p = 2x + y$ is as small as possible is ....

(a) (0 , 5) (b) (4 , 3) (c) (1 , 4) (d) (3 , 2)

Second : Accumulative quizzes on trigonometry

Total mark 12

Quiz 1 on lesson 1 – unit 3

Choose the correct answer from those given :

(1) $(\sin\theta + \cos\theta)^2 - 2\sin\theta\cos\theta =$ .... (in its simplest form)

(a) $2\sin\theta\cos\theta$ (b) 1 (c) 2 (d) $\sin^2\theta - \cos^2\theta$

(2) $\frac{\tan\theta\cot\theta}{\sec\theta} =$ ....

(a) $\sin\theta$ (b) $\cos\theta$ (c) $\sec\theta$ (d) $\csc\theta$

(3) $\frac{\sin\left(\frac{\pi}{2} - \theta\right)}{\cos(2\pi - \theta)} =$ ....

(a) $\tan\theta$ (b) $\cot\theta$ (c) 1 (d) -1

(4) $\sin(90^\circ - \theta)\csc(90^\circ - \theta) =$ .... (in its simplest form)

(a) 1 (b) $\sin^2\theta$ (c) $\cos^2\theta$ (d) $\sin\theta\cos\theta$

(5) If $X + y = 30^\circ$, then $\tan(X + 2y)\tan(2X + y) =$ ....

(a) 1 (b) zero (c) -1 (d) $2\sqrt{3}$

(6) If $\sin\theta - \cos\theta = \frac{4}{5}$ where $\theta \in \left]0 , \frac{\pi}{2}\right[$, then $\sin\theta\cos\theta =$ ....

(a) $\frac{1}{5}$ (b) $\frac{9}{25}$ (c) $\frac{41}{50}$ (d) $\frac{9}{50}$

(7) If $\sin\theta + \csc\theta = 5$, then $\sin^2\theta + \csc^2\theta =$ ....

(a) 1 (b) 5 (c) 23 (d) 25

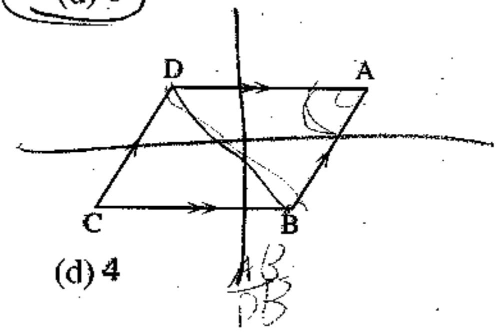
(8) If $\tan\theta = 3$, then $\sec^2\theta =$ ....

(a) 9 (b) 10 (c) -10 (d) 0.9

(9) $3\tan\theta\cot\theta + 2\sin\theta\csc\theta + \cos\theta\sec\theta =$ ....

(a) 1 (b) 3 (c) 5 (d) 6

(10) In the given figure :



ABCD is a parallelogram , then

$\cos A + \cos B + \cos C + \cos D =$ ....

(a) -1 (b) zero (c) 1 (d) 4

$9\sin^2\theta + 24\sin\theta\cos\theta + 16\cos^2\theta = 25$

$9\cos^2\theta - 24\sin\theta\cos\theta + 16\sin^2\theta = x^2$

$25\sin^2\theta + 25\cos^2\theta = 25 + x^2$

(11) If $3 \sin \theta + 4 \cos \theta = 5$, then $3 \cos \theta - 4 \sin \theta =$ ....

$25(\sin^2\theta + \cos^2\theta) = 25 + x^2$

(a) 5 (b) 4 (c) 3 (d) zero

(12) The numerical value of the expression : $5 \cos \theta \times 3 \sec \theta =$ ....

(a) 1 (b) 21 (c) 8 (d) 15

H.W

Total mark **12**

Quiz 2 till lesson 2 – unit 3

Choose the correct answer from those given :

(1) The general solution of the equation :

$\cos \theta = 1$ is .... where $n \in \mathbb{Z}$

(a) $n\pi$ (b) $2n\pi$ (c) $\frac{\pi}{2} + n\pi$ (d) $\frac{\pi}{2} + 2n\pi$

(2) $\frac{1-\cos^2\theta}{1-\sin^2\theta} + 1 =$ ....

(a) 2 (b) $2\cos^2\theta$ (c) $\sec^2\theta$ (d) $\csc^2\theta$

(3) $\sin\theta \cos\theta \cot\theta + \sin^2\theta =$ .... (in its simplest form)

(a) -1 (b) zero (c) 1 (d) 2

(4) If $\cos\theta = \frac{1}{2}$, $\theta \in \left]\frac{3\pi}{2}, 2\pi\right[$, then $\theta =$ ....

(a) $\frac{5}{3}\pi$ (b) $\frac{1}{3}\pi$ (c) $\frac{2}{3}\pi$ (d) $\frac{11}{6}\pi$

(5) If $x, y \in [0, 2\pi[$, $\theta = x + y$, then the set of values of θ satisfy $\sin x \sin y = 1$ equals ....

(a) $\{\pi, 2\pi\}$ (b) $\{\pi, 3\pi\}$ (c) $\left\{\frac{\pi}{2}, \frac{3\pi}{2}\right\}$ (d) $\left\{\frac{\pi}{2}, \frac{\pi}{3}\right\}$

(6) If $x \in [0, \pi[$, then the solution set of the equation $\cos x = \frac{1}{2}$ is the same solution set of the equation ....

(a) $\tan x = 2\sin x$

(b) $2\cos^2 x = \cos x$

(c) $2\cos^2 x + 3\cos x = 2$

(d) $\cos \frac{1}{2} x = 1$

(7) $\sin^2\theta + \cos^2\theta + \tan^2\theta =$ ....

(a) 1 (b) $\sec^2\theta$ (c) $\cot^2\theta$ (d) $2\tan^2\theta$

(8) If $k = 4 \sin 3X - 5$, then $k \in$ ....

(a) $[-4 , 4]$ (b) $[8 , 11]$ (c) $[5 , 7]$ (d) $[-9 , -1]$

(9) If $\tan \theta = 1$, then one of the values of θ is ....

(a) $30°$ (b) $60°$ (c) $135°$ (d) $225°$

(10) If $3^{\sin \theta} = 1$, where $\theta \in]0 , 2\pi[$, then $\theta =$ ....

(a) $45°$ (b) $90°$ (c) $180°$ (d) $270°$

(11) If $\tan \theta = 4$, then $\frac{\sin^2 \theta + \cos^2 \theta}{\sin^2 \theta - \cos^2 \theta} =$ ....

(a) $\frac{17}{15}$ (b) 1 (c) $\frac{-7}{15}$ (d) -1

(12) The solution set of the equation : $\sin X + \cos X = 0$ where $180° < X < 360°$

equals ....

(a) $\{210°\}$ (b) $\{225°\}$ (c) $\{240°\}$ (d) $\{315°\}$

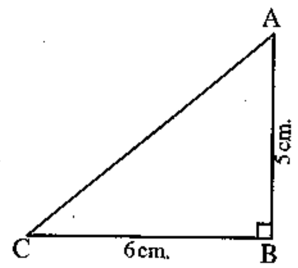
Total mark

12

Quiz 3 till lesson 3 – unit 3

Choose the correct answer from those given :

(1) In the opposite figure :

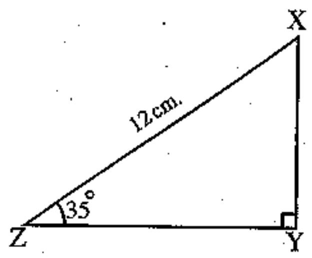


$m(\angle C) =$ ....$°$

(a) $56° 27'$ (b) $39° 48'$

(c) $33° 33'$ (d) $50° 12'$

(2) In the opposite figure :



$XY \approx$ .... cm. (to the nearest cm.)

(a) 9.8 (b) 6.9

(c) 8.4 (d) 14.6

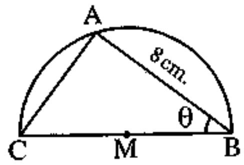
(3) If $\theta \in [0 , \pi]$, $\cos \theta + 1 = 0$, then $\theta =$ ....$°$

(a) 0 (b) 90 (c) 180 (d) 270

(4) If $\cot\theta = \frac{1}{2}$, then $\csc^2\theta =$ ....

(a) $\frac{5}{4}$ (b) $\frac{3}{2}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

(5) **In the opposite figure :**



$\overline{BC}$ is a diameter in circle M , AB = 8 cm.

, m (∠ ABC) = θ° , then the area of Δ ABC = ... cm^2

(a) $8\cos\theta$ (b) $8\cot\theta$ (c) $32\tan\theta$ (d) $32\sin\theta$

(6) ABC is a right angled triangle at B , AB = 3 cm. , its perimeter = 12 cm.

, then m (∠ C) ≃ ....

(a) 37° (b) 14° (c) 18° (d) 53°

(7) The general solution of the equation $\cos\theta = -1$ is .... where $n \in \mathbb{Z}$

(a) $\frac{\pi}{2} + \pi n$ (b) $\frac{\pi}{3} + \pi n$ (c) $\pi + 2\pi n$ (d) $\frac{\pi}{6} + 2\pi n$

(8) If $\csc\theta - \frac{1}{\tan\theta} = \frac{1}{5}$, then $\cot\theta + \frac{1}{\sin\theta} =$ ....

(a) $\frac{1}{10}$ (b) 5 (c) $\frac{1}{25}$ (d) 1

(9) If $2\sin X - 1 = 0$, where X is the greatest positive angle , $X \in [0 , 360°]$

, then $X =$ ....

(a) 150° (b) 315° (c) 330° (d) 30°

(10) $\sin^2\left(\frac{\pi}{3} - \theta\right) + \cos^2\left(\theta - \frac{\pi}{3}\right) - 1 =$ ....

(a) zero (b) 1 (c) $\sin^2\theta$ (d) $\cos^2\theta$

(11) If $\sin\theta = \frac{a}{b}$, $\theta \in \left]0 , \frac{\pi}{2}\right[$, then $\sqrt{1 + \tan^2\theta} =$ ....

(a) $\frac{a}{\sqrt{a^2 - b^2}}$ (b) $\frac{a}{\sqrt{a - b}}$ (c) $\frac{a}{\sqrt{1 + a^2}}$ (d) $\frac{b}{\sqrt{b^2 - a^2}}$

(12) The general solution of the equation :

$3\cot\left(\frac{\pi}{2} - \theta\right) = \sqrt{3}$ is .... (where $n \in \mathbb{Z}$)

(a) $\frac{\pi}{6} + 2\pi n$ (b) $\frac{\pi}{6} + \pi n$ (c) $\frac{7\pi}{6} + 2\pi n$ (d) $\frac{\pi}{3} + \pi n$

Total mark

Quiz 4 till lesson 4 – unit 3

12

Choose the correct answer from those given :

(1) If $0° \le \theta < 180°$, $\sqrt{3} \tan \theta - 1 = 0$, then $\theta =$ ....

(a) $30°$ (b) $60°$ (c) $120°$ (d) $150°$

(2) It is possible to solve the right-angled triangle except the case in which the givens are ....

(a) lengths of two sides of the triangle.

(b) lengths of two sides and measure of the included angle between them.

(c) measures of two angles of the triangle.

(d) length of one side and length of the hypotenuse.

(3) The general solution of the equation : $\tan \theta = \sqrt{3}$ is ....

(a) $\frac{\pi}{3} + n\pi$ (b) $\frac{\pi}{3} + 2n\pi$ (c) $\frac{4\pi}{3} + 2n\pi$ (d) $\frac{\pi}{6} + n\pi$

(4) $\sin (90° - \theta) \csc (180° - \theta) =$ .... (in the simplest form)

(a) -1 (b) 1 (c) $\tan \theta$ (d) $\cot \theta$

(5) If $\sin A + \sin B = 2$, then ....

(a) $\cos A + \cos B = 0$ (b) $\cos A - \cos B = 1$

(c) $\sin A - \sin B = 1$ (d) $\sin (A + B) = -1$

(6) If Δ ABC is a right angled triangle and the lengths of its sides are : a , $a + 1$, $a - 1$ where $a > 1$, then the measure of its greatest angle is approximately ....

(a) $36° 52'$ (b) $48° 18'$ (c) $53° 8'$ (d) $62° 42'$

(7) From a point on the ground surface 40 m. away from a tower base , the measure of elevation angle of the top of the tower is $72°$, then the height of the tower to the nearest metre is .... m.

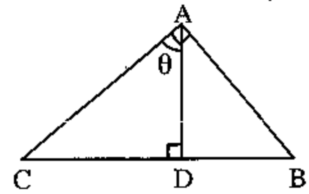
(a) 120 (b) 121 (c) 122 (d) 123

(8) $(\sin^2 40° + \cos^2 40°)^5 =$ ....

(a) 1 (b) -1 (c) 5 (d) -5

(9) In the opposite figure :

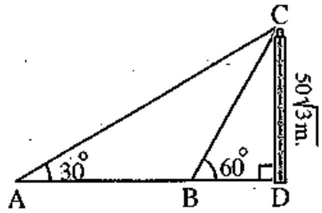
ABC is a right angled triangle at A , $\overline{AD} \perp \overline{BC}$, AD = $\sin^2 \theta$, then BC = ...



(a) $\sin \theta$ (b) $\tan \theta$ (c) $\cos \theta$ (d) $\tan^2 \theta$

(10) In the opposite figure :

The angle of elevation of the top of a tower of length $50\sqrt{3}$ m. is measured from two points A and B on the same horizontal line as the tower base , their measures are 30° , 60° respectively , then the distance between the two points equals .... m.



(a) $100\sqrt{3}$ (b) $50\sqrt{3}$ (c) 100 (d) 50

(11) The expression : $\frac{1 - \cos^2 \theta}{\sin^2 \theta - 1}$ in the simplest form is ....

(a) $-\tan^2 \theta$ (b) $-\cot^2 \theta$ (c) $\tan^2 \theta$ (d) $\cot^2 \theta$

(12) If $\csc \theta - \cot \theta = \frac{1}{5}$, then $\csc \theta + \cot \theta =$ ....

(a) $\frac{-1}{10}$ (b) 5 (c) $\frac{1}{25}$ (d) 1

Total mark

Quiz 5 till lesson 5 – unit 3

12

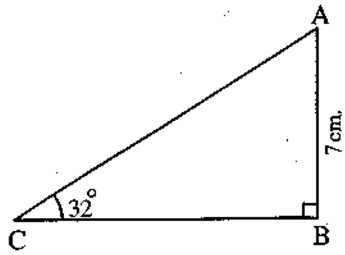
Choose the correct answer from those given :

(1) The perimeter of the circular sector whose area is 18 cm^2 and length of its arc is 6 cm. equals .... cm.

(a) 18 (b) 12 (c) 9 (d) 15

(2) In the opposite figure :

AC ≈ .... cm.



(a) 13.2 (b) 8.3

(c) 3.7 (d) 5.9

(3) The general solution of the equation : $\cos(90° - \theta) = 1$ is .... (where $n \in \mathbb{Z}$)

(a) πn (b) $\frac{\pi}{2} + 2\pi n$ (c) $2\pi n$ (d) $\pi + 2\pi n$

(4) $\sin^2\theta + \cos^2\theta + \tan^2\theta - \sec^2\theta =$ .... (in its simplest form)

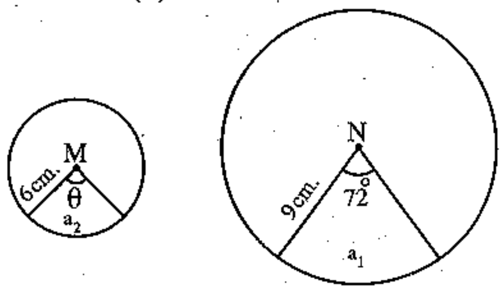
(a) 1 (b) -1 (c) zero (d) 2

(5) From a point on the ground surface 35 m. away from the base of a house , a man measures the elevation angle of the top of the house , its equal 45° , then the height of the house is = ... m.

(a) 45 (b) 35 (c) 25 (d) 55

(6) **In the opposite figure :**

M and N are two distant circles a_1 and a_2 are the areas of the two sectors and $\frac{a_1}{a_2} = \frac{9}{5}$, then $\theta =$ ....



(a) 72° (b) 80° (c) 90° (d) 100°

(7) The area of the circular sector , the measure of its central angle is 120° , in a circle of area 24 cm^2 equals .... cm^2

(a) 24 (b) 16 (c) 8 (d) 36

(8) The perimeter of a circular sector is 12 cm. and its area 9 cm^2 , then the measure of its central angle is ....

(a) $\frac{1}{2}^{rad}$ (b) 1^{rad} (c) $\frac{3}{2}^{rad}$ (d) 2^{rad}

(9) If $25\sin\theta\cos\theta = 12$, then $\cos\theta - \sin\theta =$ ....

(a) $\frac{1}{5}$ (b) $\pm\frac{1}{5}$ (c) $\pm\frac{\sqrt{3}}{5}$ (d) $\frac{\sqrt{3}}{5}$

(10) $\frac{\sin\theta}{\csc\theta} + \frac{\cos\theta}{\sec\theta} =$ ....

(a) 1 (b) $\sin\theta + \cos\theta$ (c) $\csc\theta \sec\theta$ (d) $\tan\theta$

(11) If $\theta \in]0, 2\pi[$, $2\cos\theta + \sqrt{3} = 0$, then one of the values of θ is ....

(a) 30° (b) 60° (c) 210° (d) 240°

(12) If $0° \leq X \leq 360°$, then the number of solutions of the equation :

$3\sin X = \tan X$ is ....

(a) 2 (b) 3 (c) 4 (d) 5

Total mark 12

Quiz 6 till lesson 6 – unit 3

Choose the correct answer from those given :

(1) $\sin^2\theta + \cos^2\theta + \cot^2\theta =$ ....

(a) $\sec^2\theta$ (b) $\csc^2\theta$ (c) $\tan^2\theta$ (d) $\cot^2\theta$

(2) The area of the circular sector which the radius length of its circle is 4 cm. and the length of its arc is 6 cm. equals .... cm^2.

(a) 24 (b) 12 (c) 10 (d) 8

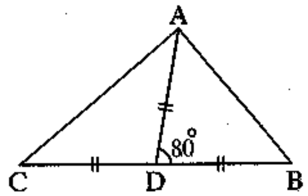
(3) If $\sin\theta + \cos\theta = 0$, where $0 < \theta < \pi$, then $\theta =$ ....

(a) 45° (b) 135° (c) 225° (d) 315°

(4) The general solution of the equation : $\cos\theta = 1$ is .... where $n \in \mathbb{Z}$

(a) $n\pi$ (b) $2n\pi$ (c) $\frac{\pi}{2} + n\pi$ (d) $\frac{\pi}{2} + 2n\pi$

(5) **In the opposite figure :**



$D \in \overline{BC}$, AD = DB = DC = 5 cm.

, m ($\angle$ ADB) = 80°

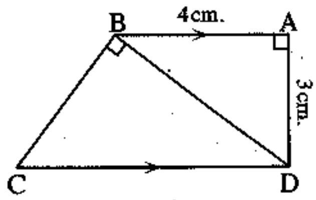
, AC = ... cm.

(a) 10 sin 40° (b) 10 sin 50° (c) 5 sin 80° (d) 5 sin 40°

(6) If $\sec\theta - \tan\theta = 2$, then $\sec\theta =$ ....

(a) $\frac{1}{2}$ (b) 1 (c) $\frac{4}{5}$ (d) $\frac{5}{4}$

(7) **In the opposite figure :**



The length of $\overline{BC}$ = ... cm.

(a) 5 (b) $6\frac{2}{3}$

(c) $3\frac{3}{4}$ (d) 3

(8) The number of solutions of the equation :

$\cos^2\theta - 4\cos\theta + 4 = 0$ equals ....

(a) zero (b) 1 (c) 2 (d) 3

(9) The area of the circular segment whose central measure is 30° and the radius length of its circle is $2\sqrt{3}$ cm. equals .... cm^2.

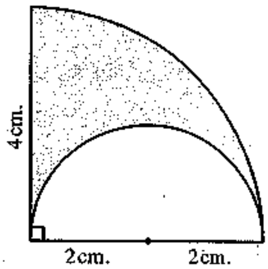
(a) $\frac{\pi}{3} + 2$ (b) $\pi - 3$ (c) $\pi + 3$ (d) $\frac{\pi}{3} - 2$

(10) $\frac{3}{1 + \tan^2 \theta} + 3 \sin^2 \theta =$ ....

(a) 3 (b) 1 (c) $3 \sin^2 \theta$ (d) $\sec^2 \theta$

(11) **In the opposite figure :**

The area of the shaded region equals .... cm^2.



(a) 8π (b) 16π

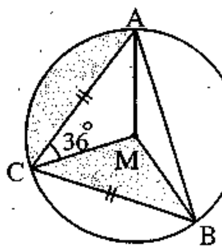
(c) 4π (d) 2π

(12) **In the opposite figure :**

The radius of circle M is 10 cm.

, BC = AC , m (∠ ACM) = 36°

, then the area of the shaded region = ... cm^2.



(a) 20π (b) 30π

(c) 40π (d) 50π

Quiz 7 till lesson 5 – unit 3

Total mark 12

Choose the correct answer from those given :

(1) If X is the side length of the equilateral triangle whose area is $9\sqrt{3}$ cm^2, then $X =$ .... cm.

(a) 6 (b) $6\sqrt{3}$ (c) $3\sqrt{3}$ (d) 3

(2) The radius length of the circle of the circular sector whose area is 45 cm^2 and the length of its arc is 10 cm. equals .... cm.

(a) 4.5 (b) 3 (c) 9 (d) 6

(3) The area of the regular pentagon whose side length is 12 cm. equals .... cm^2 (to the nearest cm^2)

(a) 131 (b) 991 (c) 50 (d) 248

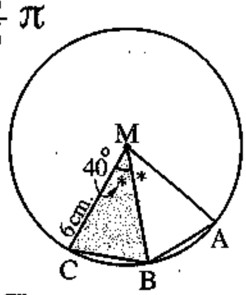
(4) The area of the convex quadrilateral whose diagonal lengths are 12 cm. , 8 cm. and the measure of the included angle between them is 30° equals .... cm^2.

(a) 48 (b) 108 (c) 24 (d) 96

(5) If $\theta \in [0, \pi[$, then the value of θ which makes the roots of the equation : $x^2 + 2x + 2\cos\theta = 0$ are equal is ....

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{2}{3}\pi$ (d) $\frac{5}{6}\pi$

(6) In the opposite figure :



M is a circle , MC = 6 cm.

, m ($\angle$ AMB) = m ($\angle$ CMB) = 40°

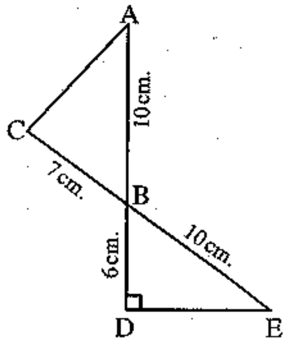
, then the area of the shaded region = ... cm^2.

(a) 4π (b) 5π (c) 6π (d) 7π

(7) If a + b = 30° , then the numerical value of the expression :
$\sin(3a + 2b) + \sin(9a + 8b) =$ ....

(a) 1 (b) $\sqrt{3}$ (c) zero (d) – 1

(8) In the opposite figure :



The area of Δ ABC equals .... cm^2.

(a) 24

(b) 28

(c) 32

(d) 35

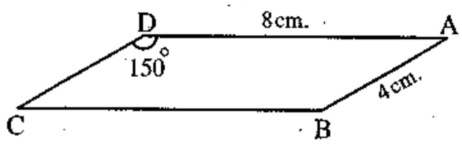
(9) The area of the circular segment whose chord length is 18 cm. , and the radius length of its circle 18 cm. approximately equals .... cm^2.

(a) 29 (b) 28 (c) 30 (d) 60

(10) The general solution of the equation : $\cos\theta = 0$ is .... (where $n \in \mathbb{Z}$)

(a) πn (b) $2\pi n$ (c) $\frac{\pi}{2} + \pi n$ (d) $\frac{\pi}{2} + 2\pi n$

(11) In the opposite figure :

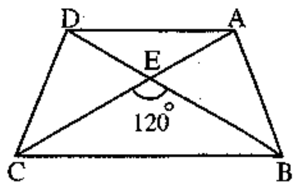


ABCD is a parallelogram

it's area = ... cm^2.

(a) 16 (b) 20 (c) 24 (d) 36

(12) In the opposite figure :



BD = 6 cm. , the area of the figure ABCD = $24\sqrt{3}$ cm^2.

, m ($\angle$ BEC) = 120° , then AC = ... cm.

(a) 12 (b) 14

(c) 15 (d) 16

Quiz 1 on lesson 1 – unit 4

Total mark 8

Choose the correct answer from those given :

(1) On the Cartesian plane , if A (4 , – 3) , B (4 , 4) , C (– 2 , – 1) and $\overrightarrow{CD}$ is equivalent to $\overrightarrow{AB}$, then the point D is ....

(a) (– 2 , 6) (b) (2 , – 6) (c) (0 , 7) (d) (0 , – 7)

(2) If ABCDEF is a regular hexagon whose centre (M) which of the following directed line segments are not equivalent ?

(a) $\overrightarrow{AB}$, $\overrightarrow{FM}$ (b) $\overrightarrow{AB}$, $\overrightarrow{ED}$ (c) $\overrightarrow{AB}$, $\overrightarrow{MC}$ (d) $\overrightarrow{AB}$, $\overrightarrow{MD}$

(3) A car covered 20 metres due north , then it covered the same distance due west , then the displacement of the car is ....

(a) 40 metres due west.
(b) 40 metres due western north.
(c) $20\sqrt{2}$ metres due western north.
(d) $20\sqrt{2}$ metres due western south.

(4) Which of the following is a vector quantity ?

(a) The time
(b) The temperature
(c) The displacement
(d) The mass

(5) If a cyclist travels 12 km. due to the north , then travels 4 km. due to the south from the point he reaches , then the total distance covered by the cyclist during the whole journey .... km.

(a) 12 (b) 4 (c) 8 (d) 16

(6) ABCD is a rectangle , if a particle moves from A to C then to D , then its displacement ....

(a) of magnitude AB in $\overrightarrow{BA}$ direction.
(b) of magnitude AD in $\overrightarrow{DA}$ direction.
(c) of magnitude AD in $\overrightarrow{AD}$ direction.
(d) of magnitude DC in $\overrightarrow{DC}$ direction.

(7) ABCD is a square , its diagonals intersect at M. If X , Y are the midpoints of $\overline{AB}$, $\overline{BC}$ respectively , then $\overrightarrow{XY}$ is equivalent to ....

(a) $\overrightarrow{CM}$ (b) $\overrightarrow{AC}$ (c) $\overrightarrow{CA}$ (d) $\overrightarrow{AM}$

(8) If the point B is the image of the point A (2 , 3) by reflection in the y-axis and C (1 , – 3) , $\overrightarrow{AB}$ is equivalent to $\overrightarrow{CD}$, then the coordinates of the point D is ....

(a) (– 2 , 3) (b) (2 , – 3) (c) (– 3 , 3) (d) (– 3 , – 3)

Quiz 2 till lesson 2 – unit 4

Total mark 12

Answer the following questions :

Choose the correct answer from those given :

(1) If $\overrightarrow{A} = (6, -8)$, then $\|\overrightarrow{A}\| = \dots\dots$

(a) 6 (b) 8 (c) 10 (d) 14

(2) If $\overrightarrow{A} = (3, -2)$, $\overrightarrow{C} = (-2, k)$ are parallel, then $k = \dots\dots$

(a) -2 (b) 3 (c) $\frac{4}{3}$ (d) $\frac{-4}{3}$

(3) If $\overrightarrow{A} = (-4, 2)$, $\overrightarrow{B} = (3, -5)$, then $\overrightarrow{A} + 2\overrightarrow{B} = \dots\dots$

(a) $(2, 8)$ (b) $(8, 2)$ (c) $(2, -8)$ (d) $(-2, 8)$

(4) If $\overrightarrow{A} = 6\sqrt{3}\,\overrightarrow{i} - 6\,\overrightarrow{j}$, then $\overrightarrow{A}$ in the polar form $= \dots\dots$

(a) $(12, 30°)$ (b) $(12, 150°)$ (c) $(12, 210°)$ (d) $(12, 330°)$

(5) If $\overrightarrow{A} = \left(3, \frac{\pi}{4}\right)$, then $2\overrightarrow{A} = \dots\dots$

(a) $\left(6, \frac{\pi}{2}\right)$ (b) $\left(6, \frac{\pi}{4}\right)$ (c) $\left(3, \frac{\pi}{2}\right)$ (d) $\left(3, \frac{\pi}{4}\right)$

(6) If $\|-4\overrightarrow{A}\| = 5\|k\overrightarrow{A}\|$, then $k = \dots\dots$

(a) $\pm\frac{4}{5}$ (b) $\pm\frac{5}{4}$ (c) ± 5 (d) ± 4

(7) If $\overrightarrow{C} = (5, 1)$, $\overrightarrow{D} = (-2, 4)$, then $\|\overrightarrow{C} + \frac{1}{2}\overrightarrow{D}\| = \dots\dots$

(a) 25 (b) 7 (c) 5 (d) 1

(8) If $\overrightarrow{A} = (-1, 2)$, $\overrightarrow{B} = (3, 7)$, $\overrightarrow{C} = (7, 12)$, then $\overrightarrow{C} = \dots\dots$

(a) $2\overrightarrow{A} - \overrightarrow{B}$ (b) $\overrightarrow{A} + 2\overrightarrow{B}$ (c) $2\overrightarrow{B} - \overrightarrow{A}$ (d) $3\overrightarrow{A} + 2\overrightarrow{B}$

(9) If $\overrightarrow{A} = (3, 6)$, $\overrightarrow{B} = (x - 5, 10)$, and $\overrightarrow{A} \perp \overrightarrow{B}$, then $x = \dots\dots$

(a) -20 (b) -18 (c) -16 (d) -15

(10) If $\overrightarrow{A} = 3\overrightarrow{i} - 4\overrightarrow{j}$, $\overrightarrow{B} = \overrightarrow{j}$, $\overrightarrow{C} = \left(5, \frac{\pi}{18}\right)$, then $\|\overrightarrow{A}\| + \|\overrightarrow{B}\| + \|\overrightarrow{C}\| = \dots\dots$

(a) 9 (b) 10 (c) 11 (d) 12

(11) If $\overrightarrow{A} = 2\overrightarrow{i} - \overrightarrow{j}$, $\overrightarrow{B} = \overrightarrow{i} + \overrightarrow{j}$, $\overrightarrow{C} = \overrightarrow{i} + 3\overrightarrow{j}$ and $\overrightarrow{A} \perp (k\overrightarrow{B} + \overrightarrow{C})$, then k = ...

(a) -1 (b) 1 (c) 3 (d) 4

(12) If $\overrightarrow{A} = -3\overrightarrow{B}$, then ....

(a) $-3\overrightarrow{A} = \overrightarrow{B}$ (b) $\overrightarrow{A}$, $\overrightarrow{B}$ act in thé same direction

(c) $\overrightarrow{A} \perp \overrightarrow{B}$ (d) $\overrightarrow{A} \mathbin{/\mkern-6mu/} \overrightarrow{B}$

Total mark 12

Quiz 3 till lesson 3 – unit 4

Choose the correct answer from those given :

(1) If $\overrightarrow{AB} = \overrightarrow{CD}$ where $\overrightarrow{AB} = (6 , 4)$, $\overrightarrow{C} = (-1 , 3)$, then $\overrightarrow{D} =$ ....

(a) (5 , 7) (b) (−5 , −7) (c) (−5 , 7) (d) (7 , 7)

(2) The vector $\overrightarrow{M} = -12\overrightarrow{i} - 12\overrightarrow{j}$ is expressed in the polar form as ....

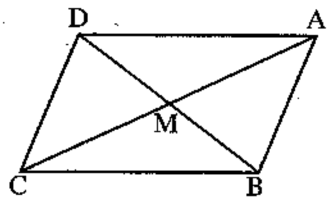
(a) $\overrightarrow{M} = \left(12 , \frac{\pi}{4}\right)$ (b) $\overrightarrow{M} = \left(12\sqrt{2} , \frac{\pi}{4}\right)$

(c) $\overrightarrow{M} = \left(12\sqrt{2} , \frac{3\pi}{4}\right)$ (d) $\overrightarrow{M} = \left(12\sqrt{2} , \frac{5\pi}{4}\right)$

(3) In the opposite figure :

ABCD is a parallelogram whose diagonals intersect at M

, then each of the following expresses $\overrightarrow{AC}$ except ....



(a) $\overrightarrow{AB} + \overrightarrow{BD}$ (b) $2\overrightarrow{AM}$

(c) $\overrightarrow{AD} + \overrightarrow{DC}$ (d) $\overrightarrow{BC} + \overrightarrow{DC}$

(4) In Δ ABC , if D is the midpoint of $\overline{BC}$

, then $\overrightarrow{BA} + \overrightarrow{CA} + \overrightarrow{AD} =$ ....

(a) $\overrightarrow{BC}$ (b) $\overrightarrow{DA}$ (c) $2\overrightarrow{DA}$ (d) $\overrightarrow{CB}$

(5) If $\overrightarrow{A}$, $\overrightarrow{B}$ are two non-zero vectors , and $\|\overrightarrow{A} + \overrightarrow{B}\| = \|\overrightarrow{A} - \overrightarrow{B}\|$, then ....

(a) $\overrightarrow{A} = -\overrightarrow{B}$ (b) $\overrightarrow{A} = \overrightarrow{B}$ (c) $\overrightarrow{A} \mathbin{/\mkern-6mu/} \overrightarrow{B}$ (d) $\overrightarrow{A} \perp \overrightarrow{B}$

(6) The measure of the angle between the two vectors $\overrightarrow{A} = 3\overrightarrow{i} + 3\overrightarrow{j}$, $\overrightarrow{B} = \overrightarrow{i} + \sqrt{3}\,\overrightarrow{j}$ is ....

(a) 45° (b) 30° (c) 60° (d) 15°

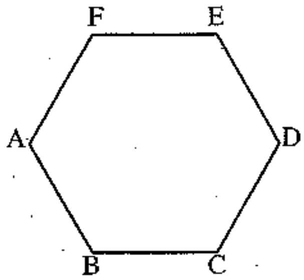
(7) $\overrightarrow{AB} - \overrightarrow{BA} = \dots\dots$

(a) zero (b) $2\overrightarrow{AB}$ (c) $2\overrightarrow{BA}$ (d) $\overrightarrow{O}$

(8) If $\overrightarrow{A} = 20\overrightarrow{i} - 15\overrightarrow{j}$, $\overrightarrow{B} = 7\overrightarrow{i} + 24\overrightarrow{j}$ and $\overrightarrow{M} = \overrightarrow{A} + \overrightarrow{B}$, $\overrightarrow{N} = \overrightarrow{A} - \overrightarrow{B}$, then $\dots\dots$

(a) $\overrightarrow{M} \parallel \overrightarrow{N}$ (b) $\overrightarrow{M} \perp \overrightarrow{N}$ (c) $\overrightarrow{M} = \overrightarrow{N}$ (d) $\|\overrightarrow{M}\| = \|\overrightarrow{N}\|$

(9) **In the opposite figure :**



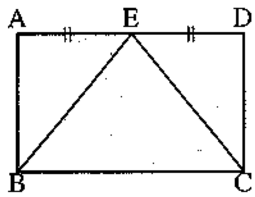
ABCDEF is a regular hexagon

, then $(\overrightarrow{AB} - \overrightarrow{CB}) + \overrightarrow{AF} + \overrightarrow{DE} = \dots\dots$

(a) $\overrightarrow{FE}$ (b) $\overrightarrow{AE}$

(c) $\overrightarrow{AD}$ (d) $\overrightarrow{AC}$

(10) **In the opposite figure :**



ABCD is a rectangle , E is the midpoint of $\overline{AD}$

, then $\overrightarrow{EB} + \overrightarrow{BA} - \overrightarrow{DC} = \dots\dots$

(a) $\overrightarrow{EB}$ (b) $\overrightarrow{BE}$

(c) $\overrightarrow{EC}$ (d) $\overrightarrow{CE}$

(11) If $3\overrightarrow{A} + \overrightarrow{B} = (5 , -2)$, $\overrightarrow{AB} = (-3 , 10)$, then $\overrightarrow{A} = \dots\dots$

(a) $(2 , -1)$ (b) $(-1 , 2)$ (c) $(2 , -3)$ (d) $(-2 , 3)$

(12) If A (k , 2) , B (1 , −1) and $\|\overrightarrow{AB}\| = 5$, then k = $\dots\dots$

(a) 5 (b) −3 (c) 5 or −3 (d) 15

Total mark

12

Quiz 4 till lesson 4 - unit 4

Choose the correct answer from those given :

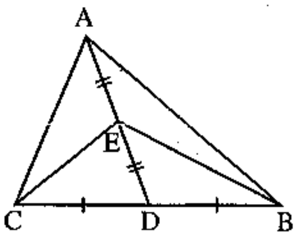
(1) If $\overrightarrow{F_1} = 2\overrightarrow{i} - 5\overrightarrow{j}$, $\overrightarrow{F_2} = \overrightarrow{i} + 2\overrightarrow{j}$ affect on one point , then the magnitude of the resultant force = $\dots\dots$ newton.

(a) $2\sqrt{3}$ (b) 9 (c) $3\sqrt{2}$ (d) $9\sqrt{2}$

(2) If $\overrightarrow{v_A} = 120\overrightarrow{e}$, $\overrightarrow{v_B} = -90\overrightarrow{e}$, then $\overrightarrow{v_{BA}} = \dots\dots$

(a) $210\overrightarrow{e}$ (b) $30\overrightarrow{e}$ (c) $-30\overrightarrow{e}$ (d) $-210\overrightarrow{e}$

(3) In the opposite figure :



ABC is a triangle , if D is the midpoint of $\overline{BC}$

, E is the midpoint of $\overline{AD}$, then

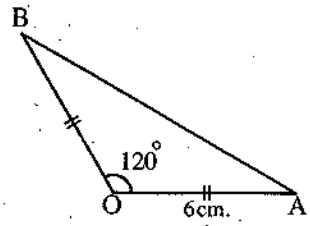
$\overrightarrow{AB} + \overrightarrow{AC} = \dots\dots\dots \overrightarrow{AE}$

(a) 1 (b) 2 (c) 4 (d) -4

(4) If $\overrightarrow{A} = (6, 8)$, $\overrightarrow{B} = (3, 2k)$, $\overrightarrow{A} \perp \overrightarrow{B}$, then k = ...

(a) 2 (b) $\frac{-9}{4}$ (c) $\frac{-9}{8}$ (d) -2

(5) In the opposite figure :



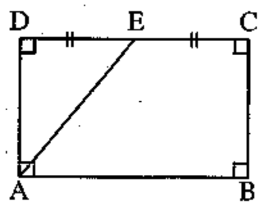
OA = OB = 6 cm. , m (∠ O) = 120°

, then $\|\overrightarrow{AB}\|$ = ... cm.

(a) 6 (b) 12

(c) $6\sqrt{3}$ (d) $6\sqrt{2}$

(6) In the opposite figure :



ABCD is a rectangle

E is the midpoint of $\overline{CD}$

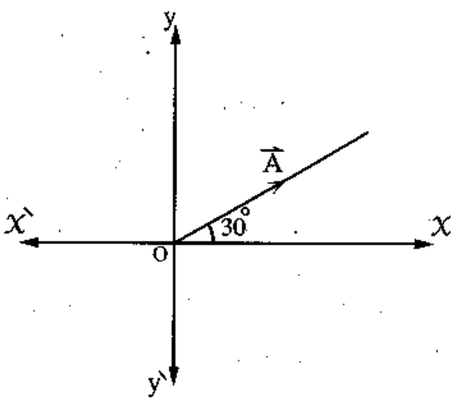
, then $\overrightarrow{AE} + \overrightarrow{DE}$ = ...

(a) $\overrightarrow{AB}$ (b) $\overrightarrow{AC}$ (c) $2\overrightarrow{AD}$ (d) $\overrightarrow{CA}$

(7) If the vector $(\overrightarrow{A} - 2\overrightarrow{C})$ is equivalent to $\overrightarrow{BA}$, then $\overrightarrow{B}$ is equivalent to ....

(a) $2\overrightarrow{A}$ (b) $\overrightarrow{C}$ (c) $2\overrightarrow{BC}$ (d) $2\overrightarrow{C}$

(8) In the opposite figure :



$\|\overrightarrow{A}\|$ = 4 length unit , then $\overrightarrow{A}$ = ...

(a) $(2, 2\sqrt{3})$

(b) $(2\sqrt{3}, 2)$

(c) $(4, \sqrt{3})$

(d) $(\sqrt{3}, 2)$

(9) If the forces $\overrightarrow{F_1} = \left(8\sqrt{2}, \frac{3}{4}\pi\right)$, $\overrightarrow{F_2} = a\,\overrightarrow{i} + 3\,\overrightarrow{j}$, $\overrightarrow{F_3} = -5\,\overrightarrow{i} + (b+2)\,\overrightarrow{j}$ act at one point and the system is in equilibrium , then $\frac{a}{b}$ = ...

(a) 13 (b) -13 (c) 1 (d) -1

(10) In the opposite figure :

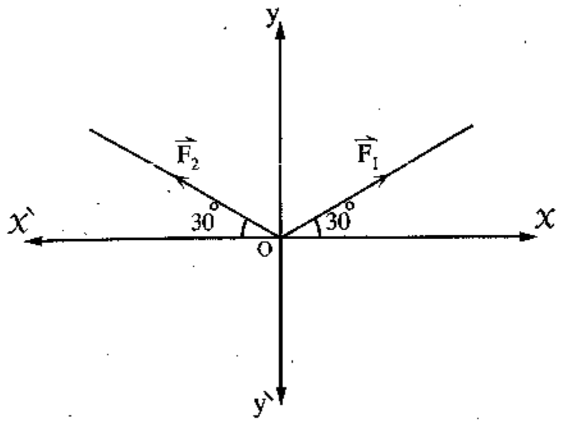
If $F_1 = F_2 = 3$ newton , then the resultant of the two forces F_1 and F_2 is $\overrightarrow{R}$ = ...

(a) (3 , 180°)

(b) (6 , 180°)

(c) (3 , 90°)

(d) (6 , 90°)



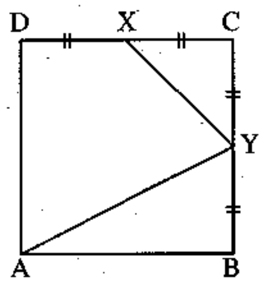
(11) In the opposite figure :

ABCD is a square , $\overrightarrow{AY} + \overrightarrow{XY} = k\,\overrightarrow{XC}$

, then k = ...

(a) 1 (b) 2

(c) 3 (d) 4



(12) If $\overrightarrow{A}$, $\overrightarrow{B}$ are two unit vectors , then ....

(a) $\|\overrightarrow{A} + \overrightarrow{B}\| = 2$ (b) $\|\overrightarrow{A} - \overrightarrow{B}\| = 2$

(c) $\|\overrightarrow{A} + \overrightarrow{B}\| \geq 2$ (d) $\|\overrightarrow{A} + \overrightarrow{B}\| \leq 2$

Total mark

Quiz 5 till lesson 1 - unit 5

12

Choose the correct answer from those given :

(1) If $\overrightarrow{OC} = \left(12 , \frac{5\pi}{6}\right)$ is the position vector of the point C with respect to the origin point O , then the point C is ....

(a) (6 , 6) (b) $(6 , 6\sqrt{3})$ (c) $(-6\sqrt{3} , 6)$ (d) $(6\sqrt{3} , -6)$

(2) If A (7 , 5) , C (5 , – 2) , then $\overrightarrow{AB} + \overrightarrow{BC}$ = ...

(a) (12 , 3) (b) (– 2 , – 7) (c) (2 , 7) (d) (7 , – 2)

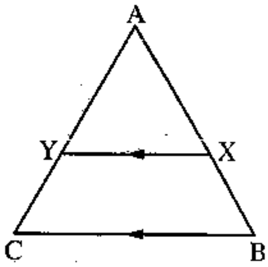
(3) If C (4 , 6) is the midpoint of $\overline{AB}$ where B (2 , 8) , then A = ...

(a) (6 , 4) (b) (6 , 14) (c) (3 , 7) (d) (2 , – 2)

(4) If $\overrightarrow{A}$ = (k , 5) , $\overrightarrow{B}$ = (– 20 , 16) , $\overrightarrow{A} \perp \overrightarrow{B}$, then k = ...

(a) – 4 (b) 4 (c) 5 (d) – 5

(5) In the opposite figure :



If A (1 , 2) , B (6 , 2) , $\overline{XY} \parallel \overline{BC}$, $\frac{AY}{AC} = \frac{3}{5}$

, then the coordinates of the point X is ....

(a) (2 , 4) (b) (4 , 2)

(c) (– 2 , 4) (d) (– 4 , 2)

(6) The vector represents a uniform velocity 6 km./h. for a car moving due to the western north = ...

(a) $3\sqrt{2}\,\vec{i} + 3\sqrt{2}\,\vec{j}$ (b) $3\sqrt{2}\,\vec{i} - 3\sqrt{2}\,\vec{j}$

(c) $-3\sqrt{2}\,\vec{i} + 3\sqrt{2}\,\vec{j}$ (d) $-6\sqrt{2}\,\vec{i} + 6\sqrt{2}\,\vec{j}$

(7) All the following are unit vectors except ....

(a) (1 , 0) (b) (0 , – 1) (c) (0.6 , 0.8) (d) (1 , 1)

(8) If $C \in \overline{AB}$ and AB = 4 BC , A (– 1 , 4) , B (3 , 4) , the coordinates of C is ....

(a) (0 , 4) (b) (4 , 2) (c) (4 , 0) (d) (2 , 4)

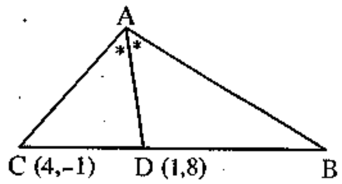
(9) The ratio of division that the X-axis divides the line segment $\overrightarrow{AB}$ where A (2 , 5) , B (7 , – 2) is ....

(a) 5 : 2 (b) 2 : 3 (c) 3 : 2 (d) 2 : 5

(10) In Δ ABC , A (3 , 5) , B (7 , 10) , C (2 , 3) , then the coordinates of the point of intersection of its medians is ....

(a) (4 , 6) (b) (6 , 4) (c) (6 , 9) (d) (9 , 6)

(11) In the given figure :



If 4 AC = 3 AB , then the coordinates of the point B is ....

(a) (– 5 , 14) (b) (– 4 , 16)

(c) (– 3 , 20) (d) (– 2 , 2)

(12) If the position vector $\vec{A} = \left(\sqrt{3}\ , 1\right)$ is rotated around the origin by an angle of measure 45° clockwise , then the polar form of the vector $\vec{A}$ after rotation is ....

(a) (2 , 30°) (b) (2 , 315°) (c) (2 , 345°) (d) (2 , 15°)

Total mark 12

Quiz 6 till lesson 2 - unit 5

Choose the correct answer from those given :

(1) The equation of the straight line passing through (2 , – 3) and is parallel to X-axis is ....

(a) $X + 3 = 0$ (b) $y + 3 = 0$ (c) $X - 3 = 0$ (d) $y - 3 = 0$

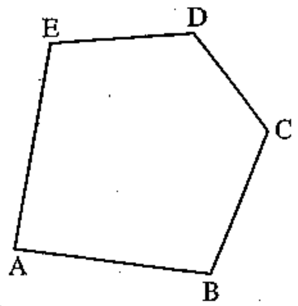
(2) The vector equation of the straight line : $4X + 3y = 12$ is ....

(a) $\vec{r} = (-4, 6) + k(4, 3)$ (b) $\vec{r} = (6, -4) + k(3, 4)$

(c) $\vec{r} = (6, -4) + k(-3, 4)$ (d) $\vec{r} = (6, -4) + k(-3, -4)$

(3) **In the opposite figure :**

All the following express $\overrightarrow{AE}$ except ....



(a) $\overrightarrow{AC} + \overrightarrow{CD} + \overrightarrow{DE}$

(b) $\overrightarrow{AB} + \overrightarrow{BD} + \overrightarrow{ED}$

(c) $\overrightarrow{AD} + \overrightarrow{DE}$

(d) $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} + \overrightarrow{DE}$

(4) If $\vec{u} = (2, -3)$ is a direction vector of a straight line , then all the following vectors are direction vectors of the same straight line except the vector ....

(a) $(-2, 3)$ (b) $(-2, -3)$ (c) $(4, -6)$ (d) $(-4, 6)$

(5) If the point A (0 , 0) is the image of the point B (4 , 2) by reflection in the straight line L , then the equation of L is ....

(a) $X = 2y$ (b) $2X + y = 5$ (c) $2X - y = 5$ (d) $X + y = 6$

(6) The vector represents the displacement of a body covered distance 40 cm. due to eastern south is ....

(a) $20\sqrt{2}\,\vec{i} + 20\sqrt{2}\,\vec{j}$ (b) $-20\sqrt{2}\,\vec{i} + 20\sqrt{2}\,\vec{j}$

(c) $-20\sqrt{2}\,\vec{i} - 20\sqrt{2}\,\vec{j}$ (d) $20\sqrt{2}\,\vec{i} - 20\sqrt{2}\,\vec{j}$

(7) If A (3 , – 5) , B (– 1 , 5) , M (6 , k) and $\overrightarrow{AB}$ // $\overrightarrow{M}$, then k = ...

(a) – 15 (b) – 10 (c) – 5 (d) 5

(8) The ratio by which the y-axis divides $\overrightarrow{AB}$ where A (2 , 5) , B (6 , 7) equals ....

(a) 1 : 3 externally. (b) 3 : 1 internally.

(c) 1 : 2 externally. (d) 3 : 2 internally.

(9) In the opposite figure :

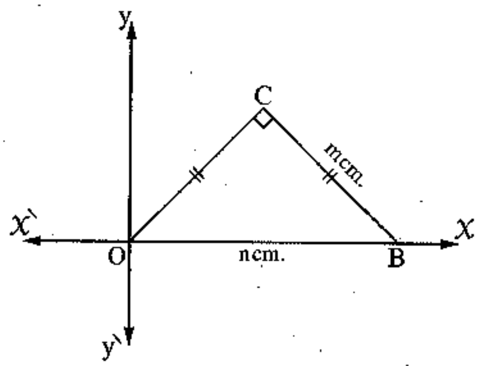
The equation of the straight line $\overleftrightarrow{OC}$ is ....

(a) $y = \frac{m}{n} x$

(b) $y = x$

(c) $y = \frac{n}{m} x$

(d) $y = mn\, x$



(10) The straight line : $6x - 8y = 48$ makes with the coordinate axes a triangle , its perimeter = ... length unit.

(a) 48 (b) 24 (c) 12 (d) 8

(11) The perpendicular direction vector on the straight line $x = 3 + 2k$, $y = 4 - k$ is ....

(a) (2 , – 1) (b) (1 , 2) (c) (2 , 1) (d) (4 , – 2)

(12) The equation of one of the two straight lines bisecting the angle between the coordinate axes is ....

(a) y = 2 (b) $x = 2y$ (c) $y = x$ (d) $y = 4x$

Total mark

....

Quiz 7 till lesson 3 – unit 5 12

Choose the correct answer from those given :

(**1**) The measure of the acute angle between the two straight lines $\vec{r} = (2 , 2) + k (1 , 1)$ and the straight line $x = 0$ equals ....

(a) 45° (b) 30° (c) 135° (d) 60°

(2) If the perpendicular direction vector on the straight line is $\vec{n} = (3, 4)$, then the slope of this straight line is ....

(a) $\frac{-4}{3}$ (b) $\frac{4}{3}$ (c) $\frac{3}{4}$ (d) $\frac{-3}{4}$

(3) If ABCD is a parallelogram, then $\overrightarrow{BA} + \overrightarrow{BC} + \overrightarrow{DB} =$ ....

(a) zero (b) $\overrightarrow{zero}$ (c) $\overrightarrow{AC}$ (d) $\overrightarrow{DB}$

(4) The measure of the angle between the two straight lines $L_1 : x + 2y + 5 = 0$, $L_2 : \vec{r} = (1, 4) + k(1, 2)$ equals ....

(a) zero (b) 45° (c) 90° (d) 135°

(5) If B (0, 3), C (3, 0) and A lies in the third distance between B and C, then the point A is ....

(a) (1, 2) (b) (2, 1) (c) (– 1, – 2) (d) (– 2, – 1)

(6) If $\vec{A} = (m - 1, 2)$, $\vec{B} = (3, -4)$ and $\vec{A} \parallel \vec{B}$, then the value of m = ...

(a) $-\frac{1}{2}$ (b) zero (c) $\frac{1}{2}$ (d) 1

(7) The measure of the angle between the two straight lines $x = 1$, $y = 2$ equals ....

(a) 30° (b) 45° (c) 90° (d) 180°

(8) The measure of the obtuse angle between the two straight lines $y = (2 - \sqrt{3})(x + 5)$, $y = (2 + \sqrt{3})(x - 7)$ is ....

(a) 150° (b) 60° (c) 135° (d) 120°

(9) The perpendicular to the straight line $\vec{r} = (3, 2) + k(1, -\sqrt{3})$ makes with the positive x-axis an angle of measure ....

(a) 120° (b) 30° (c) 60° (d) 150°

(10) Two cars A and B move in a straight line, if $\overrightarrow{v_A} = 30\vec{i}$, $\overrightarrow{v_B} = 50\vec{i}$, then $\overrightarrow{v_{AB}} =$ .... $\vec{i}$

(a) 80 (b) 20 (c) – 20 (d) – 80

(11) If the straight line : $\frac{x}{6} + \frac{y}{b} = 1$ makes with the coordinate axes a triangle, its area = 9 square units, then b = ...

(a) ± 3 (b) – 3 (c) 6 (d) ± 6

(12) The set of values of k which makes the measure of the acute angle between the two straight lines $x + ky - 8 = 0$, $2x - y - 5 = 0$ equals $\frac{\pi}{4}$ is ....

(a) $\{3, -\frac{1}{3}\}$ (b) $\{-3, \frac{1}{3}\}$ (c) $\{3, \frac{1}{3}\}$ (d) $\{3\}$

Total mark

12

Quiz 8 till lesson 4 – unit 5

Choose the correct answer from those given :

(1) If (6 , 4) , (3 , m) are two direction vectors of two parallel straight lines , then m = ...

(a) 4 (b) 3 (c) 2 (d) $\frac{-9}{2}$

(2) The equation of the straight line passing through the two points (3 , 0) , (0 , – 2) is ....

(a) $\frac{x}{3}+\frac{y}{2}=0$ (b) $\frac{x}{3}+\frac{y}{2}=1$ (c) $\frac{x}{3}-\frac{y}{2}=0$ (d) $\frac{x}{3}-\frac{y}{2}=1$

(3) The measure of the angle between the two straight lines whose slopes are $\frac{1}{2}$, – 2 equals ....°

(a) 45° (b) 30° (c) 90° (d) 60°

(4) The length of the perpendicular drawn from the point (1 , 1) on the straight line : $x + y = 0$ equals .... length unit.

(a) 2 (b) $\sqrt{2}$ (c) 1 (d) zero

(5) In triangle ABC , B (3 , 5) , C (– 3 , – 7) , D $\in \overline{BC}$ such that the area of Δ ABD = $\frac{1}{3}$ the area of Δ ABC , then D = ...

(a) $\left(3 , \frac{17}{3}\right)$ (b) $\left(\frac{3}{2} , 2\right)$ (c) (0 , – 1) (d) (1 , 1)

(6) If $\vec{u}$ = (3 , – 4) is a direction vector of the straight line , then all the following are direction vectors in the same direction as the line except ....

(a) (– 3 , 4) (b) (9 , – 12) (c) (3 , 4) (d) (1.5 , – 2)

(7) The distance between the two straight lines $3x - 4y + 20 = 0$, $3x - 4y + 10 = 0$ equals .... length unit.

(a) 2 (b) 3 (c) 4 (d) 5

(8) The length of the perpendicular drawn from the point (– 1 , 4) to the y-axis equals .... length unit.

(a) 7 (b) – 1 (c) 1 (d) 4

(9) ABCD is a square , A (2 , – 3) , the equation of $\overleftrightarrow{CD}$, $3x - 4y + 2 = 0$, then the area of the square ABCD = ... square units.

(a) 4 (b) 9 (c) 16 (d) 25

(10) The measure of the angle between the two vectors $\vec{A} = 3\vec{i} + \sqrt{3}\,\vec{j}$, $\vec{B} = -4\vec{i}$ equals ....

(a) 45° (b) 60° (c) 120° (d) 150°

(11) $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} + \overrightarrow{DA} =$ ....

(a) $\overrightarrow{CD}$ (b) $\overrightarrow{BD}$ (c) $\vec{O}$ (d) $\overrightarrow{CB}$

(12) The length of the perpendicular drawn from the origion to the straight line $\vec{r} = (5 , 0) + k (4 , 3)$ equals .... length units.

(a) 15 (b) 5 (c) 3 (d) 4

Total mark ....

Quiz 9 till lesson 5 - unit 5

12

Choose the correct answer from those given :

(1) The measure of the acute angle between the two straight lines :

$x - 3y + 5 = 0$, $x + 2y - 7 = 0$ equals ....

(a) 60° (b) 120° (c) 45° (d) 135°

(2) The length of the perpendicular drawn from the origin on the straight line :

$\vec{r} = (10 , 0) + k (4 , 3)$ equals .... length units.

(a) 15 (b) 5 (c) 6 (d) 4

(3) The equation of the straight line passing through the origin and the intersection point of the two straight lines : $x = 1$, $y = 2$ is ....

(a) $x - y = 0$ (b) $x - 2y = 0$ (c) $2x - y = 0$ (d) $2x + y = 0$

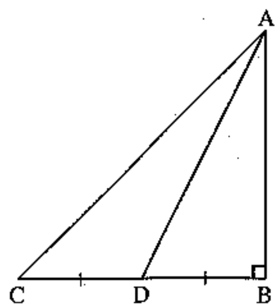
(4) **In the opposite figure :** $2\overrightarrow{AD} =$ ....

(a) $\overrightarrow{AB} + \overrightarrow{AC}$

(b) $\overrightarrow{AB} + \overrightarrow{BD}$

(c) $2\overrightarrow{AB} + 2\overrightarrow{CD}$

(d) $\overrightarrow{BA} + \overrightarrow{CA}$



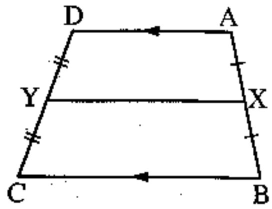
(**5**) Which of the following points lies on the straight line $\vec{r} = (-2 , 1) + k (1 , -3)$?

(a) $\left(\frac{-5}{3} , -2\right)$ (b) $\left(\frac{-3}{2} , \frac{1}{2}\right)$ (c) $\left(\frac{3}{2} , -\frac{1}{2}\right)$ (d) $\left(\frac{-7}{3} , 2\right)$

(**6**) The straight line : $\frac{X}{4} + \frac{y}{7} = 1$ makes with the coordinate axes a triangle its area equals .... square unit.

(a) 4 (b) 7 (c) 14 (d) 28

(**7**) **In the opposite figure :**



ABCD is a trapezium $\overrightarrow{AD} + \overrightarrow{BC} = k \overrightarrow{YX}$

, then the value of k = ... where $k \in \mathbb{R}$

(a) -2 (b) -1 (c) 1 (d) 2

(**8**) If $\vec{u_1} = (2 , 1)$, $\vec{u_2} = (-2 , 4)$ are direction vectors of two straight lines , then the measure of the angle between these two straight lines equals ....

(a) 45° (b) 60° (c) 90° (d) 180°

(**9**) The vector equation of the straight line passes through the intersection point of the two straight lines $L_1 : X - 5 = 0$, $L_2 : X + y = 13$ and its direction vector (4 , 1) is .... length units.

(a) $\vec{r} = (4 , 1) + k (5 , 8)$ (b) $\vec{r} = (5 , 6) + k (4 , 1)$

(c) $\vec{r} = (5 , 8) + k (4 , 1)$ (d) $\vec{r} = (5 , -8) + k (1 , 4)$

(**10**) If the two straight lines : $y = 5 X + c$, $y = a X + d$ are parallel , then a = ...

(a) 5 (b) -5 (c) -4 (d) 4

(**11**) The coordinates of the point lies at $\frac{2}{5}$ the distance between A and B where $\overline{AB}$ is a line segment and A (3 , −2) , B (−1 , 5) is ....

(a) (−1 , 3) (b) $\left(\frac{7}{5} , \frac{4}{5}\right)$ (c) (3 , −1) (d) $\left(\frac{4}{5} , \frac{7}{5}\right)$

(**12**) The equation of the straight line passes through the intersection point of the two straight lines $L_1 : X + 2y - 4 = 0$, $L_2 = X - 2y = 0$ and parallel to the X-axis is ....

(a) $X = 2$ (b) $y = 1$ (c) $y = 3$ (d) $y = 2$

First : School book examinations in algebra and trigonometry

Model 1

Answer the following questions :

1 Choose the correct answer from the given answers :

(1) The point which belongs to the solution set of the inequalities :

$x > 2$, $y > 1$, $x + y \geq 3$ is ....

(a) (2 , 1) (b) (1 , 2) (c) (3 , 2) (d) (1 , 3)

(2) If A is a matrix of order 1×3 , B^t is a matrix of order 1×3 , then it is possible to carry out the operation ....

(a) $A + B$ (b) $B^t + A^t$ (c) AB^t (d) AB

(3) The solution set of the equations : $2x - 3y = 1$, $3x + 2y = 8$ is ....

(a) $\{(1 , 2)\}$ (b) $\{(2 , 1)\}$ (c) $\{(2 , 3)\}$ (d) $\{(3 , 2)\}$

(4) The perimeter of a circular sector is 10 cm. , and the length of its arc equals 2 cm. , then its area in square centimetres equals ....

(a) 4 (b) 8 (c) 10 (d) 20

(5) The solution set of the equation : $\sin x + \cos x = 0$ where $180° < x < 360°$ equals ....

(a) $\{210°\}$ (b) $\{225°\}$ (c) $\{240°\}$ (d) $\{315°\}$

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2 [a] Solve the system of the following linear equations using matrices :

$2x - 3y = 4$, $3x + 4y = 23$

[b] Prove the identity : $\sin\theta \sin(90° - \theta) \tan\theta = 1 - \cos^2\theta$

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3 [a] Find the area of the triangle whose vertices are $(-4 , 2)$, $(3 , 1)$, $(-2 , 5)$ using matrices.

[b] Find the solution set of the equation : $2\sin x + 1 = 0$ where $x \in]0 , 2\pi[$

---

4 [a] Find the values of x which satisfy the equation : $\begin{vmatrix} x & 0 & 0 \\ 1 & x & x \\ 5 & 2 & x \end{vmatrix} = 3x$

[b] A boat was observed from the top of a lighthouse of height 50 metres , it was found that its depression angle is of measure 35°. Find the distance between the boat and the top of the lighthouse.

---

5 [a] $\overline{AB}$ is a chord of length 8 cm. , is opposite to a central angle of measure 60°

Find to the nearest tenth the area of the minor circular segment whose chord is $\overline{AB}$

[b] Determine the solution set of the following inequalities graphically in $\mathbb{R} \times \mathbb{R}$:

$X \geq 0$, $y \geq 0$, $X + 3y \leq 7$, $3X + 4y \leq 14$

, then find from the solution set the values of X , y which make the value of the function : $P = 30X + 50y$ is greatest as possible.

Model (2

Answer the following questions :

1 Choose the correct answer from the given answers :

(1) If A is a matrix of order 2×3 , B^t is a matrix of order 1×3 , then AB is a matrix of order ....

(a) 3×3 (b) 3×1 (c) 2×1 (d) 1×2

(2) The point which belogns to the solution set of the inequalities :

$X \geq 0$, $y \geq 0$, $2X + y < 4$, $X + 3y < 6$ is ....

(a) (1 , – 3) (b) (3 , 0) (c) (2 , 3) (d) (1 , 1)

(3) If $\begin{vmatrix} 2X & 2 \\ 4 & 3 \end{vmatrix} = 10$, then $X =$ ....

(a) 2 (b) 3 (c) 4 (d) 5

(4) $1 + \cot^2 \theta =$ .... in the simplest form.

(a) $\sin^2 \theta$ (b) $\cos^2 \theta$ (c) $\sec^2 \theta$ (d) $\csc^2 \theta$

---

2 [a] Solve the system of the following linear equations using Cramar's rule :

$2X - 3y = 3$, $X + 2y = 5$

[b] Prove the identity : $\dfrac{\cos X \times \tan X}{\csc X} = 1 - \cos^2 X$

---

3 [a] Find the matrix A which satisfies the relation :

$$A \times \begin{pmatrix} -2 & 2 \\ 4 & 3 \end{pmatrix} = \begin{pmatrix} 12 & 23 \\ 8 & 13 \end{pmatrix}$$

[b] Find the general solution of the equation : $\cos\left(\frac{\pi}{2} - \theta\right) = \frac{1}{2}$

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4 [a] If $A^t = \begin{pmatrix} 2 & -4 \\ 4 & 3 \end{pmatrix}$ **, prove that :** $A^2 - 5A + 22I = O$

[b] The measure of the central angle of a circular segment is 90° and the area of its surface is 56 cm². Find the length of its radius.

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5 [a] From a point on the ground 50 metres distant from the base of a vertical pole , it is found that the measure of the elevation angle of the top of the pole is 19° 24′

Find to the nearest metre , the height of the pole from the ground.

[b] Find the maximum value of the objective function : $P = 2X + y$ given that :

$X \geq 0$, $y \geq 0$, $2X + 3y \leq 18$, $-4X + y \geq -8$

Second : School book examinations in analytic geometry

Model (1

Answer the following questions :

1 **Complete the following sentences :**

(1) If $\overrightarrow{A} = 2\overrightarrow{i} + 3\overrightarrow{j}$, $\overrightarrow{B} = 3\overrightarrow{i} - \overrightarrow{j}$, then $2\overrightarrow{A} - \overrightarrow{B} =$ ....

(2) If $\overrightarrow{A} = (-2 , 1)$, $\overrightarrow{C} = (-3 , k)$ are parallel , then $k =$ ....

(3) If $A = (-4 , 4)$, $B = (5 , -8)$, $C \in \overline{AB}$ where $AC : CB = 2 : 1$, then $C = ($ .... , ... $)$

(4) If the two lines $L_1 : 3X - 2y + 7 = 0$, $L_2 : aX + 3y + 5 = 0$ are perpendicular , then $a =$ ....

(5) The vector equation of the line which passes through the point $(2 , -3)$ and its direction vector is $(3 , 4)$, is ....

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2 **[a]** If $\| -8\overrightarrow{A} \| = 5 \| k\overrightarrow{A} \|$, find the value of k

[b] Find the length of the perpendicular drawn from the point $(1 , 2)$ to the line whose equation is : $5X - 12y - 7 = 0$

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3 **[a]** ABCD is a quadrilateral , E is the midpoint of $\overline{AB}$, F is the midpoint of $\overline{CD}$

Prove that : $\overrightarrow{BC} + \overrightarrow{AD} = 2\overrightarrow{EF}$

[b] Find the equation of the line which passes through the point of intersection of the two lines whose equations are : $2X + y = 5$ and $\overrightarrow{r} = (1 , 0) + t(1 , 1)$ and passes through the point $(5 , 3)$

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4 **[a]** If the point $C(2 , 5)$ divides $\overrightarrow{AB}$ by the ratio $4 : 1$, where $A(8 , 3)$, find the coordinates of the point B

[b] Prove that the triangle whose vertices are the points $Y(4 , 2)$, $X(3 , 5)$, $Z(-5 , -1)$ is a right-angled triangle at Y , then calculate the area of the circle which passes through its vertices.

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5 If $L_1 : 3X + 2y - 7 = 0$, $L_2 : 2X - 3y + 4 = 0$, **find :**

(1) The measure of the angle between L_1 , L_2

(2) The vector equation of the line which passes through the point of intersection of the two lines L_1 , L_2 and the point $(3 , 4)$

Model (2

Answer the following questions :

1 Complete the following sentences :

(1) If $\overrightarrow{A} = (2, 3)$, $\overrightarrow{B} = (-1, 2)$, then $\overrightarrow{AB} =$ ....

(2) If $\overrightarrow{A} = (4, 2)$, $\overrightarrow{B} = (1, -2)$, then $\| \overrightarrow{A} - \overrightarrow{B} \| =$ ....

(3) If $A = (-3, 4)$, $B = (6, -8)$, then the X-axis divides $\overline{AB}$ by the ratio ....

(4) The measure of the angle between the two lines whose slopes are $\frac{1}{2}, -2$ equals ....

(5) The length of the perpendicular from $(1, 1)$ to the line whose equation is : $X + y = 0$ equals ....

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2 **[a]** If $k \| 4 \overrightarrow{A} \| = \| -3 \overrightarrow{A} \|$, find the value of k

[b] Find the equation of the line which passes through the point $(-1, 0)$, and the point of intersection of the two lines whose equations are : $2X - y + 4 = 0$, $X + y + 5 = 0$

---

3 **[a]** If $A = (3, 4)$, $B = (5, -1)$, $C = (2, -2)$ are three vertices of the parallelogram ABCD , find the coordinates of the fourth vertex D

[b] Prove that the two lines : $\overrightarrow{r} = (0, 4) + t(1, -2)$, $2X + y + 2 = 0$ are parallel , then find the shortest distance between them.

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4 **[a]** If $A = (-1, 4)$, $B = (5, -1)$, find the coordinates of the point C which divides $\overline{AB}$ internally by the ratio 2 : 1

[b] A circle whose centre is the origin point, prove that the two chords drawn in the circle whose equations are :

$3X + 4y + 10 = 0$ and $5X - 12y + 26 = 0$ are equal in length.

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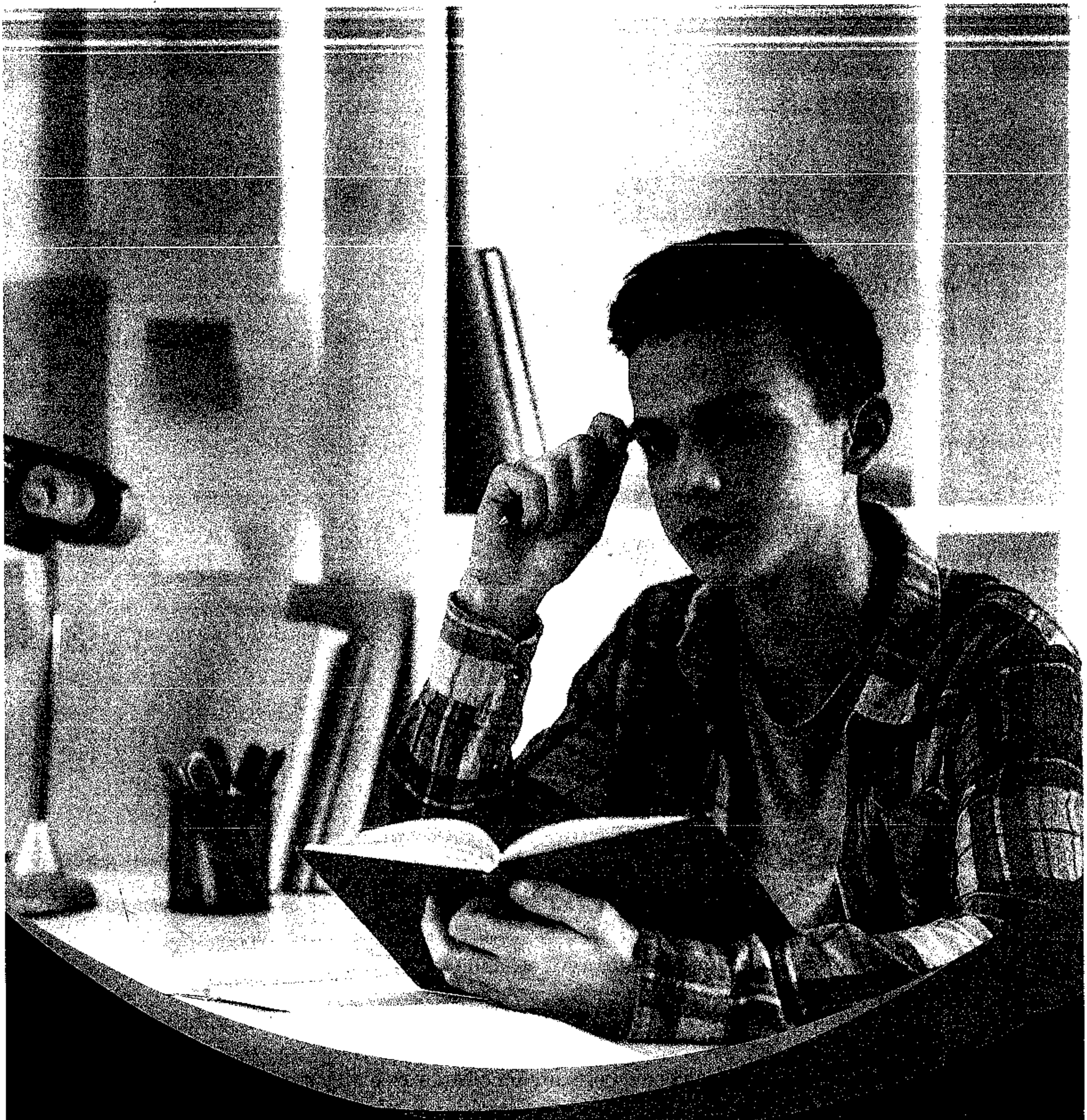
5 ABCD is a trapezium in which $\overline{AD} // \overline{BC}$

If $A(7, -1)$, $B(3, -1)$, $C(2, 1)$, $D(5, y)$:

(1) Find the value of y

(2) Find the area of the trapezium ABCD



Governorates' Examinations

1 Cairo Governorate

Answer the following questions :

1 $(X^t)^t - X =$ ....

(a) O (b) X (c) 2 X (d) zero

2 The point which belongs to the solution set of the system $x > 2$; $y > 1$ is ....

(a) (1 , 2) (b) (2 , 1) (c) (3 , 1) (d) (3 , 2)

3 If $3^{\sin\theta} = 1$, where $\theta \in]0 , 2\pi[$, then $\theta =$ .... °

(a) 45 (b) 90 (c) 180 (d) 270

4 If $X + \begin{pmatrix} 3 & -2 \\ 5 & 0 \end{pmatrix} = O$, then $X =$ ....

(a) $\begin{pmatrix} -3 & 2 \\ -5 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} 3 & 5 \\ -2 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 2 \\ -5 & 3 \end{pmatrix}$ (d) $\begin{pmatrix} -3 & -2 \\ -5 & 0 \end{pmatrix}$

5 The general solution of the equation $\tan\theta = \sqrt{3}$ is .... where $n \in \mathbb{Z}$

(a) $\frac{\pi}{2} + n\pi$ (b) $\frac{\pi}{3} + 2n\pi$ (c) $\frac{\pi}{6} + n\pi$ (d) $\frac{\pi}{3} + n\pi$

6 If ABC is a right angled triangle at B , AB = 5 cm. , BC = $5\sqrt{3}$ cm. , then find : m (∠ C) , m (∠ A) and the length of $\overline{AC}$.

7 Find the lengths of the intercepted parts from the two axes by the straight line $3x + 4y = 12$

8 The value of the determinant $\begin{vmatrix} 4 & 0 & 0 \\ 7 & 2 & 0 \\ 1 & 5 & 1 \end{vmatrix} =$ ....

(a) 1 (b) 2 (c) 4 (d) 8

9 The length of the perpendicular drawn from the point (3 , 1) to the straight line $4x + 3y - 5 = 0$ equals .... unit length.

(a) 2 (b) 3 (c) 4 (d) 5

10 The measure of the angle between the two straight lines $\mathcal{X} = 1$, $y = 2$ equals .... °

(a) 30 (b) 45 (c) 90 (d) 180

---

11 All the following vectors are unit vectors except ....

(a) (1 , 0) (b) (0 , – 1) (c) (0.6 , 0.8) (d) (1 , 1)

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12 If $k \| 4 \overrightarrow{A} \| = \| -3 \overrightarrow{A} \|$, then k = ...

(a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) 1 (d) 12

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13 Find the equation of the straight line passes through the point (3 , 5) and perpendicular to the straight line $3\mathcal{X} - 2y + 7 = 0$

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14 Using the determinants (Cramer's rule) , solve the following system of linear equations :

$\mathcal{X} + 2y = 0$, $2\mathcal{X} - 3y = 1$

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15 If $\overrightarrow{X} = \overrightarrow{O}$, $\overrightarrow{X} = (a - 3 , b + 5)$, then a + b = ...

(a) – 2 (b) 2 (c) 8 (d) 15

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16 If the arc length of a circular sector is 8 cm. and the radius length of its circle is 6 cm. then its area = ... cm^2.

(a) 2 (b) 14 (c) 24 (d) 48

---

17 In the Cartesian coordinates plane , if $\overline{OA} = \left(6 , 6\sqrt{3}\right)$, then its polar form is ....

(a) $\left(12 , \frac{\pi}{3}\right)$ (b) $\left(12 , \frac{\pi}{6}\right)$ (c) $\left(6 , \frac{\pi}{3}\right)$ (d) $\left(6 , \frac{\pi}{6}\right)$

---

18 If $\overrightarrow{A} = (3 , 4)$, $\overrightarrow{B} = (k , -8)$ and $\overrightarrow{A} // \overrightarrow{B}$, then k = ...

(a) – 6 (b) 3 (c) 4 (d) 6

---

19 If $\overrightarrow{U} = (3 , -4)$ is a direction vector of a straight line , then all the following vectors are direction vectors of the same straight line except ....

(a) (– 3 , 4) (b) (9 , – 12) (c) (3 , 4) (d) (1.5 , – 2)

---

20 If A (3 , 4) , B (5 , – 1) , C (2 , – 2) are three vertices of the parallelogram ABCD , then find the coordinates of the point D.

21 If $A = \begin{pmatrix} 2 & 1 \\ 3 & 5 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 4 \\ 6 & 2 \end{pmatrix}$, then find the matrix X where $X = 3A - B^t$

22 The matrix $(3 \quad 2 \quad 1)$ is of order ....

(a) 2×1 (b) 3×2 (c) 1×3 (d) 3×1

23 $\overrightarrow{AB} - \overrightarrow{BA} =$ ....

(a) zero (b) $2\,\overrightarrow{AB}$ (c) $2\,\overrightarrow{BA}$ (d) $\overrightarrow{O}$

24 Which of the following matrices has no multiplicative inverse ?

(a) $\begin{pmatrix} 1 & 3 \\ 2 & 5 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 4 \\ 2 & 8 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 6 \\ 3 & 9 \end{pmatrix}$ (d) $\begin{pmatrix} 4 & 0 \\ -2 & 1 \end{pmatrix}$

25 If $\overrightarrow{C} = (5 , 1)$, $\overrightarrow{D} = (-2 , 4)$, then $\| \overrightarrow{C} + \frac{1}{2} \overrightarrow{D} \| =$ ....

(a) 25 (b) 7 (c) 5 (d) 1

26 The value of the expression : $5 \cos \theta \times 3 \sec \theta =$ ....

(a) 1 (b) 2 (c) 8 (d) 15

27 **Prove the validity of the identity :**

$\sin \theta \cos \theta \left[\tan \theta + \cot \theta\right] = 1$

28 In the quadrilateral ABCD , if $\overrightarrow{BC} = 3\,\overrightarrow{AD}$, **then prove that :**

$\overrightarrow{AC} + \overrightarrow{BD} = 4\,\overrightarrow{AD}$

2 Giza Governorate

Answer the following questions :

1 If the product of the two matrices $A \times B = I$ and the matrix $A = \begin{pmatrix} 2 & 3 \\ 5 & 8 \end{pmatrix}$, then the matrix $B = \cdots\cdots$

(a) $\begin{pmatrix} 2 & 3 \\ 5 & 8 \end{pmatrix}$ (b) $\begin{pmatrix} 8 & 5 \\ 3 & 2 \end{pmatrix}$ (c) $\begin{pmatrix} 8 & -3 \\ -5 & 2 \end{pmatrix}$ (d) $\begin{pmatrix} -2 & 5 \\ 3 & -8 \end{pmatrix}$

---

2 The solution of the two equations $3y = 2X + 4$, $4y - 3X - 5 = 0$ is the point $\cdots\cdots$

(a) $(1 , 2)$ (b) $(1 , -2)$ (c) $(2 , 1)$ (d) $(2 , 3)$

---

3 The simplest form of the expression : $\sin(180° - \theta) \times \sec(90° - \theta)$ is $\cdots\cdots$

(a) $90°$ (b) $\tan\theta$ (c) $\cos\theta$ (d) 1

---

4 If the matrix $A = \begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix}$ Find the value : $A^2 - 2A + 4I$

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5 The point which belongs to the solution of the system of inequalities :

$X > 3$, $y < 1$, $X + y \leq 5$ is $\cdots\cdots$

(a) $(6 , -2)$ (b) $(1 , -2)$ (c) $(4 , 4)$ (d) $(3 , -2)$

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6 The polar form of the vector $\vec{r} = (3 , \sqrt{3})$ is $\cdots\cdots$

(a) $\left(2\sqrt{3} , \frac{\pi}{6}\right)$ (b) $\left(2\sqrt{3} , \frac{\pi}{3}\right)$ (c) $\left(\sqrt{3} , \frac{\pi}{6}\right)$ (d) $\left(\sqrt{3} , \frac{\pi}{3}\right)$

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7 Find the maximum value of the objective function $P = 3X + 4y$ under constraints :

$X \geq 0$, $y \geq 0$, $X + y \leq 3$, $X - y \leq 1$

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8 If the matrix $A = \begin{pmatrix} 4 & m & 2 \\ y - X & 5 & 7 \\ y & X - 1 & 1 \end{pmatrix}$ is symmetric , then $m = \cdots\cdots$

(a) 4 (b) -6 (c) 10 (d) -8

---

9 The value of θ which satisfies the equation $\sqrt{3}\cos\theta = \sin\theta$ where $\theta \in [0 , \pi]$

(a) $30°$ (b) $60°$ (c) $120°$ (d) $150°$

10 If $\overrightarrow{A} = (3, 5)$, $\overrightarrow{B} = (4, 6)$, then $\| -2\overrightarrow{A} + 3\overrightarrow{B} \| =$ ....

(a) 6 (b) 8 (c) 10 (d) 14

11 **Prove that :** $(\sin\theta - \cos\theta)^2 + (\sin\theta + \cos\theta)^2 = 2$

12 The slope of the striaght line perpendicular to the line with equation :

$\overrightarrow{r} = (-3, 4) + k(2, 5)$ equals ....

(a) $\frac{-4}{3}$ (b) $\frac{-2}{5}$ (c) $\frac{3}{4}$ (d) $\frac{5}{2}$

13 The simplest form of the expression : $\frac{\cot^2\theta - \csc^2\theta}{\cot\theta}$ is ....

(a) -1 (b) $\cot\theta - \csc^2\theta$ (c) $-\cot\theta$ (d) $-\tan\theta$

14 Prove that the points A (1 , 4) , B (2 , 3) , C (−3 , 8) lies on the same straight line , then find the ratio at which the point A divides the line segment $\overline{BC}$. Show the type of division.

15 If $\begin{vmatrix} 2 & 0 & 0 \\ 4 & x & 0 \\ -3 & 36 & x \end{vmatrix} = 50$, then $x =$ ....

(a) ± 6 (b) ± 5 (c) 6 (d) 25

16 The area of a circular sector is 30 cm² and the length of the diameter of its circle is 12 cm. , then its perimeter equals ....

(a) 22 cm. (b) 42 cm. (c) 44 cm. (d) 26 cm.

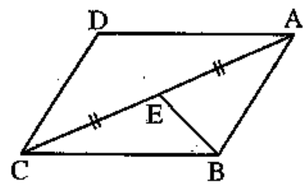
17 **In the opposite figure :**

ABCD is a parallelogram

, E is the midpoint of $\overline{AC}$

Prove that :

$\overrightarrow{BA} + \overrightarrow{EB} = \frac{1}{2}\overrightarrow{CA}$



18 The value of x which makes the matrix $\begin{pmatrix} 6 & 2 \\ x-4 & -4 \end{pmatrix}$ has no multiplicative inverse is ....

(a) −8 (b) −10 (c) 8 (d) 10

19 The area of regular hexagon whose side length is 8 cm. equals .... cm^2

(a) $12\sqrt{3}$ (b) $24\sqrt{3}$ (c) $96\sqrt{3}$ (d) $144\sqrt{3}$

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20 The distance between the two straight lines $y = -3$, $y = 4$ equals .... length units.

(a) 1 (b) 4 (c) 7 (d) 12

---

21 Find the measure of the acute angle between the two straight lines $2X = 3y - 5$, and the straight line which makes an angle of measure 45° with the positive direction of X-axis.

---

22 If the two vectors $\overrightarrow{A} = (k , 9)$, $\overrightarrow{B} = (k , -4)$ are parallel , then k = ...

(a) $\varnothing$ (b) zero (c) ± 6 (d) $\frac{1}{13}$

---

23 The distance between the point $(-2 , 3)$ and the straight line :

$3X - 4y - 2 = 0$ equals ....

(a) 3 units (b) 4 units (c) 5 units (d) 6 units

---

24 If A is a matrix of order 4×7 , B is a matrix of order 7×3 , then the order of $(AB)^t$ is ....

(a) 7×7 (b) 4×3 (c) 4×7 (d) 3×4

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25 A car A moves with speed 60 km./h. and a car B moves in the same direction as A with speed 80 km./h. Find the relative speed of the car B with respect to car A.

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26 If $\overrightarrow{AB} = (3 , -4)$, $\overrightarrow{BC} = (2 , 1)$, then $\overrightarrow{CA} =$ ....

(a) $(1 , -5)$ (b) $(5 , -3)$ (c) $(-3 , 5)$ (d) $(-5 , 3)$

---

27 From the top of a tower, its height is 80 m. , an observer measures the depression angle of a car lies on the same plane of the tower base and it was $32° 18'$, then the distance between the car and the tower base equals ....

(a) 50.6 m. (b) 42.7 m. (c) 126.5 m. (d) 149.7 m.

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28 Find the area of the triangle ABC in which $A (1 , 3)$, $B (-2 , 3)$, $C (-2 , -6)$, then find the coordinates of its centroid.

3 El-Kalyoubia Governorate

Answer the following questions :

1 If $\begin{vmatrix} 2k-1 & 2 \\ 3 & k+1 \end{vmatrix} = 2k^2 + 1$, then k = ...

(a) 2 (b) 4 (c) 6 (d) 8

---

2 If $A = \begin{pmatrix} -1 & 4 \\ -2 & 3 \end{pmatrix}$, $A = A^{-1} B$, then B = ...

(a) $\begin{pmatrix} -7 & 4 \\ -4 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} -7 & 8 \\ -4 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 7 & 8 \\ 4 & -1 \end{pmatrix}$ (d) $\begin{pmatrix} 7 & -8 \\ 4 & 4 \end{pmatrix}$

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3 The ratio that the X-axis divides $\overrightarrow{BA}$ where A (3 , 2) , B (5 , 6) equals ....

(a) 3 : 5 internally. (b) 5 : 3 externally. (c) 1 : 3 internally. (d) 3 : 1 externally.

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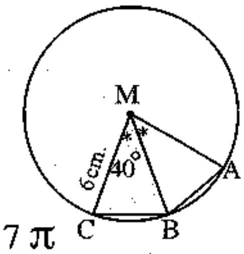
4 In the opposite figure :

a circle M , MC = 6 cm.

, m (∠ AMB) = m (∠ CMB) = 40°

, then the area of the shaded part .... cm².



(a) 4 π (b) 5 π (c) 6 π (d) 7 π

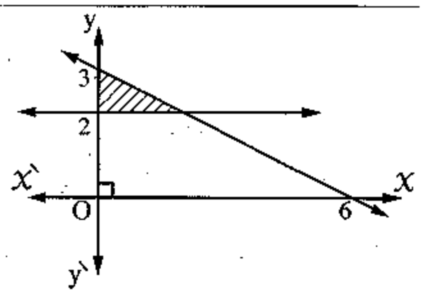
---

5 Prove that : $\dfrac{7 + 5\sin^2\theta - \cos^2\theta}{3\sin^2\theta + 2\cos^2\theta - 1} = 6$

---

6 The shaded part represent the solution set of the inequalities :

$y \geq 2$, $X \geq 0$ and ....



(a) $X + 2y - 6 \leq 0$ (b) $X + 2y + 6 \leq 0$

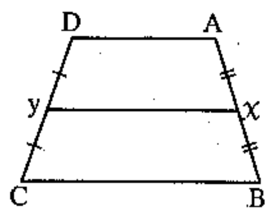
(c) $X + 2y - 6 \geq 0$ (d) $X + 2y + 6 \geq 0$

---

7 In the opposite figure :

ABCD is a trapezium if $\overrightarrow{AD} + \overrightarrow{BC} = k\,\overrightarrow{yX}$

The value of k = ... when $k \in \mathbb{R}$



(a) – 2 (b) – 1

(c) 1 (d) 2

8 If $A = \begin{pmatrix} 4 & 0 \\ 3 & -4 \end{pmatrix}$, then $A^{60} = \dots\dots\dots$

(a) $2^{30}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ **(b)** $2^{60}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ **(c)** $2^{90}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ **(d)** $2^{120}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

9 If ℓ, m are two roots of the equation : $x^2 - 4x - 10 = 0$

, then the value of $\begin{vmatrix} 2\ell & -1 \\ 3 & m \end{vmatrix}$

(a) -17 **(b)** -12 **(c)** -8 **(d)** -6

10 **Solve the system of the following linear inequalities graphically :**

$x \geq 0$, $y \geq 0$, $y \leq 8$, $\frac{1}{2}y \geq x - 2$

11 The point which makes the function $R = 20x + 15y$ has maximum value is $\dots\dots\dots$

(a) (0 , 0) **(b)** (3 , 2) **(c)** (2 , 3) **(d)** (1 , 2)

12 The number of solutions of the equation : $\cos^2\theta - 4\cos\theta + 4 = 0$ is $\dots\dots\dots$

(a) 0 **(b)** 1 **(c)** 2 **(d)** 3

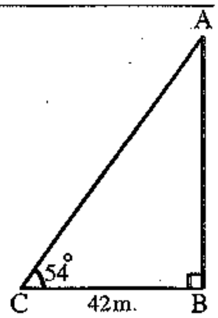
13 If $A + B = 30°$ **find the value of :** $\sin(3A + 2B) + \sin(9A + 8B)$

14 **In the opposite figure :**

Length of $\overline{AB} = \dots\dots\dots$ to nearest metre.

(a) 56 **(b)** 57

(c) 58 **(d)** 59

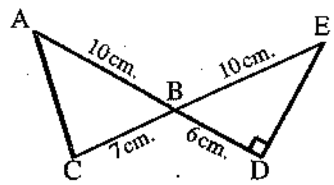


15 **In the opposite figure :**

The area of the triangle ABC = $\dots\dots\dots$ cm^2

(a) 24 **(b)** 28

(c) 32 **(d)** 35

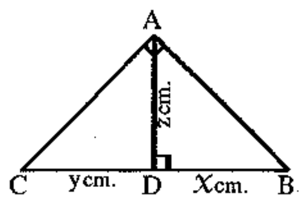


16 **In the opposite figure :**

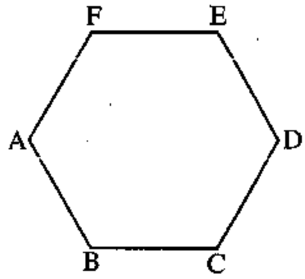
$m(\angle BAC) = 90°$, $AD \perp BC$, AD = z cm.

, BD = x cm. , DC = y cm.

Find the value of the determinant : $\begin{vmatrix} 3 & 0 & 0 \\ 2 & x & z \\ 7 & z & y \end{vmatrix}$



17 In the opposite figure :



ABCDEF is a regular hexagon ,

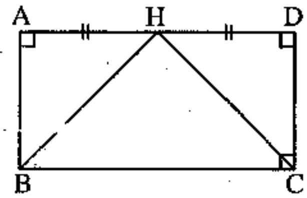
then $(\overrightarrow{AB} - \overrightarrow{CB}) + \overrightarrow{AF} + \overrightarrow{DE} =$ ....

(a) $\overrightarrow{FE}$ (b) $\overrightarrow{AE}$

(c) $\overrightarrow{AD}$ (d) $\overrightarrow{AC}$

---

18 In the opposite figure :



ABCD is a rectangle , H is the midpoint of $\overline{AD}$

, then $\overrightarrow{HB} + \overrightarrow{BA} + \overrightarrow{DC} =$ ....

(a) $\overrightarrow{HB}$ (b) $\overrightarrow{BH}$

(c) $\overrightarrow{HC}$ (d) $\overrightarrow{CH}$

---

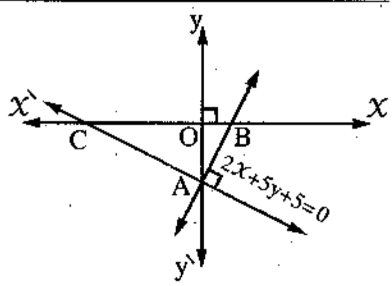
19 If $\overrightarrow{A} = (-9 , 3)$, $\overrightarrow{B} = (-2 , 27)$, then $\|\overrightarrow{AB}\| =$ ....

(a) 13 (b) 15 (c) 20 (d) 25

---

20 In the opposite figure :

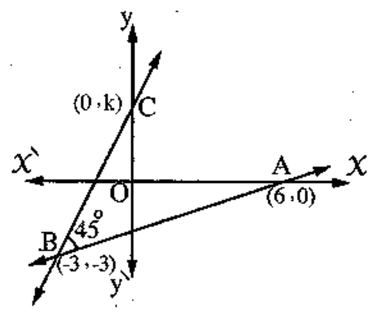
find the vector equation of $\overleftrightarrow{AB}$



---

21 In the opposite figure :

Find the value of k



---

22 If A = (3 , – 5) , B = (– 1 , 5) , $\overrightarrow{M} = (6 , k)$, $\overrightarrow{AB} \,//\, \overrightarrow{M}$, then k = ...

(a) – 15 (b) – 10 (c) – 5 (d) 5

---

23 Find the measure of the angle between the two straight lines :

$3x - y + 10 = 0$, $x - 2y - 1 = 0$

---

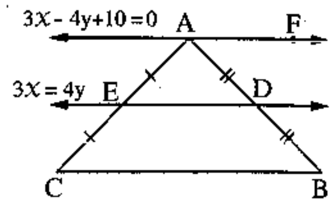
24 The point which divides $\overline{AB}$ where A (5 , – 6) , B (– 1 , 3) with ratio 1 : 2 internally is ....

(a) (0 , 0) (b) (3 , 3) (c) (– 3 , – 3) (d) (3 , – 3)

25 **In the opposite figure :**

Find length of the perpendicular

which drawn from A to $\overleftrightarrow{BC}$.



---

26 The distance between the two straight lines :

$3x - 4y + 20 = 0$, $3x - 4y + 10 = 0$ is .... length unit.

(a) 2 (b) 3 (c) 4 (d) 5

---

27 If $\overrightarrow{v_A} = 70\,\vec{i}$, $\overrightarrow{v_B} = -20\,\vec{i}$, then $\overrightarrow{v_{AB}} =$ .... $\vec{i}$

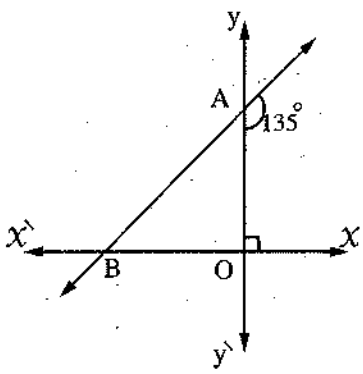
(a) -90 (b) -50 (c) 50 (d) 90

---

28 **In the opposite figure :**

If the length of $\overline{AB} = 2\sqrt{2}$ length unit

Find the equation of $\overleftrightarrow{AB}$



4 El-Sharkia Governorate

Answer the following questions :

1 If $2X + \begin{pmatrix} -2 & -2 \\ 4 & 0 \end{pmatrix} = O$, then matrix $X =$ ....

(a) $\begin{pmatrix} -2 & -2 \\ 4 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & -1 \\ 2 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 2 \\ -4 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 1 \\ -2 & 0 \end{pmatrix}$

---

2 If $\begin{vmatrix} 2x & 0 & 0 \\ 1 & 3x & 0 \\ 2 & 4 & -x \end{vmatrix} = 48$, then value of $x =$ ....

(a) 2 (b) -2 (c) ± 2 (d) zero

---

3 $(\sin\theta + \cos\theta)^2 - 2\sin\theta\cos\theta =$ ....

(a) zero (b) $\sin\theta$ (c) 1 (d) $\cos\theta$

4 The point which belongs to the S.S. of the following inequalities

$x > 2$, $y < 4$, $x - y \le 0$ is ....

(a) (2 , 3) (b) (0 , 4) (c) (3 , 3) (d) (3 , 1)

---

5 $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} =$ ....

(a) $\overrightarrow{AC}$ (b) $\overrightarrow{DA}$ (c) $\overrightarrow{AD}$ (d) $\overrightarrow{BD}$

---

6 Solve the equation : $\sin x \cos x + \cos^2 x = 0$ where $x \in [0 , \pi]$

---

7 Find the different forms of the equation of the straight line which passes through the point (4 , 1) and its slope $= \frac{3}{5}$

---

8 A circular sector , the length of its arc is 12 cm. and its perimeter is 24 cm.

, then its area = ... cm^2.

(a) 36 (b) 9 (c) 12 (d) 144

---

9 $\begin{pmatrix} 2 & 0 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 0 & 1 \\ 0 & 2 \end{pmatrix} =$ ....

(a) $\begin{pmatrix} 0 & 0 \\ 1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 0 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 2 \\ 0 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 2 \\ 0 & 0 \end{pmatrix}$

---

10 If $A \times \begin{pmatrix} 3 & -2 \\ 2 & -1 \end{pmatrix} = I$, then matrix A = ...

(a) $\begin{pmatrix} 2 & 3 \\ -1 & 5 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & 2 \\ -2 & 3 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & -1 \\ 3 & -1 \end{pmatrix}$ (d) O

---

11 If $\overrightarrow{A} = (k , 2)$, $\overrightarrow{B} = 2\,i - j$, and $\overrightarrow{A} \perp \overrightarrow{B}$, then k = ...

(a) 1 (b) − 1 (c) ± 1 (d) zero

---

12 Measure the angle between the two straight lines

$L_1 : x + 2y + 5 = 0$, $L_2 : \vec{r} = (1 , 4) + k (1 , 2)$ is ....

(a) zero (b) 45° (c) 90° (d) 135°

---

13 From the top of a tower 152 metres high , the measure of angle of depression of a body located in a horizontal level which passes through the base of the tower is $36° \, 40'$, find to nearest metre the distance between the body and base of tower and find the distance between the body and the top of tower to nearest metre.

14 ABCD is a trapezium in which $\overline{AB} \parallel \overline{CD}$, $AB = 2\,CD$, $A(2,1)$; $B(3,2)$, $C(4,0)$ find the coordinates of the point D

---

15 If $\begin{vmatrix} 3 & 1 \\ 1 & 0 \end{vmatrix} \times \begin{pmatrix} x & 2y \\ 0 & z \end{pmatrix} + I = \begin{pmatrix} 3 & 0 \\ 1 & 2 \end{pmatrix}^t$, then $x\,y\,z =$ ....

(a) 1 (b) -1 (c) 2 (d) 4

---

16 The polar form of the vector $\overrightarrow{A} = -3\,j$ is ....

(a) $\left(-3, \frac{\pi}{2}\right)$ (b) $\left(3, \frac{\pi}{2}\right)$ (c) $\left(-3, \frac{3\pi}{2}\right)$ (d) $\left(3, \frac{3\pi}{2}\right)$

---

17 The length of the perpendicular drawn from the origin point to the straight line $3x - 4y = 10$ equals .... length unit.

(a) 1 (b) 2 (c) 3 (d) 4

---

18 If $\overrightarrow{A} = 2\overrightarrow{i} + 3\overrightarrow{j}$, $\overrightarrow{B} = (k-1)\overrightarrow{i} + \overrightarrow{j}$, then $k =$ .... where $\overrightarrow{A} \parallel \overrightarrow{B}$

(a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $-\frac{5}{3}$ (d) $-\frac{3}{5}$

---

19 Area of circular segment which its central angle 30° and with radius length of its circle $2\sqrt{3}$ cm. equals ....

(a) $\frac{\pi}{3} + 2$ (b) $\pi - 3$ (c) $\pi + 3$ (d) $\frac{\pi}{3} - 2$

---

20 If $A(3,4)$, $B(2,1)$, find the ratio by which x-axis divides $\overline{AB}$ showing the type of division ?

---

21 Represent the solution set of the following inequalities graphically in $\mathbb{R} \times \mathbb{R}$

$x \geq 2$, $y \geq 1$, $x + y \leq 5$, then find the minimum value of the objective function

$P = 2x + 3y$

---

22 The area of quadrilateral in which the length of its diagonal 12 cm. and 13 cm. and cosine the angle between them is $\frac{5}{13}$ equals .... cm^2.

(a) 30 (b) 72 (c) 60 (d) 144

---

23 If twice the number x is not less than three times the number y , then ....

(a) $2x < 3y$ (b) $2x \leq 3y$ (c) $2x > 3y$ (d) $2x \geq 3y$

24 If $\overrightarrow{AB} = (-3 , 2)$, $\overrightarrow{BC} = (0 , 2)$, then $\| \overrightarrow{AC} \| =$ ....

(a) $\sqrt{13} + 2$ (b) $\sqrt{13} - 2$ (c) 4 (d) 5

25 If $\| 2 k \overrightarrow{A} \| = \| -2 \overrightarrow{A} \|$ where $\overrightarrow{A} \neq \overrightarrow{0}$, then value of k = ...

(a) 1 (b) -1 (c) ± 1 (d) zero

26 If B (0 , 3) , C (3 , 0) and A lies at third of the distance from B to C , then coordinates of the point A is ....

(a) (1 , 2) (b) (2 , 1) (c) $(-1 , -2)$ (d) $(-2 , -1)$

27 By using multiplicative inverse of matrix or by using Cramer's Rule , solve the two equations : $x + y = 3$, $x - y = 5$

28 ABCD is parallelogram in which E is the midpoint of $\overline{BC}$

Prove that : $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{DC} = 2 \overrightarrow{AE}$

5 El-Monofia Governorate

Answer the following questions :

1 The point which does not belong to the solution set of the inequalities $x \geq 2$, $y \geq 0$, $x + y > 3$ is ....

(a) (3 , 1) (b) (2 , 2) (c) (3 , 2) (d) (2 , 1)

2 The area of the circular sector whose radius length of its circle equals 4 cm. and its perimeter 20 cm. is .... cm^2

(a) 24 (b) 48 (c) 40 (d) 80

3 The measure of the angle between the two straight lines $2x = 3$, $y = 4$ is ....

(a) 30° (b) 45° (c) 60° (d) 90°

4 $2 \sin \theta - \sqrt{3} = 0$ where $90° \leq \theta \leq 270°$, then $\theta =$ ....

(a) 60° (b) 120° (c) 240° (d) 300°

5 The length of the perpendicular drawn from the origin to the straight line $\vec{r} = (5 , 0) + k (4 , 3)$ equals .... length unit.

(a) 15 (b) 5 (c) 3 (d) 4

6 If the curve $y = a x^2 + b x$ passes through the two points $(3, 0)$, $(4, 8)$ use the matrices to find the constants a and b

---

7 ABC is a triangle, D is a midpoint of $\overline{AB}$, E is a midpoint of $\overline{AC}$

Prove that : $\overrightarrow{AE} + \overrightarrow{CD} = \overrightarrow{EB} + \overrightarrow{DA}$

---

8 If the matrix A of order 2×3 and the matrix B of order 3×3, then the matrix AB of order ....

(a) 2×2 (b) 3×3 (c) 3×2 (d) 2×3

---

9 If $A + A^t = O$, then A is a .... matrix.

(a) column (b) row (c) symmetric (d) skew symmetric

---

10 In $\triangle ABC$, $\overrightarrow{AB} - \overrightarrow{CB} + \overrightarrow{AC} =$ ....

(a) $2\,\overrightarrow{AC}$ (b) $\overrightarrow{CA}$ (c) $\overrightarrow{AC}$ (d) $2\,\overrightarrow{AB}$

---

11 If the area of the triangle bounded by the straight line $\frac{x}{6} + \frac{y}{b} = 1$ and the coordinate axes is 9 square unit, then $b =$ ....

(a) ± 3 (b) ± 9 (c) 6 (d) ± 6

---

12 The direction vector perpendicular to the straight line

$x = 3 + 2k$, $y = 4 - k$ is ....

(a) $(2, -1)$ (b) $(1, 2)$ (c) $(2, 1)$ (d) $(4, -2)$

---

13 If the measure of the acute angle between the two straight lines :

$x + k y - 8 = 0$, $2x - y - 5 = 0$ equals $\frac{\pi}{4}$. Find the value of k

---

14 A ship approaches to a light house of 50 m. high. At a certain instant the measure of elevation angle of the top of the light house was 0.11^{rad} and after 15 minutes, the angle of elevation becomes 0.22^{rad}, calculate the speed of the ship knowing that it moves with uniform speed.

---

15 If $\begin{vmatrix} x & -1 \\ 2 & x \end{vmatrix} + \begin{vmatrix} 1 & 3 \\ 2 & x \end{vmatrix} = 2$, then $x =$ ....

(a) 3 or -2 (b) -3 or 2 (c) 3 or 2 (d) -3 or -2

16 If $\begin{pmatrix} 4 & 1 \\ 3 & 1 \end{pmatrix}\begin{pmatrix} 1 & -1 \\ -3 & x \end{pmatrix} = I$, then $x =$ ....

(a) 1 (b) 2 (c) 3 (d) 4

17 If $\sin\theta + \csc\theta = 5$, then $\sin^2\theta + \csc^2\theta =$ ....

(a) 1 (b) 5 (c) 23 (d) 25

18 If the two vectors $\overrightarrow{AB} = (2 , 3)$, $\overrightarrow{CB} = (-3 , 5)$, then $\overrightarrow{AC} =$ ....

(a) $(5 , -2)$ (b) $(-8 , 1)$ (c) $(-2 , 5)$ (d) $(2 , 5)$

19 The straight line $\vec{r} = (5 , 2) + k(3 , 3)$ makes with the positive direction of x-axis an angle of measure ....

(a) 30° (b) 45° (c) 60° (d) 90°

20 If $A = (2 , 3)$, $B = (-2 , 1)$. Find the ratio by which the x-axis divides $\overline{AB}$ and find the coordinates of the division point.

21 $\overline{AB}$, $\overline{AC}$ are two chords in a circle where $m(\angle A) = 45°$; $BC = 10$ cm. , find the area of the minor circular segment bounded by the chord $\overline{BC}$

22 If $\begin{vmatrix} 2 & 1 \\ 3 & 5 \end{vmatrix} - 12 = x$, then $x =$ ....

(a) 5 (b) -5 (c) -3 (d) 2

23 If $\tan\theta = 3$, then $\sec^2\theta =$ ....

(a) 9 (b) 10 (c) -10 (d) 0.9

24 If $\vec{u} = -2\vec{i} + 3\vec{j}$ is a direction vector of a straight line , then all the following are direction vectors for the same line except ....

(a) $2\vec{i} - 3\vec{j}$ (b) $6\vec{i} - 9\vec{j}$ (c) $-4\vec{i} + 6\vec{j}$ (d) $3\vec{i} - 2\vec{j}$

25 The equation of one of the two straight lines bisecting the angle between the two axes is ....

(a) $y = 2$ (b) $x = 2y$ (c) $y = x$ (d) $y = 4x$

26 If the straight line : $c\,x + b\,y + a =$ zero is parallel to the y-axis , then .... = zero

(a) a (b) b (c) c (d) x

27 ABCD is a parallelogram in which E is the midpoint of $\overline{BC}$.

Prove that : $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{DC} = 2\ \overrightarrow{AE}$

---

28 Find the matrix A which satisfies $A \times \begin{pmatrix} -2 & 2 \\ 4 & 3 \end{pmatrix} = \begin{pmatrix} 12 & 23 \\ 8 & 13 \end{pmatrix}$

6 El-Dakahlia Governorate

Answer the following questions :

1 If X is a matrix of order 2×3 , Y is a square matrix and the matrix YX is defined , then the matrix YX is of order ....

(a) 2×2 (b) 3×3 (c) 3×2 (d) 2×3

---

2 The area of a circular sector is 45 cm^2 and the diameter length of its circle is 20 cm. , then its perimeter equals ....

(a) 29 cm. (b) 19 cm. (c) 39 cm. (d) 49 cm.

---

3 If the three points $A = (-7 , k)$, $B = (-3 , -2)$, $C = (5 , e)$ lies on the same straight line , **find :**

First : The ratio by which the point B divides the line segment $\overrightarrow{AC}$ determine the type of division.

Second : The length of the perpendicular drawn from the point B on the straight line $2y + 3x = \text{zero}$

---

4 If $\overrightarrow{A} = (5 , 3)$, $\overrightarrow{B} = (1 , m)$, then $\overrightarrow{A} \mathbin{/\mkern-5mu/} \overrightarrow{B}$ at m = ...

(a) zero (b) 5 (c) 0.6 (d) $\frac{5}{3}$

---

5 Which of the following points belong to the solution set of the system :

$x > 0$, $y > 0$, $2x + y > 6$?

(a) (1 , 3) (b) (0 , 0) (c) (2 , 3) (d) (4 , −2)

---

6 Find the general solution for the equation : $\cot \theta + 1 = 0$

---

7 The area of a regular hexagon whose side length is 8 cm. equals .... cm^2

(a) $12\sqrt{3}$ (b) $24\sqrt{3}$ (c) $96\sqrt{3}$ (d) $144\sqrt{3}$

8 If the two vectors $\overrightarrow{A} = (k , 3)$, $\overrightarrow{B} = (12 , k)$ are parallel , then k = ...

(a) 6 (b) 18 (c) – 6 (d) ± 6

9 If $A^t = \begin{pmatrix} 2 & -4 \\ 4 & 3 \end{pmatrix}$, **prove that :** $A^2 - 5A + 22I = 0$

10 The straight line $\frac{x}{4} + \frac{y}{7} = 1$, makes with the coordinate axes a right angled triangle its area equals .... square unit.

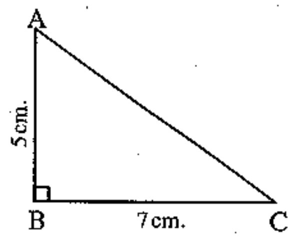
(a) 4 (b) 7 (c) 14 (d) 28

11 If the straight line : $c\,x + b\,y + a = 0$ is parallel to the y-axis , then .... = zero.

(a) a (b) b (c) c (d) x

12 Find the equation of the straight line passing through the point (– 2 , 0) and perpendicular to the straight line $y = x - 8$

13 **In the opposite figure :**



m (∠ C) = ... to the nearest degree

(a) 30° (b) 35°

(c) 36° (d) 45°

14 All the following are unit vectors except ....

(a) (1 , 0) (b) (0 , – 1) (c) (1 , 1) (d) (0.6 , 0.8)

15 ABCD is a quadrilateral , $2\,\overrightarrow{BC} = 5\,\overrightarrow{AD}$ **Prove that :** $2\,\overrightarrow{AC} + 2\,\overrightarrow{BD} = 7\,\overrightarrow{AD}$

16 The solution set of the equation $\begin{vmatrix} x & 0 & 0 \\ 5 & 3 & 0 \\ 4 & -1 & 2x \end{vmatrix} = 6$ is ....

(a) {3} (b) {6} (c) {1 , – 1} (d) {6 , – 6}

17 The length of the perpendicular drawn from the point (4 , 3) to the x-axis equals .... length unit.

(a) 3 (b) 4 (c) 5 (d) 6

18 Find the maximum value of the objective function $P = 3\,x + 2\,y$ under constraints $x \geq 0$, $y \geq 0$, $2\,x \leq 3\,y$, $2\,y + x \leq 7$

19 In Δ ABC , $\overrightarrow{AB} - \overrightarrow{CB} + \overrightarrow{AC} =$ ....

(a) $\overrightarrow{AC}$ (b) $\overrightarrow{CA}$ (c) $2\,\overrightarrow{AC}$ (d) $2\,\overrightarrow{AB}$

---

20 The direction vector of the straight line whose parametric equations :

$x + 3 = 2\,k$, $y = 5$ is ....

(a) $(2 , 0)$ (b) $(2 , -3)$ (c) $(2 , 3)$ (d) $(2 , 5)$

---

21 Find the measure of the acute angle between the two straight lines :

$L_1 : \vec{r} = (4 , 2) + k\,(-3 , 1)$, $L_2 : 2\,x = 3 - y$

---

22 The matrix $\begin{pmatrix} x+3 & 0 \\ 2 & x-3 \end{pmatrix}$ does not have a multiplicative inverse when $x =$ ....

(a) 3 (b) ± 3 (c) 5 (d) ± 5

---

23 If $\| k\,(3 , 4) \| = 1$, then $k =$ ....

(a) 5 (b) $\frac{1}{5}$ (c) $\pm\frac{1}{5}$ (d) ± 5

---

24 The length of a chord drawn in a circle is 12 cm. If the chord subtends an inscribed angle of measure 60° find the area of the minor circular segment to the nearest cm^2.

---

25 The measure of the angle between the two straight lines $3\,x = 5$, $y = 3$ equals ....

(a) 30° (b) 45° (c) 60° (d) 90°

---

26 $3 \tan\theta \cot\theta + 2 \sin\theta \csc\theta + \cos\theta \sec\theta =$ ....

(a) 1 (b) 3 (c) 5 (d) 6

---

27 If X is a matrix where $X \times \begin{pmatrix} 2 \\ 5 \end{pmatrix} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$, then X = ...

(a) $\begin{pmatrix} 1 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$ (c) I (d) (1)

---

28 The distance between the two straight lines $x + 2 = 0$, $x - 2 = 0$

equals .... length unit.

(a) -4 (b) -2 (c) 2 (d) 4

7 Port Said Governorate

Answer the following questions :

1 If $A^T + B^T = \begin{pmatrix} 1 & 0 \\ 3 & -1 \end{pmatrix}$, then $2(A+B)^T = \dots\dots$

(a) $\begin{pmatrix} 2 & 6 \\ 0 & -2 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 0 \\ 3 & -1 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 0 \\ 6 & -2 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 3 \\ 0 & -1 \end{pmatrix}$

2 If $\overrightarrow{A} = (3, -2)$, $\overrightarrow{B} = (1, 2)$, then $\overrightarrow{AB} = \dots\dots$

(a) $(3, -4)$ (b) $(-2, 4)$ (c) $(4, 0)$ (d) $(2, -4)$

3 The perimeter of a circular sector 19 cm. and the length of its arc 7 cm. , then the diameter of its circle = ... cm.

(a) 12 (b) 14 (c) 7 (d) 6

4 If the matrix $\begin{pmatrix} x & 8 \\ 2 & x \end{pmatrix}$ has no multiplicative inverse , then $x = \dots\dots$

(a) 4 (b) -4 (c) 0 (d) ± 4

5 If $A = (3, -2)$, $B = (-1, 5)$, then find the coordinates of C which divides $\overline{AB}$ externally by the ratio 4 : 3

6 The slop of perpendicular to the straight line whose equation :

$\vec{r} = (2, 1) + k(-5, 3)$ equal ....

(a) $\frac{-5}{3}$ (b) $\frac{5}{3}$ (c) $\frac{1}{2}$ (d) $\frac{3}{5}$

7 Solve the system of the following linear equations using matrices :

$x + 3y - 5 = 0$, $2x = 8 - 5y$

8 A circular sector of area 27 cm^2 and the radius of the circle = 6 cm. , then the measure of central angle = ... rad

(a) 1.5 (b) 2 (c) 3 (d) 4.5

9 The measure of the angle between the two straight lines $x = 3$, $y = 5$ equal ....

(a) 30° (b) 180° (c) 90° (d) 0°

10 By using determinants , then the area of triangle ABC in which :
A (– 4 , – 2) , B (0 , 3) , C (0 , 0) equal ....

(a) – 6 (b) 12 (c) – 12 (d) 6

---

11 If $\vec{A} = \left(6\sqrt{2} , \frac{3\pi}{4}\right)$ position vector of the point A , then A = ...

(a) (6 , – 6) (b) (– 6 , 6) (c) (6 , 6) (d) (– 6 , – 6)

---

12 From a point at the top of a tower of length 100 metre , it is found the angle of depression of a boat in the horizontal plane that passes through the base of the tower is 35°. Find the distance between the boat and the base of the tower.

---

13 The area of triangle ABC in which AB = 12 cm. , AC = 8 cm. , m (A) = 150° equal .... cm^2.

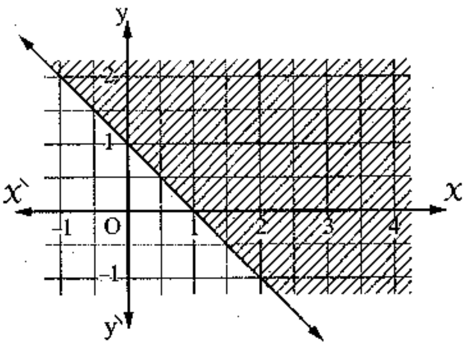
(a) 12 (b) 24 (c) 36 (d) 48

---

14 Find the different forms of the straight line passing through the point (3 , – 1) , its slope = $\frac{3}{2}$

---

15 **In the opposite figure :**



The shaded region represents the solution set of the inequality : ....

(a) $x + y \geq 1$

(b) $x + y \leq 1$

(c) $x + y > 1$

(d) $x - y < 1$

---

16 The straight line which equation : $2x - 3y = 6$, intersect the x-axis at the point ....

(a) (– 3 , 0) (b) (3 , – 2) (c) (3 , 0) (d) (0 , – 2)

---

17 Solve the equation : $\sec\theta - 2 = 0$ where $\pi < \theta < 2\pi$ is ....

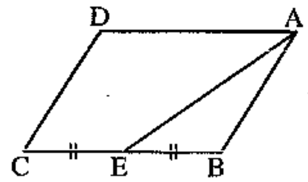
(a) 240° (b) 300° (c) 150° (d) 60°

---

18 If $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ is a skew matrix , then b + c = ...

(a) 2 a (b) 2 d (c) 2 (d) 0

19 **In the opposite figure :**



ABCD is a parallelogram in which E is the midpoint of $\overline{BC}$.

Prove that : $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{DC} = 2\,\overrightarrow{AE}$

---

20 ABCD is parallelogram in which : A = (7 , – 2) , B = (15 , 4) , C = (9 , 6)

, then the coordinates of the point D = ...

(a) (1 , 0) (b) (0 , 1) (c) (– 1 , 0) (d) (0 , – 1)

---

21 **Determine the solution set of the following inequalities graphically :**

$x \geq 0$, $y \geq 0$, $x + y \leq 4$, $3x + 4 \leq 6$

---

22 The length of the perpendicular drawn from the point (3 , – 5) to the straight line : $x + 7 = 0$ equals .... length units.

(a) 2 (b) 4 (c) 10 (d) 12

---

23 If $\begin{pmatrix} 6 & 1 \\ 5 & -3 \end{pmatrix} = x\begin{pmatrix} 0 & 1 \\ 5 & 0 \end{pmatrix} - y\begin{pmatrix} -2 & 0 \\ 0 & 1 \end{pmatrix}$, then $x + y =$ ....

(a) 4 (b) 3 (c) 2 (d) – 2

---

24 The point of intersection of medians (concurrent) to the Δ ABC in which

A = (3 , 2) , B = (1 , – 2) , C = (– 1 , 6) is ....

(a) (– 1 , 2) (b) (1 , 2) (c) (1 , – 2) (d) (– 1 , – 2)

---

25 If the point C lies in the third distance from A to B , then C divided $\overline{AB}$ internally by the ratio ....

(a) 1 : 3 (b) 3 : 1 (c) 2 : 1 (d) 1 : 2

---

26 **Prove that :** $\tan^2\theta = \sin^2\theta + \sin^2\theta\tan^2\theta$

---

27 If $\overrightarrow{A} = (k , -2)$, $\overrightarrow{B} = (-12 , 6)$, $\overrightarrow{A} \mathbin{/\!/} \overrightarrow{B}$, then k = ...

(a) 4 (b) – 4 (c) 1 (d) – 1

---

28 Find the length of perpendicular from a point (1 , 3) to the straight line $6x - 8y = 12$

8 Matrouh Governorate

Answer the following questions :

1 If O is the zero matrix of order 2×2 , then the number of its elements = ...

(a) zero (b) $\varnothing$ (c) 2 (d) 4

---

2 The solution set of the equation $\sqrt{3} \tan \theta = 1$, $90° < \theta < 270°$ is ....

(a) $\{30°\}$ (b) $\{150°\}$ (c) $\{210°\}$ (d) $\{240°\}$

---

3 The area of a circular sector is 15 cm^2 and its arc length is 2 cm. , then the radius length of its circle is .... cm.

(a) 5 cm. (b) 10 cm. (c) 2.5 cm. (d) 15 cm.

---

4 **Solve the two equations simultaneously using Cramer's method :**

$3x + y = 0$, $2x - y = 5$

---

5 If $\overrightarrow{A} = (0, 6)$, $\overrightarrow{B} = (4, 3)$, then $\overrightarrow{AB} =$ ....

(a) $(-4, 3)$ (b) $(4, -3)$ (c) $(4, 3)$ (d) $(-4, -3)$

---

6 The measure of the angle between the two straight lines $y = x$, $x =$ zero is ....

(a) zero (b) 45° (c) 30° (d) 60°

---

7 If $\begin{vmatrix} 3 & -1 \\ x & 2 \end{vmatrix} - 6 = 0$, then $x =$ ....

(a) zero (b) 6 (c) -6 (d) 12

---

8 If $A = \begin{pmatrix} 1 \\ -2 \end{pmatrix}$, $B = (2 \quad 3)$, then BA = ...

(a) (-4) (b) (4) (c) $\begin{pmatrix} 2 & 3 \\ -4 & -6 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & -4 \\ 3 & -6 \end{pmatrix}$

---

9 If $B^t A^t = \begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$, then $(AB)^t =$ ....

(a) $\begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} -3 & 2 \\ 0 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 2 \\ 0 & -3 \end{pmatrix}$

10 The value of a which makes the matrix $\begin{pmatrix} a & 2 \\ 2 & a \end{pmatrix}$ has no multiplicative inverse is ....

(a) 2 (b) -2 (c) ± 2 (d) ± 4

11 $(\sin^2 40° + \cos^2 40°)^5 =$ ....

(a) 1 (b) -1 (c) 5 (d) -5

12 The following vectors are unit vectors except ....

(a) $(1 , 1)$ (b) $(0 , -1)$ (c) $(1 , 0)$ (d) $\left(\frac{3}{5} , \frac{4}{5}\right)$

13 The point which belongs to the solution set of the inequalities : $x > 2$, $y > 1$ together is ....

(a) $(1 , 2)$ (b) $(2 , 1)$ (c) $(3 , 1)$ (d) $(3 , 2)$

14 If $\| k \overrightarrow{A} \| = 4 \| \overrightarrow{A} \|$, then $k =$ ....

(a) 4 (b) -4 (c) ± 4 (d) 2

15 If $\sin^2 \theta + \cos^2 \theta + \tan^2 \theta =$ ....

(a) 1 (b) $\sec^2 \theta$ (c) $\cot^2 \theta$ (d) $\tan^2 \theta$

16 If A $(1 , 2)$, B $(2 , 1)$, C $(3 , 6)$ are vertices of a triangle , then the coordinates of the point of intersections of its medians of the triangle is ....

(a) $(2 , 3)$ (b) $(3 , 2)$ (c) $(6 , 9)$ (d) $(3 , 2)$

17 Find the length of the perpendicular drawn from the point $(2 , -4)$ to the straight line $3x + 4y = 5$

18 If ABCD is a quadrilateral , **Prove that :** $\overrightarrow{AB} + \overrightarrow{DC} = \overrightarrow{AC} + \overrightarrow{DB}$

19 If $\overrightarrow{A} = (\ell , -3)$, $\overrightarrow{B} = (2 , -2)$, $\overrightarrow{A} \perp \overrightarrow{B}$, then $\ell =$ ....

(a) 3 (b) -3 (c) $\frac{1}{3}$ (d) $-\frac{1}{3}$

20 If ABCD is a parallelogram , then the diagonal $\overrightarrow{AC} =$ ....

(a) $\overrightarrow{AB} + \overrightarrow{AD}$ (b) $\overrightarrow{AB} + \overrightarrow{AC}$ (c) $2\,\overrightarrow{AD}$ (d) $2\,\overrightarrow{AB}$

21 **Find the measure of the acute angle between the two straight lines :**

$6x - 3y + 5 = 0$, $x - 3y = 7$

---

22 If A (– 1 , – 1) , B (9 , 4) find the coordinates of the point C if $C \in \overline{AB}$

such that : AC = 4 CB

---

23 **Prove the identity :** $\sin^2\theta + \sin^2\theta \tan^2\theta = \tan^2\theta$

---

24 From the top of a mountain of height 2.5 km. , a man observes a point on the ground surface. Its depression angle of measure 63°. Find the distance between this point and the observer to the nearest metre.

---

25 If $\overrightarrow{A} = 2\overrightarrow{B}$, then ....

(a) $\overrightarrow{A} \perp \overrightarrow{B}$ (b) $\overrightarrow{A} // \overrightarrow{B}$ (c) $2\overrightarrow{A} = \overrightarrow{B}$ (d) $\|\overrightarrow{A}\| = \|\overrightarrow{B}\|$

---

26 If $A = \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}$, $B = \begin{pmatrix} -1 & 2 \\ 3 & 1 \end{pmatrix}$ **Find the matrix X where :** $X - AB = \begin{pmatrix} 1 & 0 \\ -3 & 2 \end{pmatrix}$

---

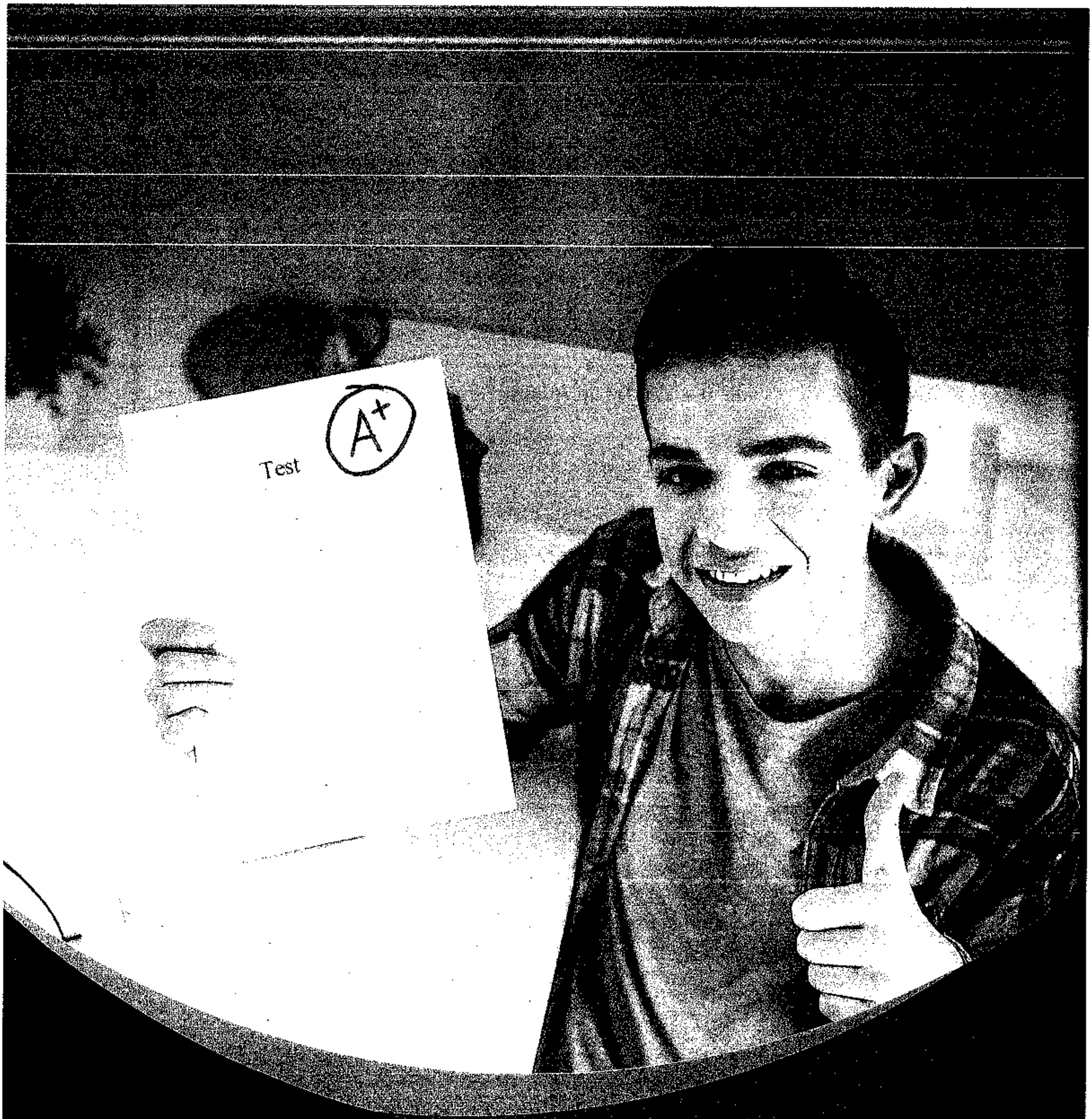
27 The distance between the two straight lines y + 2 = 0 , y – 3 = 0 is .... length unit.

(a) 5 (b) 1 (c) 6 (d) 4

---

28 In Δ ABC , $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} =$ ....

(a) O (b) $\overrightarrow{0}$ (c) zero (d) $\overrightarrow{A}$



Multiple Choice Final Examinations

Interacitve tests using
QR Codes

Interactive test 1

Model 1

Choose the correct answer from the given ones :

1 If $\overrightarrow{AB} = 3\,\overrightarrow{i} + 3\,\overrightarrow{j}$, $\overrightarrow{BC} = \overrightarrow{j}$, then $\| \overrightarrow{AC} \| =$ ....

(a) 6 **(b)** $3\sqrt{2}$ **(c)** 1 **(d)** 5

---

2 A cyclist covers 5 m. from a fixed point (O) due to the north , then 12 m. due to the east , then the total distance covered during the whole Journey = ... m.

(a) 13 **(b)** 12 **(c)** 7 **(d)** 17

---

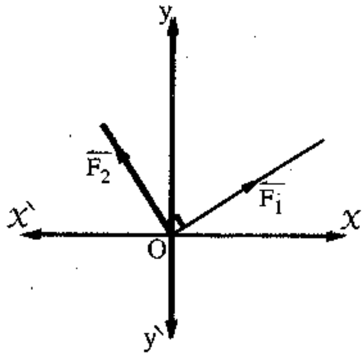
3 If $\begin{pmatrix} 1 & x & 2 \\ -1 & xy & 5 \end{pmatrix} = \begin{pmatrix} 1 & -3 & 2 \\ -1 & -15 & 5 \end{pmatrix}$, then $(x , y) =$ ....

(a) $(-3 , 5)$ **(b)** $(5 , -3)$ **(c)** $(-5 , 3)$ **(d)** $(3 , -5)$

---

4 **In the opposite figure :**

If $\| F_1 \| = 6$ newton , $\| F_2 \| = 4$ newton , $\overrightarrow{F_1} \perp \overrightarrow{F_2}$, then the normal of the resultant of the two forces = ... newton.



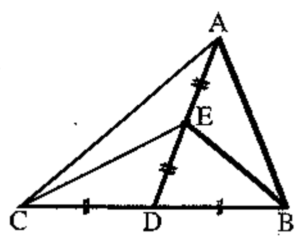
(a) 10 **(b)** 2

(c) $2\sqrt{13}$ **(d)** $\sqrt{10}$

---

5 **In the opposite figure :**

D is the midpoint of $\overline{BC}$, E is the midpoint $\overline{AD}$, then $\overrightarrow{AB} + \overrightarrow{AC} =$ ....



(a) $2\,\overrightarrow{AE}$ **(b)** $2\,\overrightarrow{AD}$ **(c)** $\overrightarrow{EB} + \overrightarrow{EC}$ **(d)** $2\,\overrightarrow{EB} + \overrightarrow{EC}$

---

6 From the top of a light house 80 metres high , the measure of the angle of depression of a fixed target on the see equals 80° , then the distance between the fixed target and the top of the light house equals .... to nearest metre.

(a) 78 **(b)** 79 **(c)** 80 **(d)** 81

7 The equation of the straight line which passes through the intersection point of the two lines $X + 5 = 0$, $y - 3 = 0$ and the origin point is ....

(a) $5X - 3y = 0$ (b) $5X + 3y = 0$ (c) $3X - 5y = 0$ (d) $3X + 5y = 0$

---

8 If $B = \begin{pmatrix} 2 & 4 \\ 3 & 1 \end{pmatrix}$, $AB = I$, then the matrix $A =$ ....

(a) $\begin{pmatrix} \frac{1}{5} & \frac{2}{5} \\ \frac{3}{10} & \frac{1}{10} \end{pmatrix}$ (b) $\begin{pmatrix} \frac{-1}{10} & \frac{2}{5} \\ \frac{3}{10} & \frac{-1}{5} \end{pmatrix}$ (c) $\begin{pmatrix} \frac{1}{10} & \frac{-2}{5} \\ \frac{-3}{10} & \frac{1}{5} \end{pmatrix}$ (d) $\begin{pmatrix} \frac{1}{2} & \frac{1}{4} \\ \frac{2}{5} & \frac{-1}{10} \end{pmatrix}$

---

9 The intercepted negative part of y-axis by the straight line : $2X - 3y - 6 = 0$ equals .... length unit.

(a) 2 (b) 3 (c) 6 (d) 5

---

10 If $\overrightarrow{A} = (k , k + 3)$, $\overrightarrow{B} = (2k , 5k - 3)$, then one of the values of k which makes $\overrightarrow{A} \parallel \overrightarrow{B}$ is ....

(a) 3 (b) -3 (c) 2 (d) -2

---

11 If $\overrightarrow{A} = (5 , 2)$, $\overrightarrow{B} = (2 , 5)$ and $\overrightarrow{C} = \overrightarrow{A} - \overrightarrow{B}$, then the polar form for $\overrightarrow{C}$ is ....

(a) $\left(3 , \frac{\pi}{4}\right)$ (b) $\left(3\sqrt{2} , \frac{3\pi}{4}\right)$ (c) $\left(3 , \frac{7\pi}{4}\right)$ (d) $\left(3\sqrt{2} , \frac{7\pi}{4}\right)$

---

12 The area of the circular sector in which the length of its circle radius is 6 cm. and its perimeter is 22 cm. equals .... cm^2

(a) 132 (b) 60 (c) 30 (d) 66

---

13 The value of "a" which makes $\begin{vmatrix} 1 & 2 & -1 \\ 3 & a & 1 \\ -1 & 4 & -2 \end{vmatrix} = 0$ is ....

(a) 5 (b) -2 (c) 1 (d) 3

---

14 If the straight line which passes through the point M (2 , 3) and $\overrightarrow{u}$ is a direction vector to it where $\overrightarrow{u} = (-1 , 2)$, then the parametric equations of the line L are ....

(a) $X = 2 - k$, $y = -3 + 2k$ (b) $X = 2 - k$, $y = 3 - 2k$

(c) $X = 2 + k$, $y = 3 + 2k$ (d) $X = 2 - k$, $y = 3 + 2k$

15 If $A = \begin{pmatrix} 2 & 3 & -1 \\ 4 & -7 & 6 \end{pmatrix}$, then $2A^t = \dots\dots$

(a) $\begin{pmatrix} 4 & 6 & -2 \\ 8 & -14 & 12 \end{pmatrix}$ (b) $\begin{pmatrix} 4 & 4 \\ 6 & -7 \\ 2 & 6 \end{pmatrix}$ (c) $\begin{pmatrix} 4 & 8 \\ 6 & -14 \\ -2 & 12 \end{pmatrix}$ (d) $\begin{pmatrix} 2 & 8 \\ 3 & -14 \\ -1 & 11 \end{pmatrix}$

---

16 If $\overrightarrow{A} = \left(5, \frac{5\pi}{6}\right)$, then the vector $\overrightarrow{A}$ in terms of the fundamental unit vectors equals $\dots\dots$

(a) $\frac{5}{2}\overrightarrow{i} + \frac{5\sqrt{3}}{2}\overrightarrow{j}$ (b) $\frac{5\sqrt{3}}{2}\overrightarrow{i} + \frac{5}{2}\overrightarrow{j}$ (c) $\frac{-5\sqrt{3}}{2}\overrightarrow{i} + \frac{5}{2}\overrightarrow{j}$ (d) $\frac{5}{2}\overrightarrow{i} - \frac{5\sqrt{3}}{2}\overrightarrow{j}$

---

17 The simplest form of the expression $\frac{\sin X \cos X \tan X + \sin X \cos X \cot X}{\sin X \sec X} = \dots\dots$

(a) $\cot X$ (b) $\tan X$ (c) $\cos X$ (d) $\csc X$

---

18 The value of X which satisfies the equation : $5 \sin X = 12 \cos X$ where $X \in [0, \pi]$ is $\dots\dots$ (to the nearest second)

(a) $157° 22' 48''$ (b) $112° 37' 12''$ (c) $22° 37' 12''$ (d) $67° 22' 48''$

---

19 If $\overline{AE}$ is a median of ΔABC, M is the centriod of the triangle ABC, A (5, 4), M (7, 8), then $\overrightarrow{AE} = \dots\dots$

(a) $\left(\frac{4}{3}, \frac{8}{3}\right)$ (b) $\left(\frac{2}{3}, \frac{4}{3}\right)$ (c) (3, 6) (d) (1, 2)

---

20 If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 5$, $d - c = 7$, then $\begin{vmatrix} a+2 & b+2 \\ c & d \end{vmatrix} = \dots\dots$

(a) 5 (b) 14 (c) -9 (d) 19

---

21 The general solution for the equation : $\frac{\tan 5X}{\tan(90 + 4X)} = -1$ is $\dots\dots$ (where $n \in \mathbb{Z}$)

(a) $X = 90° + 180° n$ (b) $X = 10° + 20° n$

(c) $X = 90° + 360° n$ (d) $X = 10° + 40° n$, $X = 90° + 360° n$

---

22 If $\begin{vmatrix} a \sin X & 0 & 0 \\ 1 & a \cos X & 0 \\ \sec X & \cot X & a \tan X \end{vmatrix} = -a^3 \cos^2 X + 8$, then $a = \dots\dots$

(a) 8 (b) -2 (c) -8 (d) 2

---

23 The point which belongs to the solution set of the inequality $X > 2$, $y < 4$, $X - y \leq 0$ is $\dots\dots$

(a) (2, 3) (b) (0, 4) (c) (3, 3) (d) (3, 1)

24 If $2X + \begin{pmatrix} -2 & -2 \\ 4 & 0 \end{pmatrix} = O$, then the matrix $X =$ ....

(a) $\begin{pmatrix} -2 & -2 \\ 4 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} -1 & -1 \\ 2 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 2 & 2 \\ -4 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 1 \\ -2 & 0 \end{pmatrix}$

---

25 If $\overrightarrow{A} = (k , 2)$, $\overrightarrow{B} = 2\overrightarrow{i} - \overrightarrow{j}$ and $\overrightarrow{A} \perp \overrightarrow{B}$, then $k =$ ....

(a) 1 (b) -1 (c) ± 1 (d) zero

---

26 The measure of the angle between the two lines
$L_1 : X + 2y + 5 = 0$, $L_2 : \overrightarrow{r} = (1 , 4) + k(1 , 2)$ equals ....

(a) zero (b) 45° (c) 90° (d) 135°

---

27 If $\begin{vmatrix} 3 & 1 \\ 1 & 0 \end{vmatrix} \times \begin{pmatrix} X & 2y \\ 0 & z \end{pmatrix} + I = \begin{pmatrix} 3 & 0 \\ 1 & 2 \end{pmatrix}^t$, then $X \times y \times z =$ ....

(a) 1 (b) -1 (c) 2 (d) 4

---

28 The length of the perpendicular drawn from the origin to the straight line $3X - 4y = 10$ equals .... length unit.

(a) 1 (b) 2 (c) 3 (d) 4

---

29 The area of the circular segment where the measure of its central angle is 30° and the length of the radius of its circle is $2\sqrt{3}$ cm. equals ....

(a) $\frac{\pi}{3} + 2$ (b) $\pi - 3$ (c) $\pi + 3$ (d) $\frac{\pi}{3} - 2$

---

30 The area of the convex quadrilateral whose diagonals lengths are 12 cm. , 13 cm. and cosine the included angle between them is $\frac{5}{13}$ equals ....

(a) 30 (b) 72 (c) 60 (d) 144

---

31 If B (0 , 3) , C (3 , 0) and A lies at third the distance from B to C , then the coordinates of the point A is ....

(a) (1 , 2) (b) (2 , 1) (c) (– 1 , – 2) (d) (– 2 , – 1)

---

32 If $\| 2K\overrightarrow{A} \| = \| -2\overrightarrow{A} \|$, $\overrightarrow{A} \neq \overrightarrow{0}$, then the value of $k =$ ....

(a) 1 (b) -1 (c) ± 1 (d) zero

---

33 If double the number X does not decrease than triple the number y , then ....

(a) $2X < 3y$ (b) $2X \leq 3y$ (c) $2X > 3y$ (d) $2X \geq 3y$

34 $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CD} =$ ....

(a) $\overrightarrow{AC}$ (b) $\overrightarrow{DA}$ (c) $\overrightarrow{AD}$ (d) $\overrightarrow{BD}$

---

35 The ratio in which the X-axis divides the directed line segment $\overrightarrow{BA}$ where $A(3, 2)$, $B(5, 6)$ equals ....

(a) 2 : 5 (b) 5 : 2 (c) 1 : 3 (d) 3 : 1

---

36 If $A = \begin{pmatrix} 4 & 0 \\ 3 & -4 \end{pmatrix}$, then $A^{60} =$ ....

(a) $2^{30}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $2^{60}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (c) $2^{90}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (d) $2^{120}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

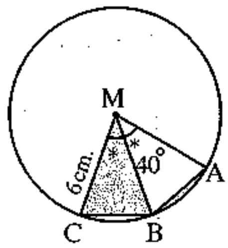
---

37 **In the opposite figure :**

Circle M , MC = 6 cm.

, m (∠ AMB) = m (∠ CMB) = 40°

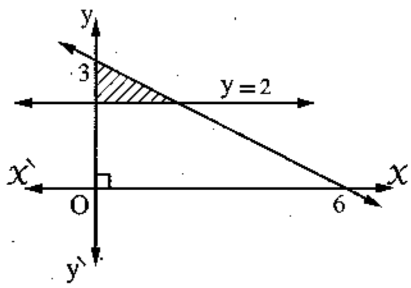
, then the area of the shaded part = ...



(a) 4π (b) 5π (c) 6π (d) 7π

---

38 The shaded area which represents the solution set of the inequality $y \geq 2$, $X \geq 0$ is ....



(a) $X + 2y - 6 \leq 0$

(b) $X + 2y + 6 \leq 0$

(c) $5X + 2y - 6 \geq 0$

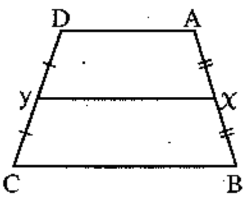
(d) $X + 2y + 6 \geq 0$

---

39 **In the opposite figure :**

ABCD is a trapezium , if $\overrightarrow{AD} + \overrightarrow{BC} = k\,\overrightarrow{yX}$

, then k = ... where $k \in \mathbb{R}$



(a) – 2 (b) – 1 (c) 1 (d) 2

---

40 If $\vec{v}_A = 70\,\vec{e}$, $\vec{v}_B = -20\,\vec{e}$, then $\vec{v}_{AB} =$ .... $\vec{e}$

(a) – 90 (b) – 50 (c) 50 (d) 90

Model 2

Interactive test 2

Choose the correct answer from the given ones :

1 If $X = \begin{pmatrix} 1 & a \\ 0 & -1 \end{pmatrix}$, then $X^{-1} =$ ....

(a) X (b) X^t (c) I (d) O

---

2 If the slope of a straight line $= \frac{-2}{3}$, then its direction vector is ....

(a) (3 , – 2) (b) (– 3 , 2)

(c) (6 , – 4) (d) All the previous answers are correct.

---

3 Equation of the straight line passing through the origin point and the point (– 4 , 4) is ....

(a) $x = -4$ (b) $y = 4$ (c) $x + y = 0$ (d) $x = y$

---

4 If ℓ and m are the two roots of the equation : $x^2 - 3x + 1 = 0$

, then value of $\begin{vmatrix} \ell^2 m & -\ell^2 \\ m^2 & m \end{vmatrix} =$ ....

(a) zero (b) 1 (c) 2 (d) 3

---

5 **In the opposite figure :**

If the equation of the straight line $\overleftrightarrow{AB}$ is $\frac{x}{6} + \frac{y}{8} = 1$

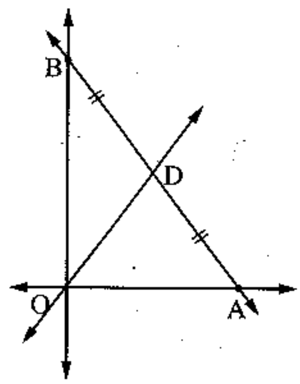
, then parametric equation of the straight line $\overleftrightarrow{OC}$ is ....

(a) $x = 3 + 4k$, $y = 4 + 3k$

(b) $x = 4 + 3k$, $y = 4 + 4k$

(c) $x = 3 + 3k$, $y = 4 + 4k$

(d) $x = 4 + 4k$, $y = 3 + 3k$



---

6 If $2\overrightarrow{AB} + 2\overrightarrow{BC} = K\overrightarrow{CA}$, then k = ...

(a) 1 (b) 2 (c) – 1 (d) – 2

7 If the measure of the elevation angle of the parachute from a point at 60 m. height above a lake level is 30° and measure of the depression angle of the reflexed image of the parachute in the lake from the same point is 60° , then height of the parachute from the lake level = ... m.

(a) 120 (b) 60 (c) 90 (d) 150

---

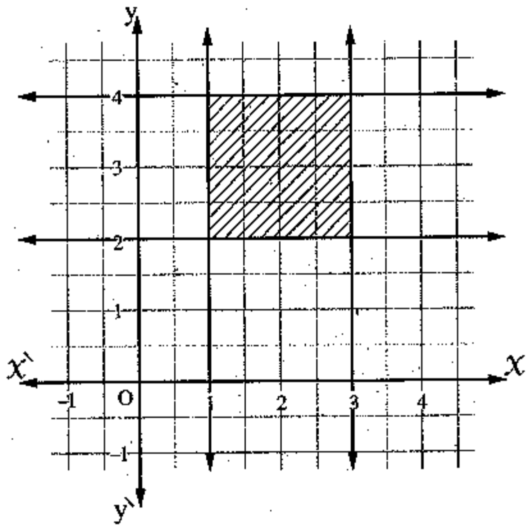
8 The shaded region in the opposite graph represents the S.S. of the inequalities ....

(a) $X > 1$, $y > 2$

(b) $1 < X < 3$, $2 < y < 4$

(c) $1 \le X \le 3$, $2 \le y \le 4$

(d) $X + y \ge 3$, $X - y \le 7$



---

9 $(\sin^2 5° + \sin^2 10° + \sin^2 15° + \cdots + \sin^2 90°) =$ ....

(a) $7\frac{1}{2}$ (b) $8\frac{1}{2}$ (c) $9\frac{1}{2}$ (d) $10\frac{1}{2}$

---

10 If $\overrightarrow{A} = \overrightarrow{i} + 3\overrightarrow{j}$, $\overrightarrow{B} = -10\overrightarrow{i} + \ell\overrightarrow{j}$ are two parallel vectors , then $\ell =$ ....

(a) -30 (b) 6 (c) -6 (d) 3

---

11 Length of the drawn perpendicular from the point (1 , 1) to the straight line : $X + y = 0$ equals .... length unit.

(a) $\frac{\sqrt{2}}{2}$ (b) $\sqrt{2}$ (c) $2\sqrt{2}$ (d) 2

---

12 Measure of the acute angle between the straight line $\overrightarrow{r} = (2 , 2) + k (1 , 1)$ and the straight line $X = 0$ is ....

(a) 45° (b) 30° (c) 135° (d) 60°

---

13 If $\overrightarrow{A} = 20\overrightarrow{i} - 15\overrightarrow{j}$, $\overrightarrow{B} = 7\overrightarrow{i} + 24\overrightarrow{j}$ and $\overrightarrow{M} = \overrightarrow{A} + \overrightarrow{B}$, $\overrightarrow{N} = \overrightarrow{A} - \overrightarrow{B}$, then ....

(a) $\overrightarrow{M} // \overrightarrow{N}$ (b) $\overrightarrow{M} \perp \overrightarrow{N}$ (c) $\overrightarrow{M} = \overrightarrow{N}$ (d) $\|\overrightarrow{M}\| = \|\overrightarrow{N}\|$

14 General solution of the equation : $3 \cot\left(\frac{\pi}{2} - \theta\right) = \sqrt{3}$ is ....

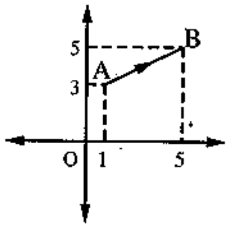
(a) $\frac{\pi}{6} + 2\pi n$ (b) $\frac{\pi}{6} + \pi n$ (c) $\frac{7\pi}{6} + 2\pi n$ (d) $\frac{\pi}{3} + \pi n$

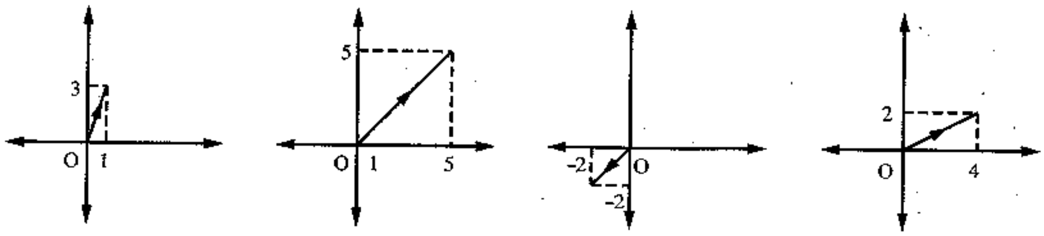
---

15 **In the opposite graph :**

$A = (1, 3)$, $B = (5, 5)$

, then which of the following represent $\overrightarrow{AB}$





(a) (b) (c) (d)

---

16 If A is a symmetric matrix , then which of the following can be a rule to deduce the element of matrix A ?

(a) $a_{ij} = 2i - j$ (b) $a_{ij} = i + j$ (c) $a_{ij} = i^j$ (d) $a_{ij} = 3i + 2j$

---

17 For the different values of k , then the equation : $(2 + k)x + (1 + k)y = 5 + 7k$ represents ....

(a) parallel lines.

(b) intersecting lines in the point $(-2, 9)$

(c) intersecting lines in the point $(2, -9)$

(d) no answer from the previous.

---

18 If a zero matrix O its order 3×3 , then number of elements of the matrix = ...

(a) zero (b) $\varnothing$ (c) 3 (d) 9

---

19 The point $(3, -1) \in$ the S.S. of the inequality $2x + y$ 5

(a) $>$ (b) $<$ (c) $\leq$ (d) $=$

---

20 If $A = \begin{vmatrix} \sin 5\theta & -\cos 5\theta \\ \cos 5\theta & \sin 5\theta \end{vmatrix} =$ ....

(a) 1 (b) -1 (c) 5 (d) -5

---

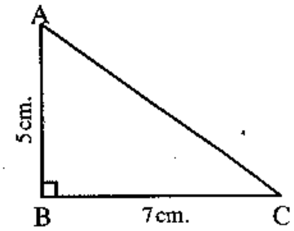
21 The area of a circular sector is 45 cm^2 and the length of the diameter of its circle is 20 cm. , then the length of its perimeter equals .... cm.

(a) 29 (b) 19 (c) 39 (d) 49

22 The area of the regular hexagon in which the length of its edge is 8 cm. equals .... cm^2

(a) $12\sqrt{3}$ (b) $24\sqrt{3}$ (c) $96\sqrt{3}$ (d) $144\sqrt{3}$

23 **In the opposite figure :**



m ($\angle$ C) = ... to the nearest degree.

(a) 30 (b) 35

(c) 36 (d) 45

24 All of the following are unit vectors except ....

(a) (1 , 0) (b) (0 , – 1) (c) (1 , 1) (d) (0.6 , 0.8)

25 In Δ ABC : $\overrightarrow{AB} - \overrightarrow{CB} + \overrightarrow{AC} =$ ....

(a) $\overrightarrow{AC}$ (b) $\overrightarrow{CA}$ (c) $2\overrightarrow{AC}$ (d) $2\overrightarrow{AB}$

26 The direction vector of the straight line whose parametric equations are $x + 3 = 2k$, $y = 5$ is ....

(a) (2 , 0) (b) (2 , – 3) (c) (2 , 3) (d) (2 , 5)

27 $3 \tan\theta \cot\theta + 2 \sin\theta \csc\theta + \cos\theta \sec\theta =$ ....

(a) 1 (b) 3 (c) 5 (d) 6

28 If $C \in \overline{AB}$, $3\overrightarrow{AB} = 5\overrightarrow{BC}$, then C divides $\overrightarrow{BA}$ by the ratio ....

(a) 2 : 3 (b) 3 : 2 (c) 3 : 5 (d) 5 : 3

29 The measure of the angle between the two straight lines $3x = 5$, $y = 3$ is ....

(a) 30° (b) 45° (c) 60° (d) 90°

30 If $\overrightarrow{AB} = 2\vec{i} + \vec{j}$, B (3 , – 1) , then the coordinates of A is ....

(a) (1 , – 2) (b) (– 2 , 1) (c) (2 , 1) (d) (1 , 2)

31 If $\begin{vmatrix} x & 12 \\ 3 & x \end{vmatrix} = \begin{vmatrix} 2 & 1 \\ 10 & 5 \end{vmatrix}$, then $x =$ ....

(a) 2 (b) 5 (c) 6 (d) ± 6

32 If $A \times \begin{pmatrix} 3 & -1 \\ 2 & -1 \end{pmatrix} = I$, then A = ...

(a) $\begin{pmatrix} -1 & 3 \\ -1 & 2 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & -1 \\ 3 & -1 \end{pmatrix}$ (c) $\begin{pmatrix} -1 & 1 \\ -2 & 3 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & -1 \\ 2 & -3 \end{pmatrix}$

---

33 If $\overrightarrow{A} = -2\overrightarrow{i} - 2\overrightarrow{j}$, then the polar form of $\overrightarrow{A}$ is ....

(a) $\left(2\sqrt{2} , \frac{\pi}{4}\right)$ (b) $\left(2\sqrt{2} , \frac{3\pi}{4}\right)$ (c) $\left(2\sqrt{2} , \frac{5\pi}{4}\right)$ (d) $\left(2\sqrt{2} , \frac{7\pi}{4}\right)$

---

34 If $\overrightarrow{A} = 3\overrightarrow{i} - 4\overrightarrow{j}$, $\overrightarrow{B} = \overrightarrow{j}$, $\overrightarrow{C} = \left(5 , \frac{\pi}{18}\right)$, then $\|\overrightarrow{A}\| + \|\overrightarrow{B}\| + \|\overrightarrow{C}\| =$ ....

(a) 9 (b) 10 (c) 11 (d) 12

---

35 The area of circular segment whose chord length is 18 cm. and the radius length of its circle is 18 cm. equals approximately .... cm^2

(a) 29 (b) 28 (c) 30 (d) 60

---

36 If $A = \begin{pmatrix} x & h \\ e & y \end{pmatrix}$ is a skew symmetric , then 2 h + 3 e = ...

(a) h (b) $x + y$ (c) e + y (d) x

---

37 The solution set of the inequality : $x + 5 \leq 3x + 1 < 2x + 2$ in $\mathbb{R}$ is ....

(a) $\mathbb{R} - [1 , 2[$ (b) $]1 , 2]$ (c) $\varnothing$ (d) $\{1 , 2\}$

---

38 The vector equation of the straight line whose equation $\frac{2x - 6}{4} = \frac{y + 5}{3}$ is ....

(a) $\overrightarrow{r} = (6 , -5) + k(4 , 3)$ (b) $\overrightarrow{r} = (3 , -5) + k(4 , 3)$

(c) $\overrightarrow{r} = (3 , -5) + k(2 , 3)$ (d) $\overrightarrow{r} = (-6 , 5) + k(2 , 3)$

---

39 If the force F = 10 newton acts in the direction 30° North of the East , then $\overrightarrow{F} =$ ....

(a) $5\sqrt{3}\,\overrightarrow{i} - 5\overrightarrow{j}$ (b) $5\overrightarrow{i} + 5\sqrt{3}\,\overrightarrow{j}$ (c) $5\sqrt{3}\,\overrightarrow{i} + 5\overrightarrow{j}$ (d) $-5\sqrt{3}\,\overrightarrow{i} + 5\overrightarrow{j}$

---

40 The area of the triangle whose vertices are A (2 , 4) , B (– 2 , 4) , C (0 , – 2) equals .... square/unit.

(a) 24 (b) 12 (c) 6 (d) 22

Interactive test 3

Model 3

Choose the correct answer from the given ones :

1 ABCD is a parallelogram : $\overline{AC} \cap \overline{BD} = \{M\}$, then $\overrightarrow{AB} + \overrightarrow{AD} =$ ....

(a) $\overrightarrow{CA}$ (b) $\overrightarrow{BD}$ (c) $2\overrightarrow{MC}$ (d) $2\overrightarrow{DM}$

---

2 If (a , b) belongs to the solution set of the inequality $x + 2y \geq 5$ where a , b are integers , then the least value of the expression : $2a + 4b =$ ....

(a) 5 (b) -5 (c) 10 (d) 6

---

3 If A (– 2 , 1) , B (2 , 3) , C (– 2 , – 4) are three points then the measure of the acute angle between the two straight lines $\overleftrightarrow{AB}$, $\overleftrightarrow{BC}$ is ....

(d) $\tan^{-1}\left(\frac{-2}{3}\right)$ (b) $\tan^{-1}\left(\frac{2}{3}\right)$ (c) $\tan^{-1}\left(\frac{3}{4}\right)$ (d) $\tan^{-1}\left(\frac{3}{2}\right)$

---

4 If ABCDEF is a regular hexagon whose geometrical centre (M) which of the following directed segments are not equivalent ?

(a) $\overrightarrow{AB}$, $\overrightarrow{FM}$ (b) $\overrightarrow{AB}$, $\overrightarrow{ED}$ (c) $\overrightarrow{AB}$, $\overrightarrow{MC}$ (d) $\overrightarrow{AB}$, $\overrightarrow{MD}$

---

5 The matrix $\begin{pmatrix} a & 12 \\ 3 & a \end{pmatrix}$ has multiplicative inverse at ....

(a) $a = 6$ (b) $a = \pm 6$

(c) $a \in \mathbb{R} - \{6\}$ (d) $a \in \mathbb{R} - \{6 , -6\}$

---

6 The solution set of the equation $\begin{vmatrix} x-2 & 0 & 0 \\ 3 & x-3 & 0 \\ 4 & -1 & x \end{vmatrix} =$ zero is ....

(a) $\{0\}$ (b) $\{3 , 4 , -1\}$ (c) $\{2 , 3\}$ (d) $\{0 , 2 , 3\}$

---

7 The length of the diagonals of convex quadrilateral are 4 cm. and 6 cm. and the measure of their included angle 60° , then its area = ... cm^2

(a) 12 (b) $12\sqrt{3}$ (c) $24\sqrt{3}$ (d) $6\sqrt{3}$

---

8 The length of the perpendicular drawn from point (– 3 , 5) to the x-axis equals .... length unit.

(a) 8 (b) 5 (c) 3 (d) 2

9 If the area of the triangle whose vertices (k , 0) , (4 , 0) , (0 , 2) is 4 square unit , then k = ...

(a) zero or – 8 (b) – 4 or 4 (c) zero or 8 (d) 8 or – 8

---

10 The slope of the striaght line perpendicular to the straight line $\vec{r} = (1 , 7) + k (3 , - 1)$ equals ....

(d) $\frac{3}{7}$ (b) $\frac{1}{3}$ (c) $\frac{1}{7}$ (d) $\frac{3}{1}$

---

11 In Δ ABC , if $\sin^2 A + \cos^2 B = 1$, then Δ ABC is ....

(a) an equilateral triangle. (b) an isosceles triangle.

(c) a scalene triangle. (d) a right-angled triangle.

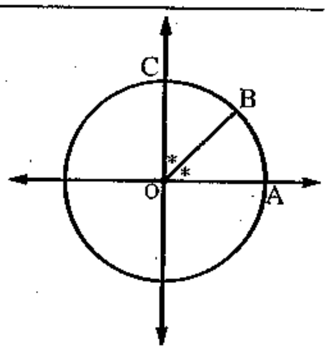
---

12 If ABC is a right-angled triangle at B and AB > BC , the area of Δ ABC = 30 cm^2. , AB + BC = 20 cm. , then m ($\angle$ A) $\approx$ ....

(a) 77° 19` (b) 54° 37` (c) 26° 18` (d) 12° 41`

---

13 **In the opposite figure :**



If $\overrightarrow{OB}$ bisects $\angle$ AOC in a unit circle , then $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} =$ ....

(a) $\sqrt{2}\ \overrightarrow{OB}$ (b) $2\ \overrightarrow{OB}$

(c) $(\sqrt{2} + 1)\ \overrightarrow{OB}$ (d) $3\ \overrightarrow{OB}$

---

14 Two points (3 , 5) , (1 , 5) belong to the solution set of the inequality $x + y$ 8

(a) > (b) ≥ (c) < (d) ≤

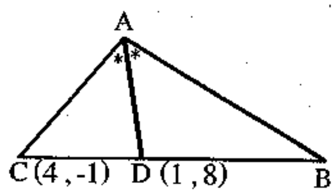
---

15 If $\begin{pmatrix} a & b & c \\ d & e & f \\ x & y & z \end{pmatrix}$ is a skew symmetric , then : $\frac{a + b + c + f}{d + x + y + z} =$ ....

(a) 1 (b) zero (c) – 1 (d) e

---

16 **In the opposite figure :**



If 4 AC = 3 AB , then the coordinates of the point B is ....

(a) (– 5 , 14) (b) (– 4 , 16)

(c) (– 3 , 20) (d) (– 2 , 21)

17 Measure of the acute angle included between the two straight lines $\sqrt{3}\,x - y = 4$, $y = 3$ equals ....

(a) $30°$ (b) $45°$ (c) $60°$ (d) $90°$

---

18 Point of intersection of the two straight lines $\frac{x}{a} + \frac{y}{b} = 1$, $\frac{x}{b} + \frac{y}{a} = 1$ is ....

(a) (a , b) (b) $\left(\frac{1}{2}a , \frac{1}{2}b\right)$ (c) $\left(\frac{a+b}{ab} , \frac{a+b}{ab}\right)$ (d) $\left(\frac{ab}{a+b} , \frac{ab}{a+b}\right)$

---

19 If $\csc\theta - \cot\theta = \frac{1}{5}$, then $\csc\theta + \cot\theta =$ ....

(a) $\frac{-1}{10}$ (b) 5 (c) $\frac{1}{25}$ (d) 1

---

20 If $\overrightarrow{EM} = \left(4\sqrt{3} , 4\right)$, then its polar form of the vector $\overrightarrow{EM}$ is ....

(a) $\left(8 , \frac{\pi}{6}\right)$ (b) $\left(8 , \frac{\pi}{2}\right)$ (c) $(8 , \pi)$ (d) $\left(8 , \frac{\pi}{3}\right)$

---

21 If $\| 12\,\overrightarrow{A} \| = 2 \| k\,\overrightarrow{A} \|$, then $k =$ ....

(a) 6 (b) ± 6 (c) -6 (d) 24

---

22 ABCD is a square in which $A(2 , -3)$ and the equation of $\overleftrightarrow{CD}$: $3x - 4y + 2 = 0$, then the area of the square ABCD = ... square unit.

(a) 4 (b) 9 (c) 16 (d) 25

---

23 $\frac{3}{1 + \tan^2\theta} + 3\sin^2\theta =$ ....

(a) 3 (b) 1 (c) $3\sin^2\theta$ (d) $\sec^2\theta$

---

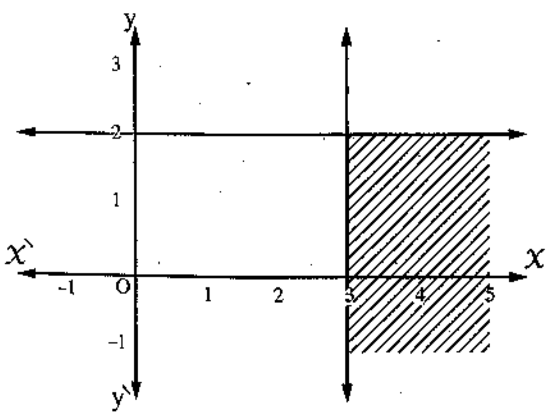
24 The shaded part in the opposite figure represents the solution set of the inequalities : ....

(a) $x > 3$, $y < 2$

(b) $x \geq 3$, $y \geq 2$

(c) $x + 1 < 4$, $y + 1 < 3$

(d) $x + 1 \geq 4$, $2y \leq 4$



---

25 The area of the triangle bounded by the straight line : $3x + 4y = 12$ and the coordinate axes = ... square unit.

(a) 12 (b) 8 (c) 6 (d) 4

26 If $\overrightarrow{\mathcal{X}y} = (2, 3)$, $\overrightarrow{yz} = (4, 5)$, then $\overrightarrow{\mathcal{X}z} =$ ....

(a) (6 , 8) (b) (2 , 2) (c) (8 , 8) (d) (4 , 3)

27 If the perimeter of a circular sector equals 10 cm. and the length of its arc equals 2 cm. , then its area = ... cm^2

(a) 4 (b) 8 (c) 10 (d) 20

28 The distance between the two straight lines : $\vec{r} = (4, 0) + k(4, 3)$, $6\mathcal{X} - 8y + 4 = 0$ equals .... length unit.

(a) 20 (b) 0.2 (c) 28 (d) 2.8

29 If X is a square matrix and $X + X^t = O$, then X is .... matrix.

(a) a skew (b) a skew symmetric

(c) a diagonal (d) otherwise

30 The vector equation of the straight line which passes through the point (2 , – 3) and perpendicular to $\mathcal{X}$-axis is ....

(a) $\vec{r} = (2, -3) + k(1, 0)$ (b) $\vec{r} = (3, 2) + k(0, 1)$

(c) $\vec{r} = (2, -3) + k(0, 7)$ (d) $\vec{r} = (-3, 2) + k(0, 1)$

31 If $\vec{A} = -10\vec{i} + k\vec{j}$, $\vec{B} = \vec{i} + 3\vec{j}$ and $\vec{A} \perp \vec{B}$, then k = ...

(a) – 30 (b) $\frac{10}{3}$ (c) $\frac{3}{10}$ (d) 30

32 The solution set of the equation $\sqrt{3}\tan\theta = 1$ where $90° < \theta < 270°$ is ....

(a) $\{30°\}$ (b) $\{150°\}$ (c) $\{210°\}$ (d) $\{240°\}$

33 If C = (– 2 , 4) , D = (2 , – 1) , then $\mathcal{X}$-axis divides $\overline{CD}$ by the ratio ....

(a) 1 : 4 (b) 2 : 1 (c) 1 : 2 (d) 4 : 1

34 If A is a matrix in order 2 × 2 and $A + A^t = I$, then the sum of the elements of A equals ....

(a) 4 (b) 2 (c) 1 (d) zero

35 If $A\begin{pmatrix} 4 & 2\mathcal{X}-1 \\ 1 & 3 \end{pmatrix} = \begin{pmatrix} 4 & 1 \\ 5 & 3 \end{pmatrix}^t$, then X = ...

(a) 1 (b) 2 (c) 3 (d) 5

36 If $X = \begin{pmatrix} 2 & 4 \\ 0 & 1 \end{pmatrix}$, then X^{-1} ....

(a) $\begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} \frac{1}{2} & 2 \\ 0 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} \frac{1}{2} & -2 \\ 0 & -1 \end{pmatrix}$ (d) $\begin{pmatrix} \frac{1}{2} & -2 \\ 0 & 1 \end{pmatrix}$

---

37 A plane 1000 metres high was observed by a person at an angle of elevation of measure $40°$, then the distance between the plane and the observer to the neanst metre ....

(a) 643 (b) 1192 (c) 1305 (d) 1556

---

38 If $\vec{u} = (3 , -4)$ is a direction vector for a straight line , then all of the following are direction vectors to the same straight line except the vector ....

(a) $(-3 , 4)$ (b) $(9 , -12)$ (c) $(3 , 4)$ (d) $(1.5 , -2)$

---

39 If $A = \begin{pmatrix} x & 2 \\ y & -2 \end{pmatrix}$, $A \times A^{-1} = A^2$, then $x \times y =$ ....

(a) 3 (b) 2 (c) -2 (d) -3

---

40 If $V_A = 25 \vec{e}$, $\vec{V}_B = -10 \vec{e}$, then $\vec{V}_{AB} =$ .... $\vec{e}$

(a) 35 (b) -35 (c) 15 (d) -15

Interactive test 4

Model 4

Choose the correct answer from the given ones :

1 If $\tan \theta = 3$, then $\sec^2 \theta =$ ....

(a) 9 (b) 10 (c) $\frac{1}{10}$ (d) $\frac{9}{10}$

---

2 Measure of the acute angle between the two straight lines : $x = 3y$, $x + 2y = 0$ is ....

(a) $15°$ (b) $30°$ (c) $45°$ (d) $60°$

---

3 Which of the following points lies on the straight line $\vec{r} = (-2 , 1) + k (1 , -3)$ ....

(a) $\left(\frac{-5}{3} , -2\right)$ (b) $\left(\frac{-3}{2} , \frac{1}{2}\right)$ (c) $\left(\frac{3}{2} , -\frac{1}{2}\right)$ (d) $\left(\frac{-7}{3} , 2\right)$

---

4 If $3 \sin \theta + 4 \cos \theta = 5$, then $3 \cos \theta - 4 \sin \theta =$ ....

(a) 5 (b) 4 (c) 2 (d) zero

---

5 If $\vec{d} = (3 , 4)$ is a direction vector of a straight line , then its slope equals ....

(a) $\frac{3}{4}$ (b) $\frac{4}{3}$ (c) $\frac{-4}{3}$ (d) $\frac{-3}{4}$

6 Equation of the straight line if the length of the perpendicular drawn from (0 , 0) to this straight line equals 4 units and this line makes an angle of measure 120° with the positive direction of X-axis is ....

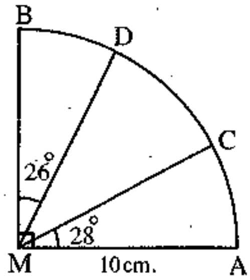
(a) $X+\sqrt{3}\,y \pm 8=0$ (b) $\sqrt{3}\,X+y \pm 4=0$

(c) $\sqrt{3}\,X+y \pm 2=0$ (d) $\sqrt{3}\,X+y \pm 8=0$

---

7 In the opposite figure :

The area of the shaded region = ... cm^2



(a) 10π (b) 20π

(c) 30π (d) 40π

---

8 If A and B are two symmetric matrices , then the matrix (ABA) is ....

(a) symmetric. (b) skew symmetric.

(c) diagonal. (d) triangular.

---

9 If the matrix A of order 3×2 and the matrix AB of order 3×1 , then matrix B of order ....

(a) 2×1 (b) 3×1 (c) 3×3 (d) 2×3

---

10 If $\overrightarrow{A}=(3 , -2)$, $\overrightarrow{B}=(7 , 1)$, then $\|\overrightarrow{A}+2\overrightarrow{B}\|=$ .... length unit.

(a) $\sqrt{13}$ (b) $5\sqrt{2}$ (c) 11 (d) 17

---

11 Area of Δ ABC in which AB = 5 cm. , AC = 4 cm. , m ($\angle$ A) = 60° equals .... cm^2

(a) $5\sqrt{2}$ (b) $5\sqrt{3}$ (c) 5 (d) 10

---

12 If position vector $\overrightarrow{A}=(\sqrt{3} , 1)$ rotates around origin with an angle of measure 45° anticlockwise , then the polar form of the vector $\overrightarrow{A}$ after rotation is ....

(a) (2 , 30°) (b) (2 , 45°) (c) (2 , 75°) (d) (4 , 75°)

---

13 To make system of equations $a_1 X+b_1 y=c_1$, $a_2 X+b_2 y=c_2$ has unique solution , it must be ....

(a) $\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}=0$ (b) $\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}=0$ (c) $\begin{vmatrix} a_1 & b_1 \\ a_2 & b_2 \end{vmatrix}\neq 0$ (d) $\begin{vmatrix} c_1 & b_1 \\ c_2 & b_2 \end{vmatrix}\neq 0$

14 The point which belongs to the solution set of the inequalities :

$2x + y < 4$, $x + 3y < 6$ is ....

(a) $(1 , -4)$ (b) $(2 , 1)$ (c) $(1 , 2)$ (d) $(3 , -1)$

---

15 **In the opposite figure :**

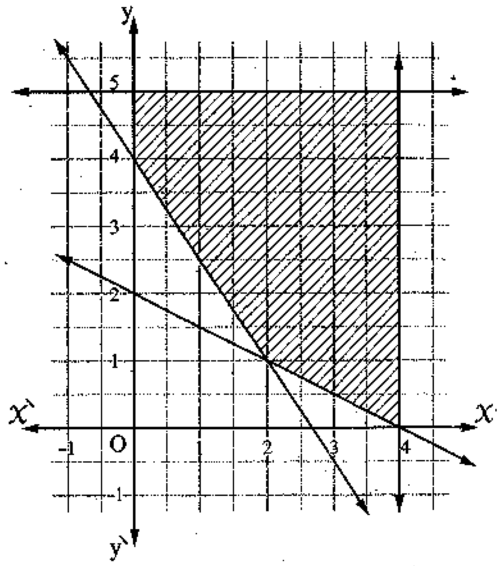
The objective function

$P = \frac{1}{2}x + y$ is minimum

at the point ....

(a) $(0 , 4)$ (b) $(1 , 2)$

(c) $(2 , 1)$ (d) $(4 , 5)$



---

16 The perpendicular distance between the two straight lines $y = 3$, $y - 2 = 0$ is .... length unit.

(a) 5 (b) 2 (c) 3 (d) 1

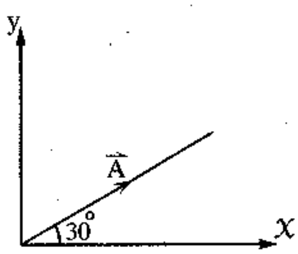
---

17 **In the opposite figure :**

$\| \vec{A} \| = 4$ cm. , then $\vec{A} =$ ....

(a) $(2 , 2\sqrt{3})$ (b) $(2\sqrt{3} , 2)$

(c) $(4 , \sqrt{3})$ (d) $(\sqrt{3} , 2)$



---

18 **In the opposite figure :**

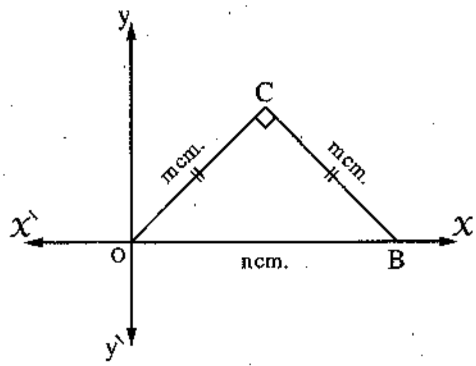
If OC = BC , m (∠ C) = 90°

which of the following consider

equation of the straight line $\overleftrightarrow{OC}$?

(a) $y = \frac{m}{n}x$ (b) $y = x$

(c) $y = \frac{n}{m}x$ (d) $y = mn\,x$



19 If $\begin{vmatrix} 1 & 0 & 0 \\ 3 & 2x & 5 \\ 6 & 1 & 4 \end{vmatrix} = 11$, then $x =$ ....

(a) 3 (b) 2 (c) 4 (d) 5

---

20 If $\overrightarrow{A}$, $\overrightarrow{B}$ are non-zero vectors and $\|\overrightarrow{A} + \overrightarrow{B}\| = \|\overrightarrow{A} - \overrightarrow{B}\|$, then ....

(a) $\overrightarrow{A} = -\overrightarrow{B}$
(b) $\overrightarrow{A}$ and $\overrightarrow{B}$ are equivalent.
(c) $\overrightarrow{A}$ and $\overrightarrow{B}$ are parallel.
(d) $\overrightarrow{A}$ and $\overrightarrow{B}$ are perpendicular.

---

21 A light pole of height 8 metres gives a shade on the ground of length 5 metres , then the measure of the the elevation angle of the sun at that moment to the nearest degree equals ....

(a) 32° (b) 51° (c) 39° (d) 58°

---

22 The area of the triangle bounded by the lines $\frac{x}{3} - \frac{y}{2} = 1$, $\frac{x}{3} + \frac{y}{2} = 1$, $x = 0$ equals .... square units.

(a) 4 (b) 6 (c) 12 (d) 24

---

23 If $L_1 : \vec{r} = (2 , 1) + k(-1 , 3)$, $L_2 : a\,x + b\,y + c = 0$ and $L_1 \perp L_2$, then ....

(a) $3a = b$ (b) $3a + b = 0$ (c) $a + 3b = 0$ (d) $a = 3b$

---

24 The length of the perpendicular drawn from the origin to the straight line $\vec{r} = (5 , 0) + k(4 , 3)$ equals .... length unit.

(a) 15 (b) 5 (c) 3 (d) 4

---

25 $2 \sin \theta - \sqrt{3} = 0$ where $90° \le \theta \le 270°$, then $\theta =$ ....

(a) 60° (b) 120° (c) 240° (d) 300°

---

26 The perpendicular direction vector on the straight line $x = 3 + 2k$, $y = 4 - k$ equals ....

(a) (2 , 10) (b) (1 , 2) (c) (2 , 1) (d) (4 , −2)

---

27 If $\begin{pmatrix} 4 & 1 \\ 3 & 1 \end{pmatrix} \begin{pmatrix} 1 & -1 \\ -3 & x \end{pmatrix} = I$, then $x =$ ....

(a) 1 (b) 2 (c) 3 (d) 4

28 If $\overrightarrow{AB} = (2 , 3)$, $\overrightarrow{CB} = (-3 , 5)$, then $\overrightarrow{AC} =$ ....

(a) $(5 , -2)$ (b) $(-8 , 1)$ (c) $(-2 , 5)$ (d) $(2 , 5)$

29 If $\begin{vmatrix} x & -1 \\ 2 & x \end{vmatrix} + \begin{vmatrix} 1 & 3 \\ 2 & x \end{vmatrix} = 2$, then $x =$ ....

(a) 3 or – 2 (b) – 3 or 2 (c) 3 or 2 (d) – 3 or – 2

30 The equation of one of the two bisector lines for the angle between the cooridnates axes is ....

(a) $y = 2$ (b) $x = 2y$ (c) $y = x$ (d) $y = 4x$

31 The area of the triangle whose vertices are $(3 , 2)$, $(5 , 3)$, $(5 , 2)$ equals .... square unit.

(a) 6 (b) 12 (c) 3 (d) 1

32 $\sin^2 x + \cos^2 x + \cot^2 x =$ ....

(a) 1 (b) $\cot^2 x$ (c) $\csc^2 x$ (d) $\sec^2 x$

33 The area of circular sector equals 45 cm.^{2} and the length of the diameter of its circle equals 20 cm. , then the perimeter of the sector equals .... cm.

(a) 29 (b) 19 (c) 39 (d) 49

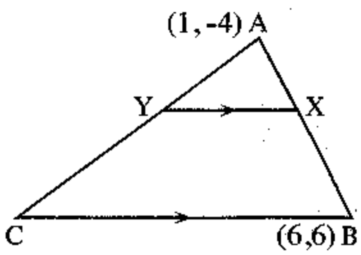
34 If A (0 , 0) is the image of the point B (4 , 2) by reflexion on the straight line L , then the equation of L is ....

(a) $x = 2y$ (b) $2x + y - 5 = 0$ (c) $2x - y = 5$ (d) $x + y - 6 = 0$

35 If $\begin{pmatrix} 3^x & 2x + y \\ x + y & 3^y \end{pmatrix} = \begin{pmatrix} 25 & b \\ a & 5 \end{pmatrix}$, then $\frac{b}{a} =$ ....

(a) $\frac{3}{5}$ (b) $\frac{5}{3}$ (c) 15 (d) 5

36 **In the opposite figure :**



$\overline{XY} \parallel \overline{BC}$, $\frac{AY}{AC} = \frac{3}{5}$

, then $x =$ ....

(a) $(2 , 4)$ (b) $(4 , 2)$

(c) $(-2 , 4)$ (d) $(-4 , 2)$

37 If M is the midpoint of $\overline{XY}$, then $\overrightarrow{XM} + \overrightarrow{YM} =$ ....

(a) $2\,\overrightarrow{XM}$ (b) $2\,\overrightarrow{YM}$ (c) $\overrightarrow{XY}$ (d) $\vec{o}$

---

38 If $X = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$, $Y = \begin{pmatrix} -3 & 5 \end{pmatrix}$, then $Y\,X =$ ....

(a) $\begin{pmatrix} -9 \\ 10 \end{pmatrix}$ (b) $\begin{pmatrix} -9 & 10 \end{pmatrix}$ (c) $\begin{pmatrix} -9 & 15 \\ 6 & 10 \end{pmatrix}$ (d) $\begin{pmatrix} 1 \end{pmatrix}$

---

39 If $X + \begin{pmatrix} 2 & -3 \\ 1 & 0 \end{pmatrix}^t = 0$, then $X =$ ....

(a) $\begin{pmatrix} -2 & 3 \\ -1 & 0 \end{pmatrix}$ (b) $\begin{pmatrix} 2 & 3 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} -2 & -1 \\ 3 & 0 \end{pmatrix}$ (d) I

---

40 The distance between the two straight lines : $3x - 4y + 20 = 0$, $3x - 4y + 10 = 0$ equals .... length unit.

(a) 2 (b) 3 (c) 4 (d) 5

Interactive test 5

Model 5

Choose the correct answer from the given ones :

1 Area of the triangle whose vertices are (3 , 2) , (3 , 5) , (5 , 2) equals ....

(a) 6 (b) 12 (c) 3 (d) 16

---

2 If $A = \begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix}$ and $A^{-1} = \begin{pmatrix} 2 & -1 \\ x & 3 \end{pmatrix}$, then $x =$ ....

(a) 3 (b) -3 (c) 5 (d) -5

---

3 If $\|\vec{A}\| = \|\vec{B}\|$, then ....

(a) $\vec{A} = \vec{B}$ (b) $\vec{A} = -\vec{B}$

(c) $\vec{A} = \pm\vec{B}$ (d) It can't be find the relation between $\vec{A}$, $\vec{B}$

---

4 If A and B are the two images of the point (3 , 1) by reflection in x-axis and y-axis respectively , then the point that divides $\overrightarrow{AB}$ internally in the ratio 2 : 3 is ....

(a) (3 , -1) (b) $\left(\frac{3}{5} , \frac{-1}{5}\right)$ (c) $\left(\frac{-3}{5} , \frac{1}{5}\right)$ (d) (0 , 0)

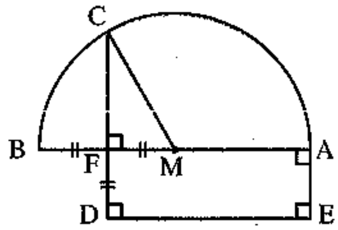
---

5 The point that belongs to the S.S. of the system of the following inequalitias :

$x > 2$, $y > 1$, $x + y \geq 3$ is ....

(a) (2 , 1) (b) (1 , 2) (c) (3 , 2) (d) (1 , 3)

6 **In the opposite figure :**



If the area of the rectangle AEDF = 27 cm^2

, then area of the shaded part = ... cm^2

(a) 9π (b) 12π

(c) 15π (d) 18π

---

7 If $0 \le X \le 360°$, then number of solution of the equation $3 \sin X = \tan X$ is ....

(a) 2 (b) 3 (c) 4 (d) 5

---

8 Equation of the straight line passing through the point $(2 , -3)$ and parallel to X-axis is ....

(a) $X = -3$ (b) $y = -3$ (c) $X = 2$ (d) $y = 3$

---

9 The straight line that intercept a part of length (a) from the X-axis and a part of length (b) from the y-axis is passing through the point ....

(a) (a , b) (b) $\left(\frac{1}{2} a , \frac{1}{2} b\right)$ (c) $\left(\frac{1}{3} a , \frac{1}{3} b\right)$ (d) $\left(\frac{1}{4} a , \frac{1}{4} b\right)$

---

10 If $\overrightarrow{A} + \overrightarrow{B} = (5 , 12)$, $\overrightarrow{A} = 2\overrightarrow{i} + 9\overrightarrow{j}$, then $\overrightarrow{B} =$ ....

(a) $(3 , 4)$ (b) $\left(3\sqrt{2} , \frac{3\pi}{4}\right)$ (c) $(-3 , -3)$ (d) $\left(3\sqrt{2} , \frac{\pi}{4}\right)$

---

11 If $A = (3 , 5)$, $B = (-1 , m)$, $\| \overrightarrow{AB} \| = 4$ length unit , then m = ...

(a) zero (b) 5 (c) -1 (d) -5

---

12 Measure of the included acute angle between the two straight lines :

$X - 3y + 5 = 0$, $X + 2y - 7 = 0$ equals ....

(a) 45° (b) 60° (c) 120° (d) 135°

---

13 If $(6 , 4)$, $(3 , m)$ are two direction vectors of two parallel straight lines , then m = ...

(a) 0 (b) 1 (c) 2 (d) 4

---

14 A car moved 20 metres in direction of North , then moved the same distance in the direction of West , then the displacement of the car is ....

(a) 40 m. in the West direction. (b) 40 m. in the Western North direction.

(c) $20\sqrt{2}$ m. in the Western North direction. (d) $20\sqrt{2}$ m. in the Western South direction.

15 $\frac{\sin\theta}{\csc\theta}+\frac{\cos\theta}{\sec\theta}=$ ....

(a) $\tan\theta$ (b) $\sin\theta+\cos\theta$ (c) $\sec\theta\csc\theta$ (d) 1

---

16 A regular hexagon of area $54\sqrt{3}$ cm^2, then its side length .... cm.

(a) 5 (b) 6 (c) 7 (d) 8

---

17 If A is a diagonal matrix in the order 3×3 and $a_{ij}=5$ for each $i=j$, then ....

(a) $A=I$ (b) $A=5\,I$ (c) $A=5\,O$ (d) $A=O$

---

18 The points A $(-1, 5)$, B $(2, 2)$ and C $(3, 1)$ are ....

(a) vertices of right-angled triangle of area 5 square unit.

(b) vertices of isosceles triangle of area 10 square unit.

(c) vertices of equilateral triangle of area 9 square unit.

(d) collinear.

---

19 If the two points $(1, 4)$, $(4, 1)$ are belonging to the S.S. of the inequality :
$a\,x+b\,y\le c$, then which of the following points is belonging to the same S.S. certainly ?

(a) $(0, 5)$ (b) $(2, 4)$ (c) $(2, 3)$ (d) $(4, 2)$

---

20 If the point A $(0, 0)$ is the image of the point B $(4, 2)$ by reflection in the straight line L, then equation of L is ....

(a) $x=2\,y$ (b) $2\,x+y=5$

(c) $2\,x-y=5$ (d) $x+y=6$

---

21 From the top of a rock 100 metres high, the depression angle of the boat which is 200 m. away from the base of the rock equals (in radian) $\approx$ ....$^{rad.}$

(a) 0.08 (b) 0.46 (c) 0.25 (d) 0.24

---

22 The area of the circular segment whose diameter length of its circle is 8 cm. and the measure of its central angle is 1.2^{rad} equals approximately .... cm^2

(a) 8.57 (b) 2.14 (c) 4.28 (d) 1.07

---

23 The length of the perpendicular drawn from the point $(3, 1)$ to the straight line $4\,x+3\,y-5=0$ equals .... length unit.

(a) 2 (b) 3 (c) 4 (d) 5

24 If $3^{\sin\theta} = 1$ where $\theta \in]0, 2\pi[$, then $\theta =$ ....°

(a) 45 (b) 90 (c) 180 (d) 270

---

25 If the vector $\overrightarrow{A} - 2\overrightarrow{C}$ is equivalent to the vector $\overrightarrow{BA}$, then $\overrightarrow{B}$ is equivalent to ....

(a) $2\overrightarrow{A}$ (b) $\overrightarrow{C}$ (c) $2\overrightarrow{BC}$ (d) $2\overrightarrow{C}$

---

26 If the polar from of $\overrightarrow{OA}$ is $\left(12, \frac{2\pi}{3}\right)$, then the polar form of $\overrightarrow{AO}$ is ....

(a) $\left(12, \frac{\pi}{6}\right)$ (b) $\left(12, \frac{2\pi}{3}\right)$ (c) $\left(6, \frac{4\pi}{3}\right)$ (d) $\left(12, \frac{5\pi}{3}\right)$

---

27 If the slope of a straight line $= \frac{-2}{3}$, then its direction vector is ....

(a) $(3, -2)$ (b) $(-3, 2)$ (c) $(6, -4)$ (d) all the previous

---

28 The solution set for the equation $\begin{vmatrix} x+2 & 2 \\ x & x-3 \end{vmatrix} = 4$ is ....

(a) $\{3, -2\}$ (b) $\{2, -3\}$ (c) $\{5, -2\}$ (d) $\{2, -5\}$

---

29 If $\sin A + \sin B = 2$, then ....

(a) $\cos A + \cos B = 0$ (b) $\cos A - \cos B = 1$

(c) $\cos A + \cos B = 1$ (d) $\sin (A + B) = -1$

---

30 If $A = \begin{pmatrix} -1 & 4 \\ -2 & 3 \end{pmatrix}$, $A = A^{-1} \times B$, then $B =$ ....

(a) $\begin{pmatrix} -7 & 4 \\ -4 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} -7 & 8 \\ -4 & 1 \end{pmatrix}$ (c) $\begin{pmatrix} 7 & -8 \\ 4 & -1 \end{pmatrix}$ (d) $\begin{pmatrix} 7 & -8 \\ 4 & 4 \end{pmatrix}$

---

31 The vector equation of x-axis is ....

(a) $\overrightarrow{r} = (1, 1) + k(0, 0)$ (b) $\overrightarrow{r} = (1, 0) + k(1, 1)$

(c) $\overrightarrow{r} = k(1, 0)$ (d) $\overrightarrow{r} = k(0, 1)$

---

32 If A is a square matrix in order 2×2 , $|2A| = 8$, then $|3A^t| =$ ....

(a) 9 (b) 12 (c) 18 (d) 24

---

33 If $A(5, 2)$, $B(2, -1)$, then the midpoint of $\overline{AB} =$ ....

(a) $(1, 2)$ (b) $(10, 2)$ (c) $(3.5, 0.5)$ (d) $(7, 1)$

34 If $\begin{pmatrix} 0 & 2 & 5 \\ x & 0 & 3 \\ 5 & 3 & 0 \end{pmatrix}$ is a symmetric matrix , then $x =$ ....

(a) 0 (b) 2 (c) 3 (d) -2

---

35 If $\| 3\, k\, \overrightarrow{A} \| = \| -15\, \overrightarrow{A} \|$, then k = ...

(a) ± 5 (b) 5 (c) 15 (d) 3

---

36 The norm of the resultant of the two forces : $\overrightarrow{F_1} = -3\,\overrightarrow{i} + \sqrt{3}\,\overrightarrow{j}$, $\overrightarrow{F_2} = \left(6 , \frac{\pi}{3}\right)$ equals .... length unit.

(a) $4\sqrt{3}$ (b) $2\sqrt{3}$ (c) 18 (d) 6

---

37 If $\overrightarrow{A} = (3 , k)$, $\overrightarrow{B} = (2 , -3)$ and $\overrightarrow{A} \perp \overrightarrow{B}$, then k = ...

(a) 3 (b) 2 (c) -2 (d) -3

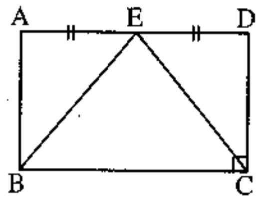
---

38 The solution set of the inequality $1 \le 2\,x - 1 < 5$ in $\mathbb{R}$ is ....

(a) $]1 , 3[$ (b) $]1 , 3]$ (c) $[1 , 3[$ (d) $[1 , 3]$

---

39 **In the opposite figure :**



ABCD is a rectangle

, E is the midpoint of $\overline{AD}$

, $\overrightarrow{EB} + \overrightarrow{BA} - \overrightarrow{DC} =$ ....

(a) $\overrightarrow{EB}$ (b) $\overrightarrow{BE}$ (c) $\overrightarrow{EC}$ (d) $\overrightarrow{CE}$

---

40 If $A = \begin{pmatrix} 3 & 1 \\ -2 & 5 \end{pmatrix}$, $C = \begin{pmatrix} 4 & 7 \\ 8 & 9 \end{pmatrix}$, then $A_{21} + C_{12} =$ ....

(a) 5 (b) 4 (c) -5 (d) 3

Interactive test 6

Model 6

Choose the correct answer from the given ones :

1 S.S. of the two equations : $2\,x - 3\,y = 1$ and $3\,x + 2\,y = 8$ is ....

(a) $\{(1 , 2)\}$ (b) $\{(2 , 1)\}$ (c) $\{(2 , 3)\}$ (d) $\{(3 , 2)\}$

---

2 Measure of the included angle between the two straight lines : $2\,x + 1 = 7$, $y = 5$ equals ....

(a) 30° (b) 45° (c) 60° (d) 90°

3 Circular sector , length of the diameter of its angle is 12 cm. and measure of its central angle 60° , then its area = ………… cm^2

(a) 12π (b) 4π (c) 3π (d) 6π

4 Point of intersection of heights of the triangle in which its sides coincide on the straight lines : $x = 0$, $y = 0$ and $x + y = 1$ is …………

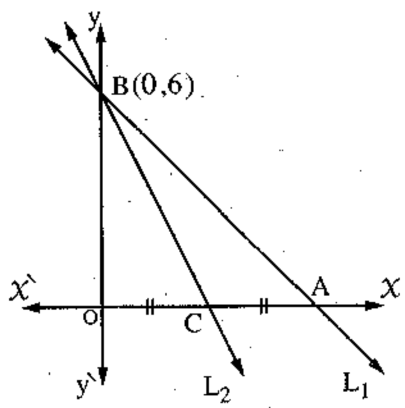
(a) $(1 , 1)$ (b) $(0 , 0)$ (c) $(1 , 0)$ (d) $\left(\frac{1}{3} , \frac{1}{3}\right)$

5 If $\begin{vmatrix} k+\frac{1}{k} & 1 \\ 1 & k+\frac{1}{k} \end{vmatrix} = 15$, then $k^2 + \frac{1}{k^2} =$ …………

(a) 16 (b) 15 (c) 14 (d) 13

6 **In the opposite figure :**

If area of $\Delta ABC = 15$ square unit , $CA = CO$, then equation of L_1 is …………



(a) $\frac{x}{5} + \frac{y}{3} = 1$ (b) $\frac{x}{6} + \frac{y}{5} = 1$

(c) $\frac{x}{10} + \frac{y}{6} = 1$ (d) $\frac{x}{6} + \frac{y}{10} = 1$

7 If $\tan\theta + \cot\theta = 2$, then $\tan^{2019}\theta + \cot^{2019}\theta =$ …………

(a) zero (b) 1 (c) 2 (d) 3

8 L_1 and L_2 are two straight lines , the tangent of the included angle between them equals $\frac{1}{3}$ and the slope of L_1 equals twice the slope of L_2 , then slope of the straight line $L_2 =$ …………

(a) $\pm\frac{1}{2}$ (b) ± 1

(c) $1 , \frac{1}{2}$ (d) All of the previous answers.

9 If the forces $\overrightarrow{F_1} = \left(8\sqrt{2} , \frac{3}{4}\pi\right)$, $\overrightarrow{F_2} = a\,\overrightarrow{i} + 3\,\overrightarrow{j}$, $\overrightarrow{F_3} = -5\,\overrightarrow{i} + (b+2)\,\overrightarrow{j}$ are acting in one point and equilibrium , then $\frac{a}{b} =$ …………

(a) 13 (b) -13 (c) 1 (d) -1

10 If A is a matrix in the order 2×3 , B^t is a matrix in the order 1×3 , then the matrix AB is in the order …………

(a) 3×3 (b) 3×1 (c) 2×1 (d) 1×2

11 If C is the midpoint of $\overline{AB}$ where $C = (0, 3)$, $B = (7, 6)$, then A = ...

(a) $(7, 6)$ (b) $(3, 6)$ (c) $(-7, 0)$ (d) $(0, 6)$

---

12 If $\overrightarrow{V_A} = 120\,\vec{e}$, $\overrightarrow{V_B} = -80\,\vec{e}$, then $\overrightarrow{V_{AB}}$ = ... $\vec{e}$

(a) 200 (b) 40 (c) -40 (d) -200

---

13 Slope of the straight line : $2x - 3y + 5 = 0$ equals .... where $(n \in \mathbb{Z})$

(a) $\frac{2}{3}$ (b) $\frac{-3}{2}$ (c) $\frac{3}{2}$ (d) $\frac{-2}{3}$

---

14 General solution of the equation : $\cos\theta = 1$ is ....

(a) $n\pi$ (b) $2n\pi$ (c) $\frac{\pi}{2} + n\pi$ (d) $\frac{\pi}{2} + 2n\pi$

---

15 If the point $(4, k)$ is lying on the axis of symmetry of the region of S.S. of the two inequalities : $x + y > a$, $x - y > a$, then k = ...

(a) 4 (b) -4 (c) a (d) zero

---

16 The straight line : $2x + 3y = 12$ makes with the two axes of coordinates a triangle of area .... square unit.

(a) 4 (b) 6 (c) 8 (d) 12

---

17 If A is a matrix in the order 2×2 and $A^2 = 3A + 2I$, $A^3 = mA + \ell I$, then $m + \ell$ = ...

(a) 20 (b) 17 (c) 11 (d) 6

---

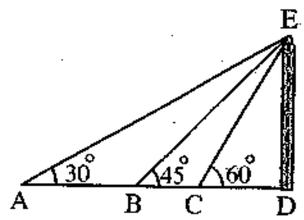
18 The point at which P has minimum value where $P = 35x + 10y$ is ....

(a) $(0, 10)$ (b) $(0, 20)$ (c) $(0, 40)$ (d) $(20, 10)$

---

19 **In the opposite figure :**

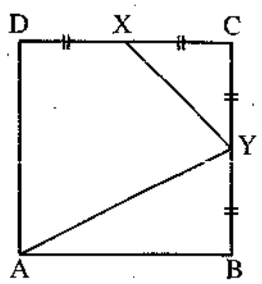
If the elevation angles of the top of a tower from three different point on the horizontal line passing through the base of the tower are of measures 30° , 45° , 60° respectively , then AB : BC = ... : ....



(a) $1 : \sqrt{3}$ (b) $2 : 3$ (c) $\sqrt{3} : \sqrt{2}$ (d) $\sqrt{3} : 1$

20 **In the opposite figure :**

ABCD is a square and $\overrightarrow{AY} + \overrightarrow{XY} = k\ \overrightarrow{XC}$, then k = ...



(a) 1 (b) 2

(c) 3 (d) 4

---

21 The measure of the central angle of a circular segment is 90° and its area is 56 cm^2 , then the radius length of its circle approximately equals .... cm.

(a) 9.9 (b) 19.8 (c) 7 (d) 14

---

22 The measure of an angle in a rhombus is 50° and its side length is 12 cm. , then its area is .... cm^2.

(a) 36 sin 50° (b) 72 cos 50° (c) 144 sin 50° (d) 72 sin 50°

---

23 If $\overrightarrow{A} = (k\ , 2)$, $\overrightarrow{B} = (3\ , k-5)$ and $\overrightarrow{A} \perp \overrightarrow{B}$, then k = ...

(a) 1 (b) 2 (c) – 1 (d) – 2

---

24 If $\overrightarrow{A} = 3\ \overrightarrow{i} - 4\ \overrightarrow{j}$, $\overrightarrow{B} = \overrightarrow{j}$, $\overrightarrow{C} = \left(5\ , \frac{\pi}{18}\right)$, then $\|\overrightarrow{A}\| + \|\overrightarrow{B}\| + \|\overrightarrow{C}\| =$ ....

(a) 9 (b) 10 (c) 11 (d) 12

---

25 The number of solutions of the equation : $\sin^2 x - 6 \sin x + 9 = 0$ is ....

(a) zero (b) 1 (c) 2 (d) 3

---

26 If $x + y = 30°$, then $\tan (x + 2\ y) \tan (2\ x + y) =$ ....

(a) zero (b) 1 (c) – 1 (d) $\frac{1}{2}$

---

27 The value(s) of x which makes the matrix $\begin{pmatrix} x & 2 \\ 2 & x \end{pmatrix}$ has no multiplicative inverse is/are ....

(a) 2 (b) – 2 (c) ± 2 (d) ± 4

---

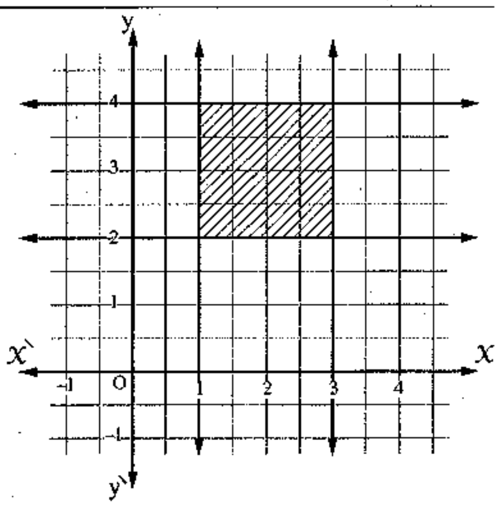
28 The shaded region in the given figure represents the solution set of the inequalities ....

(a) $x > 1$, $y > 2$

(b) $1 < x < 3$, $2 < y < 4$

(c) $1 \leq x \leq 3$, $2 \leq y \leq 4$

(d) $x + y \geq 3$, $x - y \leq 7$



29 The length of the perpendicular drawn from the point $(1, 1)$ to the straight line $x + y = 0$ equals .... length unit.

(a) $\frac{\sqrt{2}}{2}$ (b) $\sqrt{2}$ (c) $2\sqrt{2}$ (d) 2

30 If the matrix $A = \begin{pmatrix} 1 & 3 \\ 5 & -1 \end{pmatrix}$, $B = \begin{pmatrix} -1 & -3 \\ -5 & 1 \end{pmatrix}$, then $A + B =$ ....

(a) 2 A (b) 2 B (c) O (d) zero

31 If $\begin{vmatrix} x & y \\ z & \ell \end{vmatrix} = 4$, then $\begin{vmatrix} x - y & 4y \\ z - \ell & 4\ell \end{vmatrix} =$ ....

(a) 1 (b) 10 (c) 12 (d) 16

32 If $\overrightarrow{u} = (2, -5)$ is a direction vector of a straight line , then all the following are direction vectors in the same direction as the straight line except ....

(a) $(-2, 5)$ (b) $(6, -15)$ (c) $(2, 5)$ (d) $\left(-1, 2\frac{1}{2}\right)$

33 If $\begin{pmatrix} 3 & a-2 \\ b & 5 \end{pmatrix} = \begin{pmatrix} 3 & 4 \\ 7 & 5 \end{pmatrix}^t$, then $\begin{pmatrix} a & b \end{pmatrix} =$ ....

(a) $\begin{pmatrix} 6 & 7 \end{pmatrix}$ (b) $\begin{pmatrix} 7 & 6 \end{pmatrix}$ (c) $\begin{pmatrix} 9 & 4 \end{pmatrix}$ (d) $\begin{pmatrix} 4 & 7 \end{pmatrix}$

34 Measure of the angle between the two straight lines $L_1 : x = 3$, $L_2 : \overrightarrow{r} = (2, 5) + k(1, 0)$ equals ....

(a) 90° (b) 180° (c) 45° (d) zero

35 If $A \times \begin{pmatrix} 1 & 2 \\ -1 & 1 \end{pmatrix} = I$, then $3A =$ ....

(a) $\frac{1}{3}\begin{pmatrix} 1 & 1 \\ -2 & 1 \end{pmatrix}$ (b) $3\begin{pmatrix} 1 & -2 \\ 1 & 1 \end{pmatrix}$ (c) $\frac{1}{3}\begin{pmatrix} 1 & 2 \\ 1 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & -2 \\ 1 & 1 \end{pmatrix}$

36 If $A = (k, 2)$, $B = (1, -1)$ and $\|\overrightarrow{AB}\| = 5$, then $k =$ ....

(a) 5 (b) – 3 (c) 5 or – 3 (d) 15

37 If $A = (3, -5)$, $B = (-1, 5)$, $\overrightarrow{M} = (6, k)$ and $\overrightarrow{M} \parallel \overrightarrow{AB}$, then $k =$ ....

(a) – 15 (b) – 10 (c) – 5 (d) 5

38 The polar form of the vector $\overrightarrow{A} = -3\overrightarrow{j}$ is ....

(a) $\left(-3, \frac{\pi}{2}\right)$ (b) $\left(3, \frac{\pi}{2}\right)$ (c) $\left(-3, \frac{3\pi}{2}\right)$ (d) $\left(3, \frac{3\pi}{2}\right)$

39 Measure of the angle between the two vectors $\overrightarrow{A} = 3\,\overrightarrow{i} + \sqrt{3}\,\overrightarrow{j}$, $\overrightarrow{B} = -4\,\overrightarrow{i}$ equals ....

(a) 45°   (b) 60°   (c) 120°   (d) 150°

---

40 If $\overrightarrow{A} = (-1 , 2)$, $\overrightarrow{B} = (3 , 7)$, $\overrightarrow{C} = (7 , 12)$, then $\overrightarrow{C} =$ ....

(a) $2\,\overrightarrow{A} - \overrightarrow{B}$ (b) $\overrightarrow{A} + 2\,\overrightarrow{B}$ (c) $2\,\overrightarrow{B} - \overrightarrow{A}$ (d) $3\,\overrightarrow{A} + 2\,\overrightarrow{B}$

Interactive test 7

Model 7

Choose the correct answer from the given ones :

1 If A , B are two matrices where $AB = \begin{pmatrix} 3 & -1 \\ 4 & 5 \end{pmatrix}$, then $B^t A^t =$ ....

(a) $\begin{pmatrix} 3 & -1 \\ 4 & 5 \end{pmatrix}$ (b) $\begin{pmatrix} 3 & 4 \\ -1 & 5 \end{pmatrix}$ (c) $\begin{pmatrix} 5 & -1 \\ 4 & 3 \end{pmatrix}$ (d) $\begin{pmatrix} 5 & 4 \\ -1 & 3 \end{pmatrix}$

---

2 ABC is an equilateral triangle in which A $(2 , -1)$ and the equation of $\overleftrightarrow{BC}$ is $x + y = 2$, then the side length of the triangle ABC = ... length unit.

(a) $\frac{\sqrt{2}}{2}$ (b) $\frac{\sqrt{6}}{2}$ (c) $\frac{\sqrt{6}}{3}$ (d) $\sqrt{2}$

---

3 The S.S. of the equation : $\sin x + \cos x = 0$ where $180° < x < 360°$ equals ....

(a) $\{210°\}$ (b) $\{225°\}$ (c) $\{240°\}$ (d) $\{315°\}$

---

4 Which of the following is sufficient to find the value of x where $A = \begin{pmatrix} x & 2 & 3 \\ z & y & n \\ -3 & 5 & m \end{pmatrix}$?

(a) $A = A^t$ (b) $A = -A^t$

(c) A is a diagonal matrix.   (d) it is impossible to find the value of x

---

5 If $\begin{vmatrix} \ell & 2 & -1 \\ x-2 & m & 3 \\ 0 & 0 & n \end{vmatrix} = \ell\, m\, n$ where ℓ , m , n non-zero numbers , then $x =$ ....

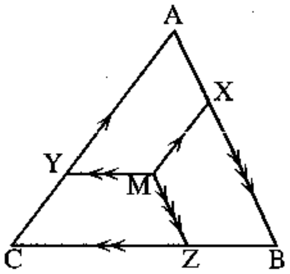
(a) 2   (b) -2 (c) 6   (d) mn

---

6 The length of the intercepted part of y-axis by the straight line : $3x + 4y = 12$ equals .... length unit.

(a) 1   (b) 2   (c) 3   (d) 4

7 In the opposite figure :



If M is the point of intersection of the medians of ΔABC , then :

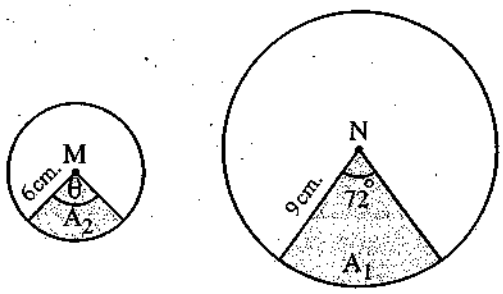
$\overrightarrow{MX} + \overrightarrow{MY} + \overrightarrow{MZ} =$ ....

(a) $3\,\overrightarrow{ZB}$ (b) $2\,\overrightarrow{YC}$

(c) $\overrightarrow{O}$ (d) $5\,\overrightarrow{AX}$

---

8 In the opposite figure :



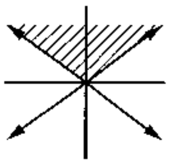
M and N are two distinct circles and A_1 , A_2 are the areas of the two sectors.

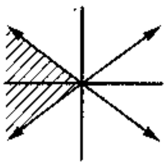
If $\frac{A_1}{A_2} = \frac{9}{5}$, then $\theta =$ ....

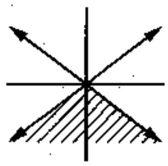
(a) 72° (b) 80° (c) 90° (d) 100°

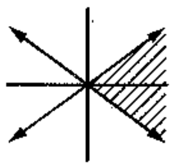
---

9 The solution set of the inequality : $-x \le y \le x$ is ....


(a)


(b)


(c)


(d)

---

10 If $\overrightarrow{M} = (2 , 5)$, $\overrightarrow{N} = (1 , 3)$, then $2\,\overrightarrow{M} - \overrightarrow{N} =$ ....

(a) (3 , 7) (b) (1 , 2) (c) (3 , 8) (d) (0 , 1)

---

11 An equilateral triangle of side length 8 cm. , then its area = ... cm^2.

(a) $8\sqrt{3}$ (b) $16\sqrt{3}$ (c) $24\sqrt{3}$ (d) $32\sqrt{3}$

---

12 If $\overrightarrow{A} = \left(6 , \frac{\pi}{2}\right)$, $\overrightarrow{B} = 4\,\overrightarrow{i} + 3\,\overrightarrow{j}$, then $\overrightarrow{AB} =$ ....

(a) (– 4 , 3) (b) (4 , 3) (c) (4 , – 3) (d) (– 4 , – 3)

---

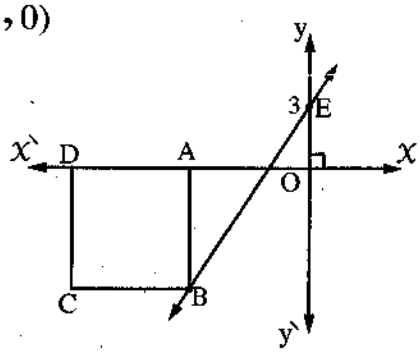
13 If ABC is a right-angled triangle whose side lengths are a , a + 1 , a – 1 where a > 1 , then the measure of its greatest acute angle ≈ ....

(a) 36° 52' (b) 48° 18' (c) 53° 8' (d) 62° 42'

14 In the opposite figure :

If the area of the square ABCD = 36 square unit and D (– 12 , 0)

, then the vector equation of the straight line $\overleftrightarrow{EB}$ is ....



(a) $\vec{r} = (0 , 3) + k (3 , 2)$

(b) $\vec{r} = (0 , 3) + k (-3 , 2)$

(c) $\vec{r} = (-6 , -6) + k (-2 , 3)$

(d) $\vec{r} = (-6 , -6) + k (2 , 3)$

---

15 The point which aren't lying in the region of the solution of the inequality : $2X - y \leq 7$ in $\mathbb{R} \times \mathbb{R}$ is ....

(a) (0 , 0) (b) (2 , 0) (c) (3 , – 2) (d) (5 , 4)

---

16 If $\begin{vmatrix} 2-X & 2 \\ -3 & X+2 \end{vmatrix} = 1$, then $X =$ ....

(a) – 3 (b) 3 (c) ± 3 (d) ± 4

---

17 If $\vec{M} = (2 , 1)$ is a direction vector of a straight line , then all of the following vectors are perpendicular to the straight line except the vector ....

(a) (1 , – 2) (b) (– 2 , 4) (c) (– 1 , 2) (d) (1 , 2)

---

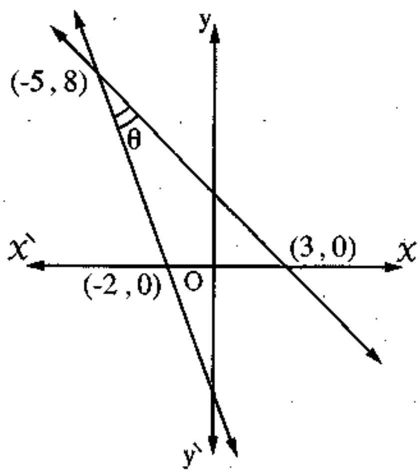
18 The equation of the straight line that parallel to y-axis and passes through the point $\left(\frac{-c}{a} , 0\right)$ ....

(a) $aX - c = 0$ (b) $a y - c = 0$ (c) $aX + c = 0$ (d) $a y + c = 0$

---

19 In the opposite figure :

Tan θ = ...



(a) $\frac{8}{3}$

(b) $\frac{3}{11}$

(c) $\frac{5}{11}$

(d) $\frac{7}{11}$

20 If $\overrightarrow{F_1} = \vec{i} - 3\vec{j}$, $\overrightarrow{F_2} = 3\vec{i} + 6\vec{j}$, then the force $\overrightarrow{F_3}$ which makes the resultant of the three forces is a unit vector and acts in the north direction equals ....

(a) $-3\vec{i} - 3\vec{j}$ (b) $-4\vec{i} - 2\vec{j}$ (c) $-5\vec{i} - 3\vec{j}$ (d) $-4\vec{i} - 3\vec{j}$

---

21 If the length of the intercepted part of y-axis by a straight line is twice the intercepted part of the X-axis and the straight line passes through the point (1 , 2) , then the equation of the straight line is ....

(a) $2X + y = -4$ (b) $2X - y = 4$

(c) $2X - y + 4 = 0$ (d) $2X + y - 4 = 0$

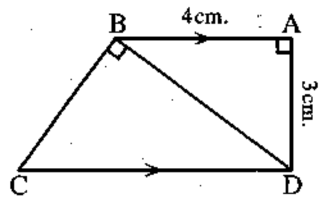
---

22 The area of the circular segment in a circle with radius length 10 cm. and its arc length 5 cm. approximately equals .... cm^2

(a) 0.13 (b) 0.51 (c) 2.05 (d) 1.03

---

23 **In the given figure :**



The length of $\overline{BC}$ = ...

(a) 5 cm. (b) $6\frac{2}{3}$ cm.

(c) $3\frac{3}{4}$ cm. (d) 3 cm.

---

24 $(\sin\theta + \cos\theta)^2 - 2\sin\theta\cos\theta$ = ...

(a) zero (b) $\sin\theta$ (c) 1 (d) $\cos\theta$

---

25 $\begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 0 & 1 \\ 0 & 2 \end{pmatrix}$ = ...

(a) $\begin{pmatrix} 0 & 0 \\ 1 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 0 \\ 1 & 0 \end{pmatrix}$ (c) $\begin{pmatrix} 0 & 1 \\ 0 & 1 \end{pmatrix}$ (d) $\begin{pmatrix} 1 & 1 \\ 0 & 0 \end{pmatrix}$

---

26 If $\vec{A} = 2\vec{i} + 3\vec{j}$, $\vec{B} = (k-1)\vec{i} + \vec{j}$, $\vec{A} \parallel \vec{B}$, then k = ...

(a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) $-\frac{5}{3}$ (d) $-\frac{3}{5}$

---

27 If $\overrightarrow{AB} = (-3 , 2)$, $\overrightarrow{BC} = (0 , 2)$, then $\| \overrightarrow{AC} \|$ = ...

(a) $\sqrt{13} + 2$ (b) $\sqrt{13} - 2$ (c) 4 (d) 5

---

28 Which of the following points belongs to the solution set of the system :

$X > 0$, $y > 0$, $2X + y > 6$?

(a) (1 , 3) (b) (0 , 0) (c) (2 , 3) (d) (4 , – 2)

29 Measure of the acute angle between the two straight lines $\ell_1 : \vec{r} = (4 , 2) + k(-3 , 1)$, $\ell_2 : 2x = 3 - y$ equals ....

(a) 30°　　(b) 45°　　(c) 60°　　(d) 150°

---

30 The matrix $\begin{pmatrix} x+3 & 2 \\ 2 & x-3 \end{pmatrix}$ has no multiplicative inverse at $x =$ ....

(a) ± 3　　(b) $\pm\sqrt{13}$　　(c) 5　　(d) ± 5

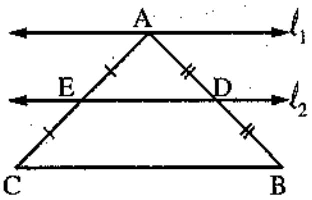
---

31 If L , M are the roots of the equation $x^2 - 4x - 10 = 0$, then the value of the determinant $\begin{vmatrix} 2L & -1 \\ 3 & M \end{vmatrix}$ equals ....

(a) -17　　(b) -12　　(c) -8　　(d) -6

---

32 In the given figure :



If $\ell_1 : 3x - 4y + 10 = 0$, $\ell_2 : 3x = 4y$, then the length of the perpendicular drawn from A to $\overleftrightarrow{BC}$ = ... length unit.

(a) 1　　(b) 2　　(c) 4　　(d) 6

---

33 The coordinates of the point C which divides $\overline{AB}$ internally in ratio 1 : 2 where A (5 , – 6) , B (– 1 , 3) is ....

(a) (0 , 0)　　(b) (3 , 3)　　(c) (– 3 , – 3)　　(d) (3 , – 3)

---

34 The general solution of the equation $\cos\theta = -1$ is .... where $n \in \mathbb{Z}$

(a) $\frac{\pi}{2} + n\pi$　　(b) $\frac{\pi}{3} + n\pi$　　(c) $\pi + 2\pi n$　　(d) $\frac{\pi}{6} + 2n\pi$

---

35 If $\overrightarrow{AB} = \overrightarrow{CD}$, $\overrightarrow{CD} = (6 , 4)$, $\vec{A} = (-1 , 3)$, then $\vec{B} =$ ....

(a) (5 , 7)　　(b) (– 5 , – 7)　　(c) (– 5 , 7)　　(d) (5 , – 7)

---

36 If $A^{-1} = \begin{pmatrix} -1 & 2 \\ 1 & 3 \end{pmatrix}$, $AB = \begin{pmatrix} 4 & -2 \\ 0 & 1 \end{pmatrix}$, then B = ...

(a) $\begin{pmatrix} 4 & -2 \\ 0 & 1 \end{pmatrix}$　　(b) $\begin{pmatrix} 4 & -4 \\ -4 & 1 \end{pmatrix}$　　(c) $\begin{pmatrix} -4 & 4 \\ 4 & 1 \end{pmatrix}$　　(d) $\begin{pmatrix} -4 & 4 \\ 1 & -4 \end{pmatrix}$

---

37 The polar form of the vector $\vec{A} = \sqrt{3}\,\vec{i} + \vec{j}$ is ....

(a) $\left(2 , \frac{\pi}{3}\right)$　　(b) $\left(4 , \frac{\pi}{3}\right)$　　(c) $\left(2 , \frac{\pi}{6}\right)$　　(d) $\left(4 , \frac{\pi}{6}\right)$

38 The equation of the straight line passing through the point $(-2 , 7)$ and parallel to the x-axis is ....

(a) $x = -2$ (b) $x = 7$ (c) $y = -2$ (d) $y = 7$

---

39 The vector equation of the straight line passing through the point N $(5 , 3)$ and its slope $= \frac{1}{2}$ is ....

(a) $\vec{r} = (2 , 1) + k (5 , 3)$ (b) $\vec{r} = (5 , 6) + k (2 , 1)$

(c) $\vec{r} = (5 , 3) + k (2 , 1)$ (d) $\vec{r} = (5 , 3) + k (1 , 2)$

---

40 The area of the triangle with vertices $(1 , 6)$, $(0 , 10)$, $(0 , 0)$ equals .... square unit.

(a) 5 (b) 10 (c) 15 (d) 20

Interactive test 8

Model 8

Choose the correct answer from the given ones :

1 If $\begin{pmatrix} 4 & 1 \\ 1 & 3 \end{pmatrix} \begin{pmatrix} 1 & -1 \\ -3 & x \end{pmatrix} = I$, then $x =$ ....

(a) 4 (b) 5 (c) 1 (d) zero

---

2 If $\sin A + \sin B = 2$, then ....

(a) $\cos A + \cos B =$ zero (b) $\cos A - \cos B = 1$

(c) $\sin A - \sin B = 1$ (d) $\sin (A + B) = -1$

---

3 If the origin point is the point of concurrency of medians of the triangle whose vertices are (a , b) , (b , c) , (c , a) , then $a^3 + b^3 + c^3 =$ ....

(a) zero (b) abc (c) $a + b + c$ (d) 3 abc

---

4 If A is a square matrix , then $(A + A^t)$ is ....

(a) symmetric matrix. (b) skew symmetric matrix.

(c) zero matrix. (d) diagonal matrix.

---

5 If A is a matrix of order 2×2 and $a_{ij} = \frac{i}{j}$, then $a_{11} \times a_{12} \times a_{21} \times a_{22} =$ ....

(a) 4 (b) 2 (c) 1 (d) $\frac{1}{2}$

6 Measure of the included angle between the two straight lines their slopes are $\frac{1}{2}$ and -2 equals ....

(a) 45° (b) 90° (c) 120° (d) 135°

---

7 If x and y are two integers where $x > 0$, $y > 0$ and $x + y < 5$, then the number of ordered pairs (x , y) that satisfy the previous conditions are ....

(a) 4 (b) 5 (c) 6 (d) 7

---

8 The additive inverse of the vector $\overrightarrow{AB}$ is the vector ....

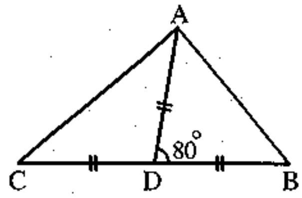
(a) $\overrightarrow{BA}$ (b) $\overrightarrow{O}$ (c) $-\overrightarrow{BA}$ (d) $\overrightarrow{AB}$

---

9 **In the opposite figure :**

If $D \in \overline{BC}$ where DA = DB = DC = 5 cm. , m ($\angle$ ADB) = 80°

, then AC = ... cm.



(a) 10 sin 40° (b) 10 sin 50°

(c) 5 sin 80° (d) 5 sin 40°

---

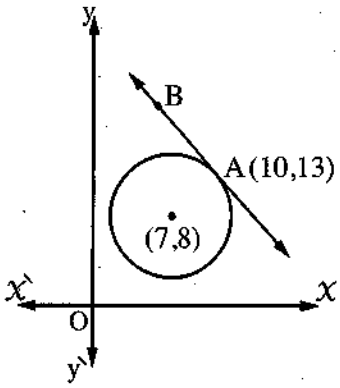
10 $2 \sin^2 3 x^3 + 2 \cos^2 3 x^3 =$ ....

(a) 6 (b) 54 (c) 2 (d) $2 x^3$

---

11 **In the opposite figure :**

A circle whose centre (7 , 8) , the straight line $\overleftrightarrow{AB}$ is a tangent to it at A , then equation of the straight line $\overleftrightarrow{AB}$ is ....



(a) $5 x + 3 y = 95$ (b) $3 x + 5 y = 35$

(c) $3 x + 5 y + 95 = 0$ (d) $3 x + 5 y = 95$

---

12 If $\overrightarrow{AB} = \overrightarrow{CD}$ where $\overrightarrow{AB} = (6 , 4)$, $\overrightarrow{C} = (-1 , 3)$, then $\overrightarrow{D} =$ ....

(a) (5 , 7) (b) (−5 , −7) (c) (−5 , 7) (d) (7 , 7)

---

13 Area of the triangle subtended by the straight lines : $x = 0$, $y = 0$ and $\frac{x}{2} + \frac{y}{5} = 1$ equals .... square units.

(a) 2 (b) 5 (c) 10 (d) 7

14 Length of the drawn perpendicular from the point $(-3, -5)$ to the y-axis equals .... length unit.

(a) -3 (b) -5 (c) 3 (d) 5

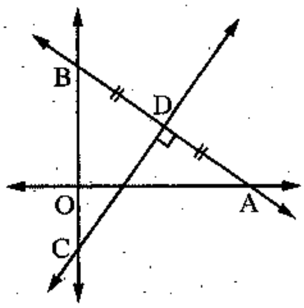
---

15 If $\overrightarrow{A}$ and $\overrightarrow{B}$ are two unit vectors , then ....

(a) $\|\overrightarrow{A}+\overrightarrow{B}\| = 2$ (b) $\|\overrightarrow{A}-\overrightarrow{B}\| = 2$ (c) $\|\overrightarrow{A}+\overrightarrow{B}\| \geq 2$ (d) $\|\overrightarrow{A}+\overrightarrow{B}\| \leq 2$

---

16 **In the opposite figure :**



If the equation of the straight line $\overleftrightarrow{AB}$ is : $2x + 3y = 12$

, then the vector equation of the straight line $\overleftrightarrow{DC}$ is ....

(a) $\vec{r} = (2, 3) + k(2, 3)$

(b) $\vec{r} = (2, 3) + k(3, 2)$

(c) $\vec{r} = (3, 2) + k(2, 3)$

(d) $\vec{r} = (3, 2) + k(3, 2)$

---

17 If $\begin{vmatrix} x^2 & 5 \\ 3 & x \end{vmatrix} = 12$, then $x =$ ....

(a) 15 (b) 3 (c) 12 (d) 27

---

18 If $0 \leq \theta < 360°$ and $\cos\theta + 1 = 0$, then $\theta =$ ....

(a) 90° (b) 180° (c) 270° (d) 360°

---

19 The point that belonges to the S.S. of the following inequalities :

$x \geq 0$, $y \geq 0$, $2x + y < 4$ and $x + 3y < 6$ is ....

(a) $(1, -3)$ (b) $(3, 0)$ (c) $(2, 3)$ (d) $(1, 1)$

---

20 Which pair of the following vectors are perpendicular ?

(a) $(3, 0)$, $(2, -1)$ (b) $(-2, 5)$, $(4, -10)$

(c) $(2, 0)$, $(0, 2)$ (d) $(1, -4)$, $(2, -8)$

---

21 If $\overrightarrow{V}_{AB} = 15\vec{e}$, $\overrightarrow{V}_A = -55\vec{e}$, then $\overrightarrow{V}_B =$ ....

(a) $15\vec{e}$ (b) $-15\vec{e}$ (c) $-70\vec{e}$ (d) $70\vec{e}$

22 From the top of a tower 80 m high. , the measure of depression angle of a body lies on the horizontal plane that passing through the tower base equals $24^\circ\ 12'$, then the distance between the body from the base of the tower approximately equals ....

(a) 195 m. (b) 178 m. (c) 88 m. (d) 36 m.

---

23 If $\overrightarrow{A} = (6 , 8)$, $\overrightarrow{B} = (3 , m)$, $\overrightarrow{C} = (n , 9)$ and $\overrightarrow{A} // \overrightarrow{B}$, $\overrightarrow{B} \perp \overrightarrow{C}$, then m + n = ...

(a) 8 (b) – 8 (c) 12 (d) – 12

---

24 If $\sin \theta = \frac{a}{b}$, $\theta \in]0 , \frac{\pi}{2}[$, then $\sqrt{1 + \tan^2 \theta} =$ ....

(a) $\frac{1}{\sqrt{a^2 - b^2}}$ (b) $\frac{1}{\sqrt{a - b}}$ (c) $\frac{a}{\sqrt{1 + a^2}}$ (d) $\frac{b}{\sqrt{b^2 - a^2}}$

---

25 The length of the perpendicular drawn from the point (3 , 5) on the straight line : $3x + 4y - 4 = 0$ equals .... length unit.

(a) 5 (b) – 5 (c) 4 (d) – 4

---

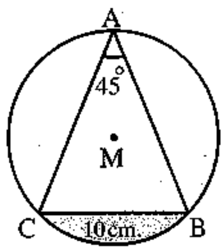
26 If $\overrightarrow{A} = \left(2 , \frac{\pi}{6}\right)$, then the Cartesian form of the vector $2\overrightarrow{A}$ equals ....

(a) $2\sqrt{3}\,\overrightarrow{i} + 2\,\overrightarrow{j}$ (b) $2\,\overrightarrow{i} + 2\sqrt{3}\,\overrightarrow{j}$

(c) $4\sqrt{3}\,\overrightarrow{i} + 4\,\overrightarrow{j}$ (d) $4\,\overrightarrow{i} + 4\sqrt{3}\,\overrightarrow{j}$

---

27 **In the given figure :**



The area of the shaded part approximately equals .... cm^2

(a) 7.1 (b) 28.5

(c) 14.3 (d) 2.02

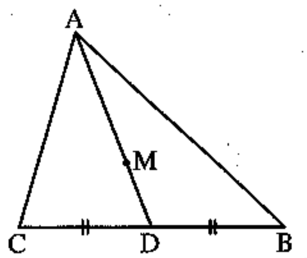
---

28 The perimeter of a circular sector is (4 r) cm. where r is the radius length of its circle , then the radian measure of its central angle equals .... radian.

(a) $\frac{1}{2}$ (b) 8 (c) 2 (d) $\frac{1}{3}$

---

29 **In the opposite figure :**



M is the intersection point of the medians of Δ ABC , $\overrightarrow{AB} + \overrightarrow{AC} = k\,\overrightarrow{AM}$, then k = ...

(a) $\frac{1}{3}$ (b) 3

(c) $\frac{1}{2}$ (d) 2

30 If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 6$ and $\begin{vmatrix} ak & kc \\ b & d \end{vmatrix} = -24$, then k = ...

(a) 4 (b) 3 (c) -3 (d) -4

---

31 If $A = \begin{pmatrix} X & 2 \\ y & -2 \end{pmatrix}$ and $A \times A^{-1} = A^2$, then $X \times y$ = ...

(a) 3 (b) 2 (c) -2 (d) -3

---

32 If $\overrightarrow{A} = -7\,\overrightarrow{B}$, then ....

(a) $\overrightarrow{A} \perp \overrightarrow{B}$ (b) $\overrightarrow{A} \,//\, \overrightarrow{B}$ (c) $\|\overrightarrow{A}\| = \|\overrightarrow{B}\|$ (d) $7\,\overrightarrow{A} = \overrightarrow{B}$

---

33 Measure of the acute angle between the two straight lines $X - \sqrt{3}\,y = 5$, $y = 2$ equals ....

(a) 90° (b) 60° (c) 45° (d) 30°

---

34 If the slope of a straight line = 0.6 , then its direction vector could be ....

(a) (5 , 3) (b) (3 , 5) (c) (– 3 , 5) (d) (3 , – 5)

---

35 The coordinates of the point lies at $\frac{2}{5}$ the distance from A to B to the directed segment $\overrightarrow{AB}$ where A (3 , – 2) , B (– 1 , 5) is ....

(a) (– 1 , 3) (b) $\left(\frac{7}{5} , \frac{4}{5}\right)$ (c) (3 , – 1) (d) $\left(\frac{4}{5} , \frac{7}{5}\right)$

---

36 The value of the determinant $\begin{vmatrix} 4 & 0 & 0 \\ 7 & 2 & 0 \\ 1 & 5 & 1 \end{vmatrix}$ = ...

(a) 1 (b) 2 (c) 4 (d) 8

---

37 The length of the perpendicular drawn from the point (3 , 1) to the straight line $4X + 3y - 5 = 0$ equals .... length unit.

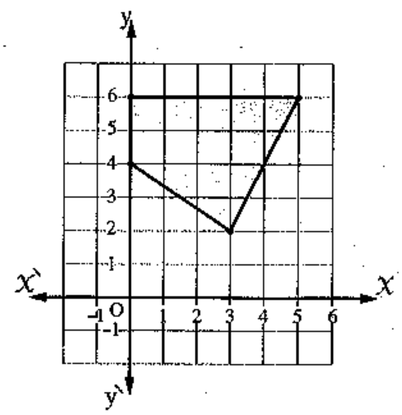
(a) 2 (b) 3 (c) 4 (d) 5

---

38 By using the given figure , the point which makes the objective function : $P = 3X + 2y$ as small as possible ....

(a) (0 , 4) (b) (3 , 2)

(c) (5 , 6) (d) (0 , 6)



39 If $\begin{pmatrix} 2 & 1 \\ 3 & -1 \end{pmatrix}\begin{pmatrix} a \\ b \end{pmatrix}=\begin{pmatrix} 9 \\ 6 \end{pmatrix}$, then a + b = ...

(a) 3 (b) 4 (c) 5 (d) 6

---

40 If $\begin{pmatrix} X \\ 6 \end{pmatrix}-\begin{pmatrix} 1 \\ y \end{pmatrix}=\begin{pmatrix} 3 \\ 5 \end{pmatrix}$, then $X + y =$ ....

(a) 5 (b) 4 (c) 3 (d) 1

Interactive test 9

Model 9

Choose the correct answer from the given ones :

1 If A is a matrix of order 1×3, B^t is a matrix of order 1×3, then its possible to find ....

(a) $A + B$ (b) $B^t + A^t$ (c) $A\,B^t$ (d) $A\,B$

---

2 Coordinates of the projection of the point (2 , 3) on the straight line $L : X + y = 11$ is ....

(a) (– 6 , 5) (b) (6 , 5) (c) (5 , 6) (d) (– 5 , 6)

---

3 Measure of the obtuse angle included between the two straight lines :

$y = \left(2-\sqrt{3}\right)(X+5)$, $y = \left(2+\sqrt{3}\right)(X-7)$ is ....

(a) 150° (b) 60° (c) 135° (d) 120°

---

4 If A is a square matrix in order 2×2 and $|2\,A| = 8$, then $|3\,A^t| =$ ....

(a) 9 (b) 12 (c) 18 (d) 24

---

5 The productive rate of a factory is 120 units at most of two different kinds of articles X and y respectively.

If what is sold from the second kind doesn't less than half what is sold from the first kind.

Which of the following system of inequalities represent the previous data and conditions ?

(a) $X \geq 0$, $y \geq 0$, $X + y \leq 120$, $2\,y \leq X$

(b) $X \geq 0$, $y \geq 0$, $X + y \geq 120$, $y \leq 2\,X$

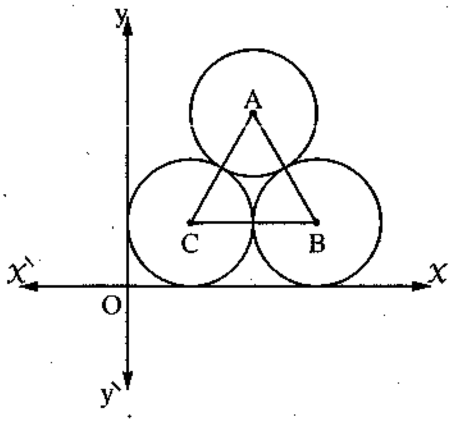
(c) $X \geq 0$, $y \geq 0$, $X + y \leq 120$, $2\,y \geq X$

(d) $X \geq 0$, $y \geq 0$, $X + y \leq 120$, $y \geq 2\,X$

6 **In the opposite figure :**

Three congruent circles are tangent to each other

If C = (4 , 4) , then equation of the straight line $\overleftrightarrow{AB}$ is ....



(a) $\vec{r} = (4, 4) + k\left(1, -\sqrt{3}\right)$

(b) $\vec{r} = (8, 4) + k\left(1, -\sqrt{3}\right)$

(c) $\vec{r} = (12, 4) + k\left(1, -\sqrt{3}\right)$

(d) $\vec{r} = (12, 4) + k\left(-\sqrt{3}, 1\right)$

---

7 If $\vec{A} = (6, 4)$, $\vec{B} = (2, m)$ and $\vec{A} \perp \vec{B}$, then m = ...

(a) – 3 (b) 3 (c) – 6 (d) 4

---

8 Perpendicular distance between the two straight lines : $X - 3 = 0$ and $X + 2 = 0$ equals .... length unit.

(a) 1 (b) 2 (c) 3 (d) 5

---

9 The direction vector of the straight line $aX + by + c = 0$ is ....

(a) (a , b) (b) (a , – b) (c) (b , a) (d) (b , – a)

---

10 Perimeter of a circular sector is 4 r cm. where r is the radius length of its circle , then the measure of its central angle in radian equals ....rad

(a) $\frac{1}{2}$ (b) 8 (c) 2 (d) $\frac{1}{3}$

---

11 Number of solutions of the equation : $\sin X = 0$ where $X \in [0, 6\pi[$ is ....

(a) 2 (b) 4 (c) 6 (d) 8

---

12 If the measure of the included angle between the two straight lines :

$X = 7$, $y = aX + 2$ equals 90° , then a = ...

(a) zero (b) 1 (c) 90 (d) – 1

---

13 Value of the determinant $\begin{vmatrix} -2 & 3 & 7 \\ 0 & 4 & 5 \\ 0 & 0 & -3 \end{vmatrix}$ = ...

(a) – 24 (b) 24 (c) 342 (d) zero

14 Which of the following statement is incorrect ?

(a) If $\overrightarrow{A} = \overrightarrow{B}$, then $\|\overrightarrow{A}\| = \|\overrightarrow{B}\|$
(b) If $\|\overrightarrow{A}\| = \|\overrightarrow{B}\|$, then $\overrightarrow{A} = \overrightarrow{B}$
(c) If $\overrightarrow{A} \parallel \overrightarrow{B}$, then $\overrightarrow{A} = k\,\overrightarrow{B}$
(d) If $\overrightarrow{A} = k\,\overrightarrow{B}$, then $\overrightarrow{A} \parallel \overrightarrow{B}$

---

15 **In the triangle ABC :**

$\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{CA} =$ ....

(a) $\overrightarrow{BA}$ (b) $\overrightarrow{CA}$ (c) $\overrightarrow{CB}$ (d) $\overrightarrow{O}$

---

16 The quadrant that represent the S.S. of the system of the two inequalities : $x > 0$, $y > 0$ is the .... quadrant.

(a) first (b) second (c) third (d) fourth

---

17 If the matrix A is symmetric and skew symmetric , then ....

(a) A = I
(b) A = O
(c) A is a diagonal matrix.
(d) A is a row matrix.

---

18 If $\overrightarrow{F_1} = \left(6 , \frac{2\pi}{3}\right)$, $\overrightarrow{F_2} = \left(6 , \frac{4\pi}{3}\right)$, $\overrightarrow{F_3} = 9\,\overrightarrow{i} + 4\,\overrightarrow{j}$ measured in dyne , then magnitude of resultant of these forces = ... dyne.

(a) 13 (b) 10 (c) 5 (d) $6\sqrt{3}$

---

19 If $\theta \in]0° , 360°[$, $2\cos\theta + \sqrt{3} = 0$, then θ may be equals ....

(a) 30° (b) 60° (c) 210° (d) 300°

---

20 If sin θ , cos θ are the two roots of the equation : $2x^2 + bx - 1 = 0$, then b = ...

(a) zero (b) 2 (c) 3 (d) – 4

---

21 If the area of a regular hexagon is $54\sqrt{3}$ cm^2 , then its side length equals .... cm.

(a) 6 (b) 12 (c) $6\sqrt{3}$ (d) $12\sqrt{3}$

---

22 Which of the following vectors represents the velocity of a car moves with speed of magnitude 100 km./hr. in the direction 60° West of North ?

(a) $50\,\overrightarrow{i} + 50\sqrt{3}\,\overrightarrow{j}$ (b) $50\sqrt{3}\,\overrightarrow{i} - 50\,\overrightarrow{j}$ (c) $-50\sqrt{3}\,\overrightarrow{i} + 50\,\overrightarrow{j}$ (d) $-50\,\overrightarrow{i} - 50\sqrt{3}\,\overrightarrow{i}$

---

23 If ABCD is a parallelogram , A (1 , 2) , B (x , – 3) , C (– 3 , 5) , D (– 7 , y) , then $\overrightarrow{BD} =$ ....

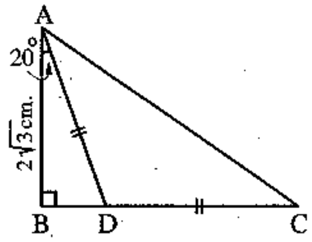
(a) (– 2 , 7) (b) (– 12 , – 13) (c) (4 , – 3) (d) (– 12 , 13)

24 If $\overrightarrow{A} = (7 , 8)$, $\overrightarrow{B} = (4 , 4)$, then all of the following is true except ....

(a) $\overrightarrow{A} + \overrightarrow{B} = (11 , 12)$
(b) $\overrightarrow{A} - \overrightarrow{B} = (3 , 4)$
(c) $2\overrightarrow{A} - \overrightarrow{B} = (10 , 12)$
(d) $\overrightarrow{AB} + \overrightarrow{A} = (4 , 6)$

---

25 **In the opposite figure :**



The length of $\overline{AC} \approx$ .... cm.

(a) 6
(b) 10
(c) 4
(d) 5

---

26 The solution set of the equation $\begin{vmatrix} x+2 & 2 \\ x & x-3 \end{vmatrix} = 4$ is ....

(a) $\{3 , -2\}$
(b) $\{2 , -3\}$
(c) $\{5 , -2\}$
(d) $\{2 , -5\}$

---

27 If $x , y \in [0 , 2\pi[$, $\theta = x + y$, then the values of θ which satisfy :

$\sin x \sin y = 1$ are ....

(a) $\{\pi , 2\pi\}$
(b) $\{\pi , 3\pi\}$
(c) $\left\{\frac{\pi}{2} , \frac{3\pi}{2}\right\}$
(d) $\left\{\frac{\pi}{2} , \frac{\pi}{3}\right\}$

---

28 If $A = \begin{pmatrix} \cos\theta & \sin\theta \\ \sin\theta & -\cos\theta \end{pmatrix}$, then $A^{2019} =$ ....

(a) A
(b) A^2
(c) $2019\,A^3$
(d) $2019\,I$

---

29 Equation of the straight line that is equidistant from the two straight lines :

$y = -2$, $y = 10$ is ....

(a) $y = 8$
(b) $y = 4$
(c) $x = 4$
(d) $x = -12$

---

30 If the heigth of a circular segment is 5 cm. and the radius length of its circle is 10 cm.

, then the area of the segment approximately equals .... cm^2

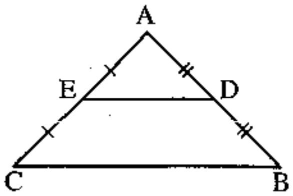
(a) 9.1
(b) 122.8
(c) 12.3
(d) 61.4

---

31 If $2\overrightarrow{AB} + 2\overrightarrow{BC} = k\,\overrightarrow{CA}$, then k = ...

(a) 1
(b) 2
(c) -1
(d) -2

32 **In the opposite figure :**



D , E are the midpoints of $\overline{AB}$, $\overline{AC}$

, $\overrightarrow{AB} = \overrightarrow{M}$, $\overrightarrow{AC} = \overrightarrow{N}$

, then $\overrightarrow{DE} =$ ....

(a) $\overrightarrow{M} + \overrightarrow{N}$ (b) $\overrightarrow{M} - \overrightarrow{N}$

(c) $\frac{1}{2}\left(\overrightarrow{M} - \overrightarrow{N}\right)$ (d) $\frac{-1}{2}\left(\overrightarrow{M} - \overrightarrow{N}\right)$

---

33 If $\overrightarrow{A} = (6 , -8)$, $\overrightarrow{B} = (-3 , 4)$, then the X-axis divides $\overline{AB}$ by the ratio ....

(a) 2 : 1 (b) 1 : 2 (c) 1 : 1 (d) 3 : 1

---

34 If A is a skew symmetric matrix , then $A + A^t =$ ....

(a) 2 A (b) $2 A^t$ (c) O (d) zero

---

35 If $X + \begin{pmatrix} 2 & 0 \\ 5 & 7 \end{pmatrix}^t = 0$, then X = ...

(a) $\begin{pmatrix} 2 & -5 \\ 0 & -7 \end{pmatrix}$ (b) $\begin{pmatrix} -2 & -5 \\ 0 & -7 \end{pmatrix}$ (c) $\begin{pmatrix} -2 & 5 \\ 0 & 7 \end{pmatrix}$ (d) $\begin{pmatrix} -2 & 0 \\ 5 & 7 \end{pmatrix}$

---

36 Which of the following points lies on the straight line $\overrightarrow{r} = (-2 , 1) + k (1 , -3)$?

(a) $\left(\frac{-5}{3} , -2\right)$ (b) $\left(\frac{-3}{2} , \frac{1}{2}\right)$ (c) $\left(\frac{3}{2} , \frac{-1}{2}\right)$ (d) $\left(\frac{-7}{3} , 2\right)$

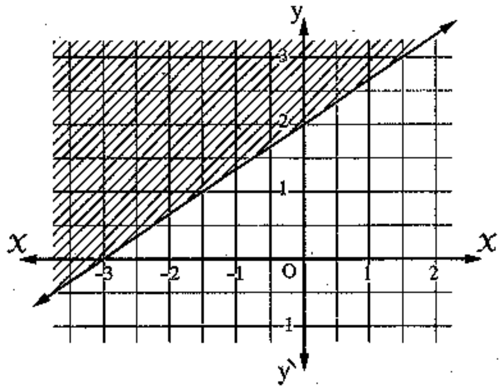
---

37 If $\overrightarrow{A} = (X , 4)$, $\overrightarrow{B} = (2 , y)$ and $\overrightarrow{A} // \overrightarrow{B}$, then ....

(a) $X + 2y = 0$ (b) $X = 2y$ (c) $Xy = 8$ (d) $\frac{X}{y} = 2$

---

38 Which of the following inequalities represent the opposite graph ?



(a) $X - 2y - 6 \le 0$

(b) $2X - 3y + 6 \le 0$

(c) $3X - 2y + 12 \le 0$

(d) $3X + 2y + 12 \ge 0$

---

39 If $A = \begin{pmatrix} 3 & 1 \\ 5 & 2 \end{pmatrix}$, $A^{-1} = \begin{pmatrix} 2 & -1 \\ X & 3 \end{pmatrix}$, then $X =$ ....

(a) 3 (b) – 3 (c) 5 (d) – 5

40 The area of the triangle bounded be the straight line $\frac{x}{4}+\frac{y}{3}=1$ and the coordinates axes equals .... square unit.

(a) 6 (b) 12 (c) 4 (d) 3

Interactive test 10

Model 10

Choose the correct answer from the given ones :

1 If $X \times \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then X = ...

(a) $\begin{pmatrix} \frac{1}{2} & 0 \\ 0 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix}$ (c) $\frac{1}{3}\begin{pmatrix} 1 & 1 \\ 1 & 2 \end{pmatrix}$ (d) $3\begin{pmatrix} 1 & -1 \\ 1 & 2 \end{pmatrix}$

2 The measure of the angle between two straight lines their slopes 2 and $-\frac{1}{2}$ equals ....

(a) 45° (b) 60° (c) 90° (d) 30°

3 If AB = AC , then ....

(a) B = C for all matrices A (b) B ≠ C for all matrices A

(c) B = C at | A | = zero (d) B = C at | A | ≠ zero

4 **The normal straight line to the straight line :**

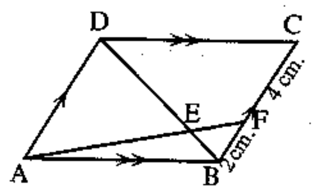
$\vec{r} = (3 , 2) + k\left(1 , -\sqrt{3}\right)$ makes with the positive direction of x-axis positive angle of measure ....

(a) 120° (b) 30° (c) 60° (d) 150°

5 If $\sin\theta = \frac{a}{b}$, $\theta \in]0 , \frac{\pi}{2}[$, then $\sqrt{1+\tan^2\theta} =$ ....

(a) $\frac{a}{\sqrt{a^2-b^2}}$ (b) $\frac{a}{\sqrt{a-b}}$ (c) $\frac{a}{\sqrt{1+a^2}}$ (d) $\frac{b}{\sqrt{b^2-a^2}}$

6 **In the opposite figure :**



If ABCD is a parallelogram in which

BF = 2 cm. , FC = 4 cm. $\therefore \overrightarrow{AE} =$ ....

(a) $\frac{1}{2}\overrightarrow{AB}+\frac{1}{3}\overrightarrow{AD}$ (b) $\frac{1}{4}\overrightarrow{AB}+\frac{3}{4}\overrightarrow{AD}$

(c) $\frac{2}{3}\overrightarrow{AB}+\frac{1}{3}\overrightarrow{AD}$ (d) $\frac{3}{4}\overrightarrow{AB}+\frac{1}{4}\overrightarrow{AD}$

7 If A , B are two square matrices of order 3×3 and $|A| = -1$, $|B| = 3$, then $|3\,AB| =$ ....

(a) -9 (b) -81 (c) -27 (d) 81

---

8 If matrix A of order 2×3 and AB of order 2×4 , then B^t is a matrix of order ....

(a) 4×2 (b) 2×4 (c) 4×3 (d) 3×4

---

9 The expression $\frac{1 - \cos^2 \theta}{\sin^2 \theta - 1}$ in its simplest form equals ....

(a) $-\tan^2 \theta$ (b) $-\cot^2 \theta$ (c) $\tan^2 \theta$ (d) $\cot^2 \theta$

---

10 If $\overrightarrow{OC} = \left(12\sqrt{2} , \frac{3\pi}{4}\right)$ is a position vector of point C with respect to the origin , then point C is ....

(a) $(-6 , 6)$ (b) $(-12 , 12)$ (c) $(12 , -12)$ (d) $(6 , -6)$

---

11 If two different points (a , b) , (b , c) lie on the straight line $\vec{r} = (1 , 4) + k\,(1 , -1)$, then $a - c =$ ....

(a) b^2 (b) $2\,b$ (c) 2 (d) zero

---

12 If $\| 4\,k\,\overrightarrow{A} \| = \| -12\,\overrightarrow{A} \|$, then $k =$ ....

(a) 3 (b) -3 (c) ± 3 (d) ± 4

---

13 Which of the following verbal expressions represents the inequality $y \geq 2\,x$

(a) Two numbers , one of them greater than twice the other.

(b) Two numbers , one of them not more than twice the other.

(c) Two numbers , one of them less than twice the other.

(d) Two numbers , one of them not less than twice the other.

---

14 The solution set of the equation $\csc \theta = -2$ where $\theta \in [0 , 2\pi[$ is ....

(a) $\{30° , 150°\}$ (b) $\{30° , 330°\}$ (c) $\{210° , 330°\}$ (d) $\{150° , 210°\}$

---

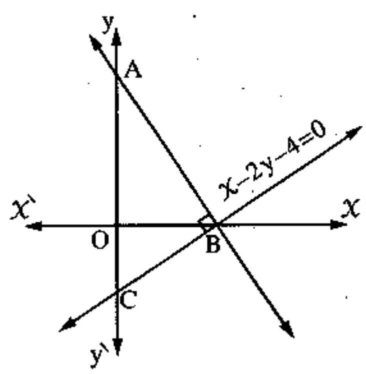
15 **In the opposite figure :**

the area of Δ ABC

= .... square unit.

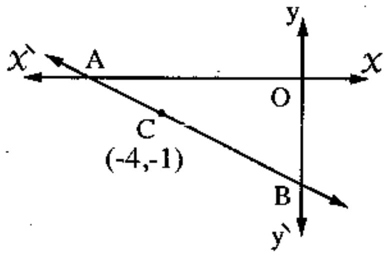
(a) 15 (b) 20

(c) 24 (d) 32



16 In the opposite figure :

If BC = 2 CA , then the equation of the straight line $\overleftrightarrow{AB}$ is ....



(a) $X + 2y + 6 = 0$ (b) $X - 2y - 6 = 0$

(c) $2X + y + 9 = 0$ (d) $X - 3y + 1 = 0$

---

17 The equation of the straight line which passes through the point (1 , 2) and parallel to y-axis is ....

(a) $X + 1 = 0$ (b) $X - 1 = 0$ (c) $y - 2 = 0$ (d) $y + 2 = 0$

---

18 The area of an equilateral triangle whose side length X cm. equals .... cm².

(a) X^2 (b) $\frac{\sqrt{3}}{2} X^2$ (c) $\frac{\sqrt{3}}{4} X^2$ (d) $\frac{1}{2} X^2$

---

19 If $\overrightarrow{A}$ is non-zero vector , then ....

(a) $-\overrightarrow{A} \perp \overrightarrow{A}$ (b) $-\overrightarrow{A}$ and $\overrightarrow{A}$ have same direction.

(c) $\|-\overrightarrow{A}\| < \|\overrightarrow{A}\|$ (d) $-\overrightarrow{A}$ and $\overrightarrow{A}$ have opposite directions.

---

20 The point .... belongs to the solution set of the inequality : $2X + y > 6$

(a) (1 , 4) (b) (0 , 0) (c) (4 , − 2) (d) (2 , 3)

---

21 Value of X that makes the matrix $\begin{pmatrix} X & 4 \\ 9 & X \end{pmatrix}$ has no multiplicative inverse is ....

(a) − 6 (b) 6 (c) ± 6 (d) 36

---

22 A circular sector , its perimeter 10 cm. and length of its arc is 2 cm.

, then its area equals .... cm².

(a) 4 (b) 8 (c) 10 (d) 20

---

23 Length of the drawn perpendicular from the origin point to the straight line whose equation $3X - 4y - 15 = 0$ equals .... length unit.

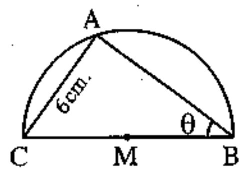
(a) 3 (b) 4 (c) 5 (d) 15

24 A system of 100 forces , magnitude of each is 10 newton acting at a point , measure of the included angle between each two consecutive forces is of measure $\frac{\pi}{50}$, then magnitude of resultant of these forces = ... newton.

(a) 100 (b) 500 (c) 10 (d) zero

---

25 **In the opposite figure :**



$\overline{DC}$ is a diameter in the circle M

, AC = 6 cm. , m (∠ ABC) = θ , then area of Δ ABC = ... cm^2.

(a) 6 sin θ (b) 6 tan θ (c) 18 tan θ (d) 18 cot θ

---

26 If $\sin A + \sin^2 A = 1$, then $\cos^2 A + \cos^4 A =$ ....

(a) – 1 (b) 1 (c) $\sin^2 A$ (d) 2

---

27 The vector equation of the X-axis is ....

(a) $\vec{r} = (1 , 1) + k (0 , 0)$ (b) $\vec{r} = (1 , 0) + k (1 , 1)$

(c) $\vec{r} = k (1 , 0)$ (d) $\vec{r} = k (0 , 1)$

---

28 If $\sin\theta + \cos\theta = 1.4$, then $\sin\theta\cos\theta =$ ....

(a) 0.96 (b) 0.24 (c) 0.48 (d) ± 0.24

---

29 If $\vec{A} = 2\,\vec{i} - \vec{j}$, $\vec{B} = \vec{i} + \vec{j}$, $\vec{C} = \vec{i} + 3\,\vec{j}$ and $\vec{A} \perp \left(t\,\vec{B} + \vec{C}\right)$, then t = ...

(a) – 1 (b) 1 (c) 3 (d) 4

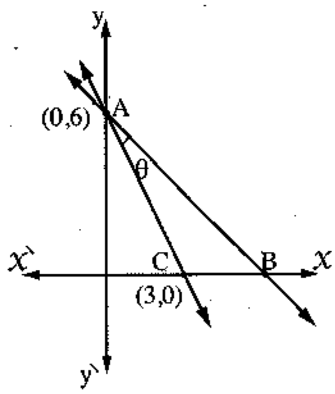
---

30 If (1 , y) lies on the region of the S.S. of the inequality : $X + 2y < 7$, then ....

(a) y < 3 (b) y > 3 (c) y = 3 (d) y > 7

---

31 **In the opposite figure :**



If $\cos\theta = \frac{2}{\sqrt{5}}$

, then B = ...

(a) (8 , 0) (b) (7 , 0)

(c) (6 , 0) (d) (4 , 0)

---

32 If $\vec{A} = 3\,\vec{B}$, then ....

(a) $\vec{A} \perp \vec{B}$ (b) $\vec{A} \mathbin{//} \vec{B}$ (c) $\|\vec{A}\| = \|\vec{B}\|$ (d) $3\,\vec{A} = \vec{B}$

33 Triangle ABC in which D is the midpoint of $\overline{BC}$, then $\overrightarrow{AB} + \overrightarrow{AC} =$ ....

(a) $\overrightarrow{BC}$ (b) $2\overrightarrow{AD}$ (c) $\vec{O}$ (d) $\overrightarrow{AD}$

---

34 If $\begin{vmatrix} 2x & 0 & 0 \\ 1 & 3x & 0 \\ 2 & 4 & -x \end{vmatrix} = 48$, then $x =$ ....

(a) 2 (b) -2 (c) ± 2 (d) 0

---

35 If $A = \begin{pmatrix} 4 & 0 \\ 3 & -4 \end{pmatrix}$, then $A^{30} =$ ....

(a) $2^{30}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (b) $2^{60}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (c) $2^{90}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ (d) $2^{15}\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

---

36 If $\begin{vmatrix} 2k-1 & 2 \\ 3 & k+1 \end{vmatrix} = 2k^2 + 1$, then the value of k = ...

(a) 2 (b) 4 (c) 6 (d) 8

---

37 If $\vec{A} = k\vec{i} + \vec{j}$, $\vec{B} = (k-2 , 2)$ and $\vec{A} \parallel \vec{B}$, then k = ...

(a) 2 (b) -2 (c) ± 2 (d) 3

---

38 If $C \in \overline{AB}$, $3\overrightarrow{AB} = 5\overrightarrow{BC}$, then C divides $\overline{BA}$ by the ratio ....

(a) 2 : 3 (b) 3 : 2 (c) 3 : 5 (d) 5 : 3

---

39 The measure of the angle between the two straight lines $\vec{r} = (3 , 1) + k(2 , 1)$, $2x + y + 5 = 0$ equals ....

(a) 45° (b) 115° (c) 90° (d) zero

---

40 If A is a non-zero square matrix , then the matrix $A + A^t$ is .... matrix.

(a) symmetric (b) skew symmetric (c) diagonal (d) zero

Answers

Answers of accumulative quizzes on Algebra

Quiz 1

(1) b	(2) d	(3) b	(4) a
(5) b	(6) d	(7) b	(8) b
(9) b	(10) b	(11) c	(12) b

Quiz 2

(1) d	(2) d	(3) c	(4) d
(5) b	(6) a	(7) c	(8) c
(9) b	(10) c	(11) c	(12) a

Quiz 3

(1) a	(2) b	(3) d	(4) b
(5) d	(6) b	(7) c	(8) c
(9) a	(10) d	(11) a	(12) d

Quiz 4

(1) b	(2) d	(3) b	(4) c
(5) d	(6) c	(7) c	(8) b
(9) c	(10) b	(11) b	(12) b

Quiz 5

(1) d	(2) d	(3) a	(4) b
(5) b	(6) d	(7) c	(8) a
(9) a	(10) d	(11) d	(12) a

Quiz 6

(1) b	(2) c	(3) b	(4) d
(5) a	(6) a	(7) a	(8) b
(9) a	(10) a	(11) b	(12) c

Quiz 7

(1) c	(2) b	(3) d	(4) c
(5) c	(6) b	(7) b	(8) c
(9) c	(10) d	(11) d	(12) c

Answers of accumulative quizzes on Trigonometry

Quiz 1

(1) b	(2) b	(3) c	(4) a
(5) a	(6) d	(7) c	(8) b
(9) d	(10) b	(11) d	(12) d

Quiz 2

(1) b	(2) c	(3) c	(4) a
(5) b	(6) c	(7) b	(8) d
(9) d	(10) c	(11) a	(12) d

Quiz 3

(1) b	(2) b	(3) c	(4) a
(5) c	(6) a	(7) c	(8) b
(9) a	(10) a	(11) d	(12) b

Quiz 4

(1) a	(2) c	(3) a	(4) d
(5) a	(6) c	(7) d	(8) a
(9) b	(10) c	(11) a	(12) b

Quiz 5

(1) a	(2) a	(3) b	(4) c
(5) b	(6) c	(7) c	(8) d
(9) b	(10) a	(11) c	(12) d

Quiz 6

(1) b	(2) b	(3) b	(4) b
(5) b	(6) d	(7) c	(8) a
(9) b	(10) a	(11) d	(12) b

Quiz 7

(1) a	(2) c	(3) d	(4) c
(5) a	(6) a	(7) c	(8) b
(9) a	(10) c	(11) a	(12) d

Answers of accumulative quizzes on Analytic Geometry

Quiz 1

(1) a	(2) d	(3) c	(4) c
(5) d	(6) c	(7) d	(8) d

Quiz 2

(1) c	(2) c	(3) c	(4) d
(5) b	(6) a	(7) c	(8) c
(9) d	(10) c	(11) b	(12) d

Quiz 3

(1) a	(2) d	(3) a	(4) b
(5) d	(6) d	(7) b	(8) b
(9) b	(10) d	(11) c	(12) c

Quiz 4

(1) c	(2) d	(3) c	(4) c
(5) c	(6) b	(7) d	(8) b
(9) d	(10) c	(11) c	(12) d

Quiz 5

(1) c	(2) b	(3) a	(4) b
(5) b	(6) c	(7) d	(8) d
(9) a	(10) a	(11) c	(12) c

Quiz 6

(1) b	(2) c	(3) b	(4) b
(5) b	(6) d	(7) a	(8) a
(9) b	(10) b	(11) b	(12) c

Quiz 7

(1) a	(2) d	(3) b	(4) c
(5) a	(6) a	(7) c	(8) d
(9) b	(10) c	(11) a	(12) b

Quiz 8

(1) c	(2) d	(3) c	(4) b
(5) d	(6) c	(7) a	(8) c
(9) c	(10) d	(11) c	(12) c

Quiz 9

(1) c	(2) c	(3) c	(4) a
(5) d	(6) c	(7) a	(8) c
(9) c	(10) a	(11) b	(12) b

Answers of school book examinations on Algebra & Trigonometry

Model 1

1

(1) c (2) d (3) b (4) a (5) d

2

[a] Let the matrix equation be AX = C where

$A = \begin{pmatrix} 2 & -3 \\ 3 & 4 \end{pmatrix}$, $X = \begin{pmatrix} x \\ y \end{pmatrix}$, $C = \begin{pmatrix} 4 \\ 23 \end{pmatrix}$

$\therefore |A| = \begin{vmatrix} 2 & -3 \\ 3 & 4 \end{vmatrix} = 8 + 9 = 17$

$\therefore A^{-1} = \frac{1}{17}\begin{pmatrix} 4 & 3 \\ -3 & 2 \end{pmatrix} = \begin{pmatrix} \frac{4}{17} & \frac{3}{17} \\ \frac{-3}{17} & \frac{2}{17} \end{pmatrix}$

, $X = A^{-1}C = \begin{pmatrix} \frac{4}{17} & \frac{3}{17} \\ \frac{-3}{17} & \frac{2}{17} \end{pmatrix}\begin{pmatrix} 4 \\ 23 \end{pmatrix}$

$\therefore \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 2 \end{pmatrix}$

$\therefore x = 5$, $y = 2$

[b] L.H.S. $= \sin\theta \times \cos\theta \times \frac{\sin\theta}{\cos\theta} = \sin^2\theta$

$= 1 - \cos^2\theta =$ R.H.S.

3

[a] $A = \frac{1}{2}\begin{vmatrix} -4 & 2 & 1 \\ 3 & 1 & 1 \\ -2 & 5 & 1 \end{vmatrix}$

$= \frac{1}{2}\left[-4\begin{vmatrix} 1 & 1 \\ 5 & 1 \end{vmatrix} - 2\begin{vmatrix} 3 & 1 \\ -2 & 1 \end{vmatrix} + 1\begin{vmatrix} 3 & 1 \\ -2 & 5 \end{vmatrix}\right]$

$= \frac{1}{2}\left[-4 \times (1-5) - 2(3+2) + (15+2)\right] = 11.5$

$\therefore$ The area of the triangle = | A |

= 11.5 square units.

[b] $\sin x = -\frac{1}{2}$ (negative).

$\therefore x$ lies in the 3rd or 4th quadrant

, $\because$ the acute angle whose $\sin = \frac{1}{2}$ is of measure 30°

$\therefore x = 180° + 30° = 210°$ or $x = 360° - 30° = 330°$

$\therefore$ The S.S. = {210° , 330°}

4

[a] $\because \begin{vmatrix} x & 0 & 0 \\ 1 & x & x \\ 5 & 2 & x \end{vmatrix} = 3x$

$\therefore x\begin{vmatrix} x & x \\ 2 & x \end{vmatrix} = 3x$

$\therefore x(x^2 - 2x) = 3x$

$\therefore x(x^2 - 2x) - 3x = 0$

$\therefore x(x^2 - 2x - 3) = 0$

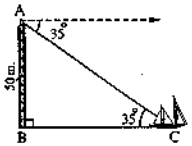
$\therefore x(x-3)(x+1) = 0$

$\therefore x = 0$, 3 or − 1

[b] $\because \sin C = \frac{AB}{AC}$

$\therefore \sin 35° = \frac{50}{AC}$

$\therefore AC \approx 87$ m.



5

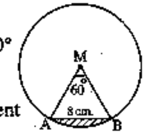
[a] In Δ AMB :

$\because$ MA = MB = r , m (∠ M) = 60°

$\therefore$ r = AB = 8 cm.

$\therefore$ The area of the circular segment

$= \frac{1}{2}(8)^2\left(\frac{\pi}{3} - \sin 60°\right) \approx 5.8$ cm².



[b] • $x \geq 0$, $y \geq 0$ are represented by

$\overrightarrow{OX} \cup \overrightarrow{OY} \cup$ 1st quadrant

• Draw the boundary line

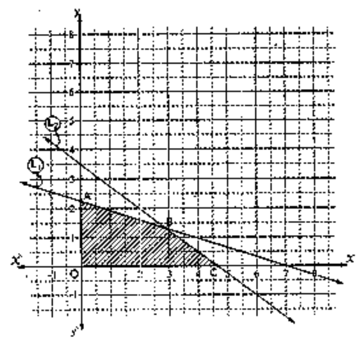
$L_1 : x + 3y = 7$ (solid)

which passes through $\left(0, 2\frac{1}{3}\right)$, (7 , 0)

• Draw the boundary line

$L_2 : 3x + 4y = 14$ (solid)

which passes through $\left(0, 3\frac{1}{2}\right)$, $\left(4\frac{2}{3}, 0\right)$



$\therefore$ The S.S. of the inequalities is the shaded region ABCO where $A\left(0, 2\frac{1}{3}\right)$, $B\left(2\frac{4}{5}, 1\frac{2}{5}\right)$, $C\left(4\frac{2}{3}, 0\right)$, $O(0, 0)$

, $\because$ the function is $P = 30X + 50y$

$\therefore [P]_A = 30(0) + 50\left(2\frac{1}{3}\right) = 116\frac{2}{3}$

, $[P]_B = 30\left(2\frac{4}{5}\right) + 50\left(1\frac{2}{5}\right) = 154$

, $[P]_C = 30\left(4\frac{2}{3}\right) + 50(0) = 140$, $[P]_O = 0$

$\therefore$ To get the greatest value of the function P

$X = 2\frac{4}{5}$, $y = 1\frac{2}{5}$

Model (2)

1

(1) c (2) d (3) b (4) d

2

[a] $\because \Delta = \begin{vmatrix} 2 & -3 \\ 1 & 2 \end{vmatrix} = 4 + 3 = 7$

, $\Delta_x = \begin{vmatrix} 3 & -3 \\ 5 & 2 \end{vmatrix} = 6 + 15 = 21$

, $\Delta_y = \begin{vmatrix} 2 & 3 \\ 1 & 5 \end{vmatrix} = 10 - 3 = 7$

$\therefore X = \frac{\Delta_x}{\Delta} = 3$, $y = \frac{\Delta_y}{\Delta} = 1$

[b] L.H.S. $= \cos X \times \frac{\sin X}{\cos X} \times \sin X$

$= \sin^2 X = 1 - \cos^2 X =$ R.H.S.

3

[a] $\begin{pmatrix} -2 & 2 \\ 4 & 3 \end{pmatrix}^{-1} = \frac{1}{\begin{vmatrix} -2 & 2 \\ 4 & 3 \end{vmatrix}} \begin{pmatrix} 3 & -2 \\ -4 & -2 \end{pmatrix}$

$= \frac{1}{-6-8}\begin{pmatrix} 3 & -2 \\ -4 & -2 \end{pmatrix} = \begin{pmatrix} \frac{-3}{14} & \frac{1}{7} \\ \frac{2}{7} & \frac{1}{7} \end{pmatrix}$

$\therefore A = \begin{pmatrix} 12 & 23 \\ 8 & 13 \end{pmatrix}\begin{pmatrix} \frac{-3}{14} & \frac{1}{7} \\ \frac{2}{7} & \frac{1}{7} \end{pmatrix} = \begin{pmatrix} 4 & 5 \\ 2 & 3 \end{pmatrix}$

[b] $\because \cos\left(\frac{\pi}{2} - \theta\right) = \frac{1}{2}$ $\therefore \sin\theta = \frac{1}{2}$ (positive)

$\therefore \theta$ lies in the 1st or 2nd quad.

, $\because \sin 30° = \frac{1}{2}$

$\therefore \theta = 30°$ or $\theta = 180° - 30° = 150°$

$\therefore$ The general solution is

$\theta = \frac{\pi}{6} + 2n\pi$ or $\theta = \frac{5\pi}{6} + 2n\pi$

4

[a] $\because A = \begin{pmatrix} 2 & 4 \\ -4 & 3 \end{pmatrix}$

$\therefore A^2 - 5A + 22I = \begin{pmatrix} 2 & 4 \\ -4 & 3 \end{pmatrix}\begin{pmatrix} 2 & 4 \\ -4 & 3 \end{pmatrix}$

$-5\begin{pmatrix} 2 & 4 \\ -4 & 3 \end{pmatrix} + \begin{pmatrix} 22 & 0 \\ 0 & 22 \end{pmatrix}$

$= \begin{pmatrix} -12 & 20 \\ -20 & -7 \end{pmatrix} - \begin{pmatrix} 10 & 20 \\ -20 & 15 \end{pmatrix} + \begin{pmatrix} 22 & 0 \\ 0 & 22 \end{pmatrix}$

$= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} = O$

[b] $\because \frac{1}{2} r^2 \left(\frac{\pi}{2} - \sin 90°\right) = 56$

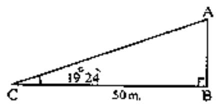
$\therefore r^2 \approx 196$ $\therefore r \approx 14$ cm.

5

[a] $\tan 19° 24' = \frac{AB}{50}$

$\therefore AB = 50 \tan 19° 24'$

≈ 18 m.

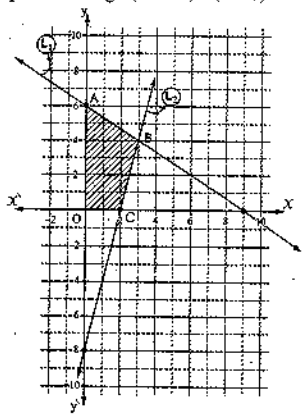


$\therefore$ The height of the pole ≈ 18 m.

[b] • $X \geq 0$, $y \geq 0$ are represented by $\overrightarrow{OX} \cup \overrightarrow{OY} \cup$ 1st quadrant.

• Draw the boundary line $L_1 : 2X + 3y = 18$ (solid) which passes through $(0, 6)$, $(9, 0)$

• Draw the boundary line $L_2 : -4X + y = -8$ (solid) which passes through $(0, -8)$, $(2, 0)$



$\therefore$ The S.S. of the inequalities is the shaded region ABCO

Where : $A(0, 6)$, $B(3, 4)$, $C(2, 0)$, $O(0, 0)$

, $\because$ the objective function is : $P = 2X + y$ has a maximum value.

$\therefore [P]_A = 2(0) + (6) = 6$, $[P]_B = 2(3) + (4) = 10$

, $[P]_C = 2(2) + 0 = 4$, $[P]_O = 0$

$\therefore$ The maximum value is $P = 10$

Answers of school book examinations on Analytic Geometry

Model 1

1

(1) $\hat{i} + 7\hat{j}$ (2) $\frac{3}{2}$ (3) $(2, -4)$

(4) 2 (5) $\vec{r} = (2, -3) + k(3, 4)$

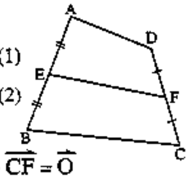
2

[a] $\because 8\|\vec{A}\| = 5|k|\ \|\vec{A}\|$

$\therefore |k| = \frac{8}{5}$ $\therefore k = \pm\frac{8}{5}$

[b] $L = \frac{|5(1) - 12(2) - 7|}{\sqrt{5^2 + 12^2}} = 2$ length units.

3



[a] $\because \overrightarrow{EB} + \overrightarrow{BC} + \overrightarrow{CF} = \overrightarrow{EF}$ (1)

$, \overrightarrow{EA} + \overrightarrow{AD} + \overrightarrow{DF} = \overrightarrow{EF}$ (2)

Adding (1) , (2)

$\because \overrightarrow{EA} + \overrightarrow{EB} = \vec{O}$, $\overrightarrow{DF} + \overrightarrow{CF} = \vec{O}$

$\therefore \overrightarrow{BC} + \overrightarrow{AD} = 2\ \overrightarrow{EF}$

[b] $\because \vec{r} = (1, 0) + t(1, 1)$

$\therefore (x, y) = (1, 0) + t(1, 1)$

$\therefore x = 1 + t$ i.e. $t = x - 1$

$, y = t$ $\therefore x - 1 = y$ $\therefore x - y - 1 = 0$

$\therefore$ the general equation is :

$2x + y - 5 + k(x - y - 1) = 0$

$, \because$ the required straight line passes through (5 , 3)

$\therefore 2(5) + 3 - 5 + k(5 - 3 - 1) = 0$

$\therefore 8 + k = 0$ $\therefore k = -8$

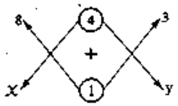
$\therefore$ The required equation is

$2x + y - 5 - 8(x - y - 1) = 0$

$\therefore 2x + y - 5 - 8x + 8y + 8 = 0$

$\therefore 9y - 6x + 3 = 0$ i.e. $3y - 2x + 1 = 0$

4



[a] **First :** Let $B = (x, y)$

, C divides $\overline{AB}$ internally

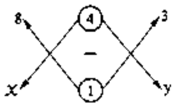
$\therefore \frac{4x + 8}{5} = 2$ $\therefore 4x + 8 = 10$

$\therefore 4x = 2$ $\therefore x = \frac{1}{2}$ $, \frac{4y + 3}{5} = 5$

$\therefore 4y + 3 = 25$ $\therefore 4y = 22$ $\therefore y = 5\frac{1}{2}$

$\therefore B = \left(\frac{1}{2}, 5\frac{1}{2}\right)$

Second : Let $B = (x, y)$



, C divides $\overline{AB}$ externally

$\therefore \frac{4x - 8}{3} = 2$

$\therefore 4x - 8 = 6$ $\therefore 4x = 14$

$\therefore x = 3\frac{1}{2}$ $, \frac{4y - 3}{3} = 5$

$\therefore 4y - 3 = 15$ $\therefore 4y = 18$

$\therefore y = 4\frac{1}{2}$ $\therefore B = \left(3\frac{1}{2}, 4\frac{1}{2}\right)$

[b] $\overrightarrow{XY} = (4 - 3, 2 - 5) = (1, -3)$

$, \overrightarrow{YZ} = (-5 - 4, -1 - 2) = (-9, -3)$

$, \because 1 \times -9 + (-3)(-3) = 0$

$\therefore \overrightarrow{XY} \perp \overrightarrow{YZ}$

$\therefore \Delta XYZ$ is right-angled at Y

$\therefore \overline{XZ}$ is a diameter in the circumcircle

$\therefore XZ = \sqrt{(3 + 5)^2 + (5 + 1)^2} = 10$

$\therefore$ Radius of the circle = 5 length units.

, its area = 25π square units.

5

(1) $m_1 = \frac{-3}{2}, m_2 = \frac{2}{3}$

$\therefore m_1 \times m_2 = \frac{-3}{2} \times \frac{2}{3} = -1$

$\therefore$ The angle between the two lines is right

(2) $L_1 : 3x + 2y - 7 = 0$ (1)

$, L_2 : 2x - 3y + 4 = 0$ (2)

Multiplying (1) by 3 , (2) by 2

$\therefore 9x + 6y - 21 = 0$ (3)

$, 4x - 6y + 8 = 0$ (4)

Adding (3) , (4)

$\therefore 13x - 13 = 0$ $\therefore x = 1$

, substituting in (1) :

$\therefore 3(1) + 2y - 7 = 0$ $\therefore y = 2$

$\therefore$ The intersection point is (1 , 2)

$\therefore \vec{u} = (3, 4) - (1, 2) = (2, 2)$

$\therefore \vec{r} = (3, 4) + k(2, 2)$

Model 2

1

(1) $(-3, -1)$ (2) 5 length units.

(3) 1 : 2 internally (4) 90°

(5) $\sqrt{2}$ length units.

2

[a] $\because 4k\|\vec{A}\| = |-3|\ \|\vec{A}\|$ $\therefore k = \frac{3}{4}$

[b] $\because 2x - y + 4 = 0$ $, x + y + 5 = 0$

By adding : $\therefore 3x + 9 = 0$

$\therefore x = -3$

$\therefore 2(-3) - y + 4 = 0$ $\therefore y = -2$

$\therefore$ The point of intersection of the two lines is $(-3, -2)$

$\therefore \frac{y + 2}{x + 3} = \frac{0 + 2}{-1 + 3}$ $\therefore \frac{y + 2}{x + 3} = \frac{2}{2} = 1$

$\therefore y + 2 = x + 3$ $\therefore y - x - 1 = 0$

3

[a] $\because$ ABCD is a parallelogram $\therefore \overrightarrow{AD} = \overrightarrow{BC}$

$\therefore \vec{D} - \vec{A} = \vec{C} - \vec{B}$

$\therefore \vec{D} = \vec{A} + \vec{C} - \vec{B} = (3, 4) + (2, -2) - (5, -1)$

$= (0, 3)$

$\therefore$ The point D is (0 , 3)

[b] $\because m_1 = \frac{-2}{1} = -2$, $m_2 = \frac{-2}{1} = -2$

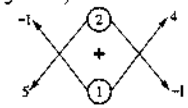
$\therefore m_1 = m_2$ $\therefore$ The two straight lines are parallel

$, \because (0, 4) \in$ the first straight line.

$\therefore$ The shortest distance between the two lines

$= \frac{|2(0) + (4) + 2|}{\sqrt{2^2 + 1^2}} = \frac{6\sqrt{5}}{5}$ length units.

4



[a] $C = \left(\frac{2 \times 5 + (-1)(1)}{3}, \frac{2(-1) + (1)(4)}{3}\right)$

$= \left(3, \frac{2}{3}\right)$

[b] $\because \frac{|3(0) + 4(0) + 10|}{\sqrt{3^2 + 4^2}}$

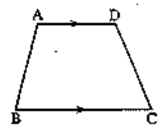
$= \frac{10}{5} = 2$ length units.

$, \frac{|5(0) - 12(0) + 26|}{\sqrt{5^2 + 12^2}} = \frac{26}{13} = 2$ length units.

$\therefore$ The two chords are equidistant from the centre of the circle.

$\therefore$ The two chords are equal in length.

5



(1) $\overrightarrow{AD} = (5 - 7, y + 1)$

$= (-2, y + 1)$

$, \overrightarrow{BC} = (2 - 3, 1 + 1)$

$= (-1, 2)$

$, \because \overrightarrow{AD} \parallel \overrightarrow{BC}$

$\therefore -2 \times 2 - (-1)(y + 1) = 0$

$\therefore -4 + y + 1 = 0$ $\therefore y = 3$

(2) $\therefore \overrightarrow{AD} = (-2, 4)$

$\therefore \|\overrightarrow{AD}\| = \sqrt{4 + 16} = 2\sqrt{5}$ length units.

$, \|\overrightarrow{BC}\| = \sqrt{1 + 4} = \sqrt{5}$ length units.

$, \because$ the equation of $\overleftrightarrow{BC}$ is $\frac{y + 1}{x - 3} = -2$

$\therefore y + 1 = -2x + 6$ $\therefore y + 2x - 5 = 0$

$\therefore$ The height of the trapezium $= \frac{|-1 + 2(7) - 5|}{\sqrt{1 + 4}}$

$= \frac{8}{\sqrt{5}}$ length units.

$\therefore$ The area $= \frac{2\sqrt{5} + \sqrt{5}}{2} \times \frac{8}{\sqrt{5}} = 3\sqrt{5} \times \frac{4}{\sqrt{5}}$

$= 12$ square units.

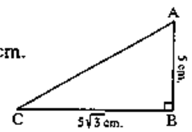
Answers of Governorates' Examinations

1 Cairo

1 (a) 2 (d) 3 (c) 4 (a) 5 (d)

6

In ΔABC , $m(\angle B) = 90°$



$\therefore AC = \sqrt{(5)^2 + (5\sqrt{3})^2} = 10$ cm.

, $\tan C = \frac{5}{5\sqrt{3}} = \frac{1}{\sqrt{3}}$

$\therefore m(\angle C) = 30°$

$\therefore m(\angle A) = 90° - 30° = 60°$

7

$\because 3X + 4y = 12$ (Divide by 12) $\therefore \frac{X}{4} + \frac{y}{3} = 1$

$\therefore$ The lengths of the intercepted parts of X-axis and y-axis are 4 and 3 length unit respectively

8 (d) 9 (c) 10 (c) 11 (d) 12 (a)

13

$\because$ The slope of the given straight line :
$3X - 2y + 7 = 0$ equals $\frac{3}{2}$

$\therefore$ The slope of the straight line perpendicular to it $= \frac{-2}{3}$

$\therefore$ The equation of the required straight line is $\frac{y-5}{X-3} = \frac{-2}{3}$

$\therefore 3y - 15 = -2X + 6$ $\therefore 2X + 3y - 21 = 0$

14

$\Delta = \begin{vmatrix} 1 & 2 \\ 2 & -3 \end{vmatrix} = -3 - 4 = -7$

, $\Delta_x = \begin{vmatrix} 0 & 2 \\ 1 & -3 \end{vmatrix} = 0 - 2 = -2$

, $\Delta_y = \begin{vmatrix} 1 & 0 \\ 2 & 1 \end{vmatrix} = 1 - 0 = 1$

$\therefore X = \frac{\Delta_x}{\Delta} = \frac{-2}{-7} = \frac{2}{7}$, $y = \frac{\Delta_y}{\Delta} = \frac{-1}{7}$

$\therefore$ The solution set $= \left\{\left(\frac{2}{7}, \frac{-1}{7}\right)\right\}$

15 (a) 16 (c) 17 (a) 18 (a) 19 (c)

20

$\because$ ABCD is a parallelogram $\therefore \overrightarrow{AD} = \overrightarrow{BC}$

$\therefore \vec{D} - \vec{A} = \vec{C} - \vec{B}$ $\therefore \vec{D} = \vec{C} - \vec{B} + \vec{A}$

$\therefore \vec{D} = (2, -2) - (5, -1) + (3, 4) = (0, 3)$

$\therefore$ The coordinates of the point D is $(0, 3)$

21

$X = 3\begin{pmatrix} 2 & 1 \\ 3 & 5 \end{pmatrix} - \begin{pmatrix} 1 & 6 \\ 4 & 2 \end{pmatrix} = \begin{pmatrix} 6 & 3 \\ 9 & 15 \end{pmatrix} - \begin{pmatrix} 1 & 6 \\ 4 & 2 \end{pmatrix}$

$= \begin{pmatrix} 5 & -3 \\ 5 & 13 \end{pmatrix}$

22 (c) 23 (b) 24 (c) 25 (c) 26 (d)

27

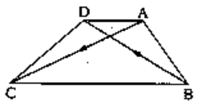
The left hand side

$= \sin\theta \cos\theta \tan\theta + \sin\theta \cos\theta \cot\theta$

$= \sin\theta \cancel{\cos\theta} \times \frac{\sin\theta}{\cancel{\cos\theta}} + \cancel{\sin\theta} \cos\theta \times \frac{\cos\theta}{\cancel{\sin\theta}}$

$= \sin^2\theta + \cos^2\theta = 1 =$ the right hand side.

28



In ΔABC :

$\overrightarrow{AC} = \overrightarrow{AB} + \overrightarrow{BC}$

, in ΔABD : $\overrightarrow{BD} = \overrightarrow{BA} + \overrightarrow{AD}$

$\therefore \overrightarrow{AC} + \overrightarrow{BD} = \overrightarrow{AB} + \overrightarrow{BA} + \overrightarrow{BC} + \overrightarrow{AD}$
$= \overrightarrow{BC} + \overrightarrow{AD}$

, $\because \overrightarrow{BC} = 3\,\overrightarrow{AD}$

$\therefore \overrightarrow{AC} + \overrightarrow{BD} = 3\,\overrightarrow{AD} + \overrightarrow{AD} = 4\,\overrightarrow{AD}$

2 Giza

1 (c) 2 (a) 3 (d)

4

$A^2 - 2A + 4I = \begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix}\begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix} - 2\begin{pmatrix} 4 & 3 \\ -2 & 1 \end{pmatrix}$
$+ 4\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

$= \begin{pmatrix} 10 & 15 \\ -10 & -5 \end{pmatrix} + \begin{pmatrix} -8 & -6 \\ 4 & -2 \end{pmatrix} + \begin{pmatrix} 4 & 0 \\ 0 & 4 \end{pmatrix}$

$= \begin{pmatrix} 6 & 9 \\ -6 & -3 \end{pmatrix}$

5 (a) 6 (b)

7

$\because X \geq 0$, $y \geq 0$ represented by
$\overrightarrow{OX} \cup \overrightarrow{OY} \cup$ the first quadrant

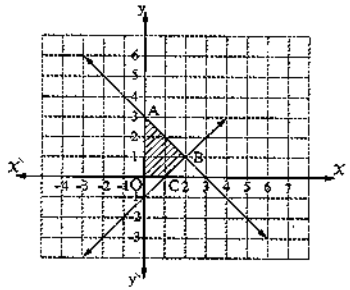
, the boundary line :

$X + y = 3$ passes through $(0, 3)$, $(3, 0)$

, the boundary line :

$X - y = 1$ passes through $(1, 0)$, $(0, -1)$

$\therefore$ The solution set is the shaded region ABCO



$\because [P]_A = 3(0) + 4(3) = 12$, $[P]_B = 3(2) + 4(1) = 10$
, $[P]_C = 3(1) + 4(0) = 3$, $[P]_O = 3(0) + 4(0) = 0$

The maximum value of the objective function = 12 at the point A $(0, 3)$

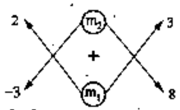
8 (b) 9 (b) 10 (c)

11

The left hand side $= \sin^2\theta - \cancel{2\sin\theta\cos\theta} + \cos^2\theta$
$+ \sin^2\theta + \cancel{2\sin\theta\cos\theta} + \cos^2\theta$
$= 2(\sin^2\theta + \cos^2\theta)$
$= 2 \times 1 = 2 =$ The right hand side

12 (b) 13 (d)

14



$\because$ The slope of $\overleftrightarrow{AB} = \frac{3-4}{2-1} = -1$

, the slope of $\overleftrightarrow{BC} = \frac{8-3}{-3-2} = -1$

$\therefore$ The slope of $\overleftrightarrow{AB}$ = The slope of $\overleftrightarrow{BC}$

$\therefore$ A , B , C are collinear. $\therefore 1 = \frac{2m_1 - 3m_2}{m_1 + m_2}$

$\therefore 2m_1 - 3m_2 = m_1 + m_2$

$\therefore m_1 = 4m_2$ $\therefore m_2 : m_1 = 1 : 4$

$\therefore$ A divides $\overline{BC}$ internally by ratio 1 : 4

15 (b) 16 (a)

17

In ΔABE , $\overrightarrow{BA} + \overrightarrow{EB} = \overrightarrow{EA}$

, $\because \overrightarrow{EA} = \frac{1}{2}\overrightarrow{CA}$ $\therefore \overrightarrow{BA} + \overrightarrow{EB} = \frac{1}{2}\overrightarrow{CA}$

18 (a) 19 (c) 20 (c)

21

$m_1 = \frac{2}{3}$, $m_2 = \tan 45° = 1$ $\therefore \tan\theta = \left|\frac{\frac{2}{3} - 1}{1 + \frac{2}{3} \times 1}\right| = \frac{1}{5}$

$\therefore \theta = 11° \, 18' \, 36''$

22 (b) 23 (b) 24 (d)

25

$\vec{V}_{BA} = \vec{V}_B - \vec{V}_A = 80\,\vec{e} - 60\,\vec{e} = 20\,\vec{e}$

$\therefore$ The speed of the car B with respect to A = 20 km./h.

26 (d) 27 (c)

28

$\Delta = \begin{vmatrix} 1 & 3 & 1 \\ -2 & 3 & 1 \\ -2 & 6 & 1 \end{vmatrix}$

$= \begin{vmatrix} -2 & 3 \\ -2 & 6 \end{vmatrix} - \begin{vmatrix} 1 & 3 \\ -2 & 6 \end{vmatrix} + \begin{vmatrix} 1 & 3 \\ -2 & 3 \end{vmatrix}$

$= -6 - 12 + 9 = -9$

$\therefore$ The area of $\Delta ABC = \frac{1}{2}|\Delta| = 4.5$ square units.

The coordinates of the centroid

$= \left(\frac{1-2-2}{3}, \frac{3+3-6}{3}\right) = (-1, 0)$

3 El-Kalyoubia

1 (d) 2 (b) 3 (d) 4 (a)

5

The left hand side $= \frac{7 + 5\sin^2\theta - (1 - \sin^2\theta)}{3\sin^2\theta + 2(1 - \sin^2\theta) - 1}$

$= \frac{6\sin^2\theta + 6}{\sin^2\theta + 1} = \frac{6\cancel{(\sin^2\theta + 1)}}{\cancel{(\sin^2\theta + 1)}}$

$= 6 =$ The right hand side

6 (a) 7 (a) 8 (d) 9 (a)

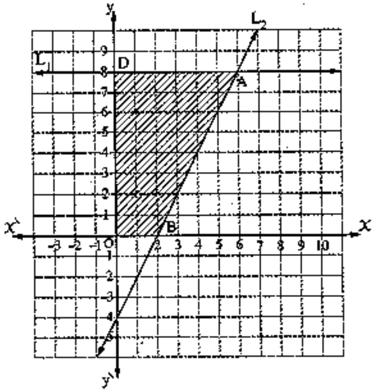
10

$\because x \geq 0$, $y \geq 0$ represented by

$\overrightarrow{Ox} \cup \overrightarrow{Oy} \cup$ the first quadrant

, $L_1 : y - 8 = 0$ is a straight line parallel to x-axis and cut y-axis at the point (0 , 8)

, $L_2 : \frac{1}{2} y = x - 2 \Rightarrow 2x - y - 4 = 0$ is a straight line passing through the two points (0 , − 4) , (2 , 0)



$\therefore$ The solution set of the inequalities is the shaded region ABOD

11 ⓑ **12** ⓐ

13

$\because A + B = 30°$

$\therefore \sin(3A + 2B) + \sin(9A + 8B)$

$= \sin(3A + 3B - B) + \sin(9A + 9B - B)$

$= \sin(90° - B) + \sin(270° - B)$

$= \cos B + (-\cos B) = \text{zero}$

14 ⓒ **15** ⓑ

16

$\because m(\angle BAC) = 90°$, $\overline{AD} \perp \overline{BC}$

$\therefore (AD)^2 = DB \times DC$

$\therefore z^2 = xy$ $\qquad \therefore xy - z^2 = 0$

$$\begin{vmatrix} 3 & 0 & 0 \\ 2 & x & z \\ 7 & z & y \end{vmatrix} = 3 \begin{vmatrix} x & z \\ z & y \end{vmatrix} = 3(xy - z^2) = 3 \times 0 = 0$$

17 ⓑ **18** ⓐ **19** ⓓ

20

$\because$ The slope of the straight line $\overleftrightarrow{AC} = \frac{-2}{5}$

$\therefore$ The slope of the straight line $\overleftrightarrow{AB} = \frac{5}{2}$

$\therefore$ The direction vector of $\overleftrightarrow{AB} = (2 , 5)$

put $x = 0$ in the equation of the straight line $\overleftrightarrow{AC}$

$\therefore 5y + 5 = 0$

$\therefore y = -1$

$\therefore A(0 , -1)$

$\therefore$ The vector equation of the straight line $\overleftrightarrow{AB}$ is :

$\vec{r} = (0 , -1) + k(2 , 5)$

21

The slope of $\overleftrightarrow{AB} = \frac{0+3}{6+3} = \frac{1}{3}$,

The slope of $\overleftrightarrow{BC} = \frac{k+3}{0+3} = \frac{k+3}{3}$

$\tan 45° = \left|\dfrac{\frac{1}{3} - \frac{k+3}{3}}{1 + \frac{k+3}{9}}\right|$ $\qquad \therefore \left|\dfrac{\frac{1}{3} - \frac{k+3}{3}}{1 + \frac{k+3}{9}}\right| = 1$

$\therefore \left|\dfrac{\frac{1-k-3}{3}}{\frac{9+k+3}{9}}\right| = 1$ $\qquad \therefore \left|\frac{-k-2}{3} \times \frac{9}{k+12}\right| = 1$

$\therefore \left|\frac{-3k-6}{k+12}\right| = 1$ $\qquad \therefore \frac{-3k-6}{k+12} = \pm 1$

$\therefore -3k - 6 = k + 12$ hence $4k = -18$

$\therefore k = \frac{-9}{2}$ (Refused because k > 0 from the figure)

or $3k + 6 = k + 12$ hence $2k = 6$ $\qquad \therefore k = 3$

22 ⓐ

23

$\because m_1 = \frac{-3}{-1} = 3$, $m_2 = \frac{-1}{-2} = \frac{1}{2}$ $\quad \therefore \tan\theta = \left|\dfrac{3 - \frac{1}{2}}{1 + \frac{3}{2}}\right| = 1$

$\therefore \theta = 45°$

$\therefore$ The measure of the angle between the two straight lines = 45°

24 ⓓ

25

$\because$ D , E are the midpoints of $\overline{AB}$, $\overline{AC}$ $\quad \therefore \overleftrightarrow{DE} \parallel \overleftrightarrow{BC}$

, $\because \overleftrightarrow{AF} : 3x - 4y + 10 = 0$ $\quad \therefore$ The slope of $\overleftrightarrow{AF} = \frac{3}{4}$

, $\because \overleftrightarrow{DE} : 3x - 4y = 0$ $\quad \therefore$ The slope of $\overleftrightarrow{DE} = \frac{3}{4}$

$\therefore \overleftrightarrow{AF} \parallel \overleftrightarrow{DE} \parallel \overleftrightarrow{BC}$

put y = 1 in the equation of $\overleftrightarrow{AF}$

$\therefore 3x - 4 + 10 = 0$ $\qquad \therefore x = -2$

$\therefore (-2 , 1) \in \overleftrightarrow{AF}$

$\therefore$ The distance between the two straight lines $\overleftrightarrow{AF}$ and $\overleftrightarrow{DE} = \frac{|3(-2) - 4(1)|}{\sqrt{9+16}} = 2$ length units

$\therefore$ The length of perpendicular drawn from A to $\overleftrightarrow{DE}$ = 2 length units

$\therefore$ The length of perpendicular drawn from A to $\overleftrightarrow{BC}$ = 2 × 2 = 4 length units

26 ⓐ **27** ⓓ

28

$m(\angle OAB) = 180° - 135° = 45°$ $\quad \therefore m(\angle OBA) = 45°$

$\therefore$ The slope of $\overleftrightarrow{AB} = \tan 45° = 1$

, $\because \tan(\angle ABO) = \frac{OA}{AB}$ $\quad \therefore \sin 45° = \frac{OA}{2\sqrt{2}}$

$\therefore$ OA = 2 length unit

$\therefore$ The equation of $\overleftrightarrow{AB}$ is : $y = x + 2$

$\therefore x - y + 2 = 0$

4 El-Sharkia

1 ⓓ **2** ⓑ **3** ⓒ **4** ⓒ **5** ⓒ

6

$\cos x(\sin x + \cos x) = 0$

$\therefore \cos x = 0$ $\qquad \therefore x = 90°$ or $x = 270°$ (Refused)

or $\sin x + \cos x = 0$ $\quad \therefore \sin x = -\cos x$

$\therefore \frac{\sin x}{\cos x} = -1$ $\qquad \therefore \tan x = -1$

$\therefore x = 135°$ or $x = 315°$ (Refused)

$\therefore$ The solution set = {90° , 135°}

7

$\because m = \frac{3}{5}$ $\qquad \therefore \vec{u} = (5 , 3)$

$\therefore$ The vector equation is : $\vec{r} = (4 , 1) + k(5 , 3)$

, the parametric equations are :

$x = 4 + 5k$, $y = 1 + 3k$

, the Cartesian equation is : $\frac{y-1}{x-4} = \frac{3}{5}$

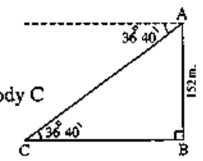
$\therefore 5y - 5 = 3x - 12$

$\therefore$ The general from : $3x - 5y - 7 = 0$

8 ⓐ **9** ⓒ **10** ⓑ **11** ⓐ **12** ⓒ

13

$\tan 36° 40' = \frac{152}{BC}$



$\therefore BC = \frac{152}{\tan 36° 40'} \simeq 204$ m.

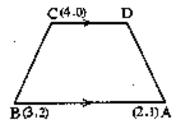
$\therefore$ The distance between the body C and the tower base ≃ 204 m.

, $\sin 36° 40' = \frac{152}{AC}$

$\therefore AC = \frac{152}{\sin 36° 40'} \simeq 255$ m.

$\therefore$ The distance between the body and the tower top ≃ 255 m.

14



$\because \overline{AB} \parallel \overline{DC}$, AB = 2 DC

$\therefore \overrightarrow{AB} = 2\overrightarrow{DC}$

$\therefore \vec{B} - \vec{A} = 2(\vec{C} - \vec{D})$

$\therefore \vec{B} - \vec{A} = 2\vec{C} - 2\vec{D}$

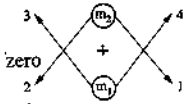
$\therefore 2\vec{D} = 2\vec{C} - \vec{B} + \vec{A} = (8 , 0) - (3 , 2) + (2 , 1)$
$= (7 , -1)$

$\therefore \vec{D} = \left(3\frac{1}{2} , \frac{-1}{2}\right)$

$\therefore$ The coordinates of D = $\left(3\frac{1}{2} , \frac{-1}{2}\right)$

15 ⓑ **16** ⓓ **17** ⓑ **18** ⓐ **19** ⓑ

20

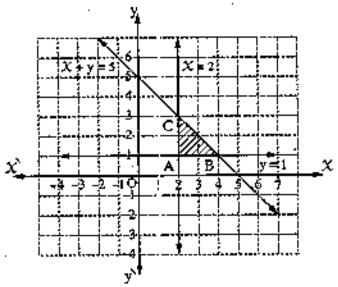


$\frac{4m_1 + m_2}{m_1 + m_2} = \text{zero}$ $\quad \therefore 4m_1 + m_2 = \text{zero}$

$\therefore 4m_1 = -m_2$ $\qquad \therefore \frac{m_2}{m_1} = -4$

$\therefore$ The x-axis divides $\overline{AB}$ by ratio 4 : 1 externally

21



The solution set of the inequalities is the shaded region ABC

, $\because [P]_A = 2(2) + 3(1) = 7$, $[P]_B = 2(4) + 3(1) = 11$

, $[P]_C = 2(2) + 3(3) = 13$

$\therefore$ The smallest value of the objective function = 7 at the point A (2 , 1)

22 ⓑ **23** ⓓ **24** ⓓ **25** ⓒ **26** ⓐ

27

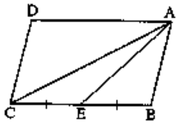
$\begin{pmatrix}1 & 1\\1 & -1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}3\\5\end{pmatrix}$

$\therefore \begin{pmatrix}x\\y\end{pmatrix}=\dfrac{1}{\begin{vmatrix}1 & 1\\1 & -1\end{vmatrix}}\begin{pmatrix}-1 & -1\\-1 & 1\end{pmatrix}\begin{pmatrix}3\\5\end{pmatrix}$

$\therefore \begin{pmatrix}x\\y\end{pmatrix}=\dfrac{-1}{2}\begin{pmatrix}-8\\2\end{pmatrix}$ $\quad\therefore \begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}4\\-1\end{pmatrix}$

$\therefore x=4 , y=-1$

28



$\because$ ABCD is a parallelogram

$\therefore \overrightarrow{AB}=\overrightarrow{DC} , \overrightarrow{AB}+\overrightarrow{AD}=\overrightarrow{AC}$

$, \because$ the left hand side

$=\left(\overrightarrow{AB}+\overrightarrow{AD}\right)+\overrightarrow{DC}$

$=\overrightarrow{AC}+\overrightarrow{AB}=2\,\overrightarrow{AE}=$ The right hand side

5 El-Monofia

1 ⓓ **2** ⓐ **3** ⓓ **4** ⓑ **5** ⓒ

6

$\because (3 , 0)\in$ the curve $\quad\therefore 9a+3b=0$

$\therefore 3a+b=0 \qquad (1)$

$, \because (4 , 8)\in$ the curve $\quad\therefore 16a+4b=8$

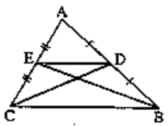
$\therefore 4a+b=2 \qquad (2)$

$\therefore \begin{pmatrix}3 & 1\\4 & 1\end{pmatrix}\begin{pmatrix}a\\b\end{pmatrix}=\begin{pmatrix}0\\2\end{pmatrix}$

$\therefore \begin{pmatrix}a\\b\end{pmatrix}=\dfrac{1}{\begin{vmatrix}3 & 1\\4 & 1\end{vmatrix}}\begin{pmatrix}1 & -1\\-4 & 3\end{pmatrix}\begin{pmatrix}0\\2\end{pmatrix}$

$\therefore \begin{pmatrix}a\\b\end{pmatrix}=-1\begin{pmatrix}-2\\6\end{pmatrix}=\begin{pmatrix}2\\-6\end{pmatrix}$ $\quad\therefore a=2 , b=-6$

7



In Δ ADC :

$\overrightarrow{AD}+\overrightarrow{DC}=\overrightarrow{AC}=2\,\overrightarrow{AE} \qquad (1)$

In Δ AEB :

$\overrightarrow{AE}+\overrightarrow{EB}=\overrightarrow{AB}=2\,\overrightarrow{AD} \qquad (2)$

By adding (1) , (2) :

$\therefore \overrightarrow{AD}+\overrightarrow{DC}+\overrightarrow{AE}+\overrightarrow{EB}=2\,\overrightarrow{AE}+2\,\overrightarrow{AD}$

$\therefore \overrightarrow{DC}+\overrightarrow{EB}=\overrightarrow{AE}+\overrightarrow{AD} \quad \therefore \overrightarrow{AE}-\overrightarrow{DC}=\overrightarrow{EB}-\overrightarrow{AD}$

$\therefore \overrightarrow{AE}+\overrightarrow{CD}=\overrightarrow{EB}+\overrightarrow{DA}$

8 ⓓ **9** ⓓ **10** ⓐ **11** ⓐ **12** ⓑ

13

$\because m_1=\dfrac{-1}{k} , m_2=2 \quad \therefore \left|\dfrac{\frac{-1}{k}-2}{1+\frac{-2}{k}}\right|=\tan 45°$

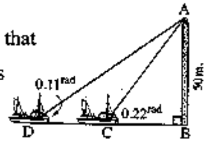
$\therefore \left|\dfrac{\frac{-1}{k}-2}{1-\frac{2}{k}}\right|=1 \qquad \therefore \dfrac{\frac{-1}{k}-2}{1-\frac{2}{k}}=1$

$\therefore \dfrac{-1}{k}-2=1-\dfrac{2}{k} \qquad \therefore \dfrac{1}{k}=3 \qquad \therefore k=\dfrac{1}{3}$

or $\dfrac{\frac{-1}{k}-2}{1-\frac{2}{k}}=-1 \qquad \therefore \dfrac{1}{k}+2=1-\dfrac{2}{k} \quad \therefore \dfrac{3}{k}=-1$

$\therefore k=-3$

14



Let $\overline{CD}$ represent the distance that the ship covered in 15 minutes

In Δ ABD :

$\therefore \tan 0.11^{rad}=\dfrac{50}{BD}$

$\therefore BD=\dfrac{50}{\tan 0.11^{rad}}\approx 452.7$ m.

$, $ in Δ ABC : $\tan 0.22^{rad}=\dfrac{50}{BC}$

$\therefore BC=\dfrac{50}{\tan 0.22^{rad}}\approx 223.6$ m.

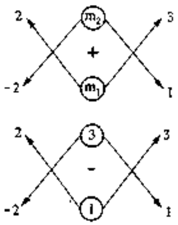
$\therefore CD=BD-BC=452.7-223.6=229.1$ m.

$\therefore$ The velocity of the ship $=\dfrac{229.1}{15}\approx 15.3$ m./minute

15 ⓑ **16** ⓓ **17** ⓒ **18** ⓐ **19** ⓑ

20

let C $(x , 0)$ be the point at which x-axis divides $\overline{AB}$



$\therefore \dfrac{3\,m_1+m_2}{m_1+m_2}=0$

$\therefore 3\,m_1+m_2=0$

$\therefore 3\,m_1=-m_2 \qquad \therefore \dfrac{m_2}{m_1}=\dfrac{3}{-1}$

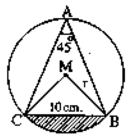
$\therefore$ C divides $\overline{AB}$

by the ratio 3 : 1 externally

$\therefore x=\dfrac{1\times 2-3\times -2}{1-3}=-4$

$\therefore$ The coordinates of division point is $(-4 , 0)$

21



$m(\angle BMC)=2\,m(\angle A)=90°$

In Δ BMC :

$m(\angle MBC)=m(\angle MCB)=45°$

$\therefore \cos 45°=\dfrac{r}{10}$

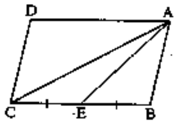
$\therefore r=10\cos 45°=5\sqrt{2}$ cm.

$\therefore$ The area of the minor circular segment whose chord $\overline{BC}=\dfrac{1}{2}\left(5\sqrt{2}\right)^2\left(\dfrac{\pi}{2}-\sin 90°\right)$

$\approx 14.3\text{ cm}^2$

22 ⓑ **23** ⓑ **24** ⓓ **25** ⓒ **26** ⓑ

27



$\because$ ABCD is a parallelogram

$\therefore \overrightarrow{AB}+\overrightarrow{AD}=\overrightarrow{AC}$

$\therefore \overrightarrow{AB}+\overrightarrow{AD}+\overrightarrow{DC}=\overrightarrow{AC}+\overrightarrow{DC}$

$, \because \overrightarrow{AB}=\overrightarrow{DC}$

$\therefore \overrightarrow{AB}+\overrightarrow{AD}+\overrightarrow{DC}=\overrightarrow{AC}+\overrightarrow{AB}=2\,\overrightarrow{AE}$

28

$A=\begin{pmatrix}12 & 23\\8 & 13\end{pmatrix}\times\dfrac{1}{\begin{vmatrix}-2 & 2\\4 & 3\end{vmatrix}}\times\begin{pmatrix}3 & -2\\-4 & -2\end{pmatrix}$

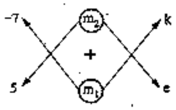
$=\dfrac{-1}{14}\begin{pmatrix}12 & 23\\8 & 13\end{pmatrix}\begin{pmatrix}3 & -2\\-4 & -2\end{pmatrix}$

$=\dfrac{-1}{14}\begin{pmatrix}-56 & -70\\-28 & -42\end{pmatrix}=\begin{pmatrix}4 & 5\\2 & 3\end{pmatrix}$

6 El-Dakahlia

1 ⓓ **2** ⓐ

3



First : $-3=\dfrac{-7\,m_1+5\,m_2}{m_1+m_2}$

$\therefore -3\,m_1-3\,m_2$

$=-7\,m_1+5\,m_2$

$\therefore 4\,m_1=8\,m_2 \qquad \therefore \dfrac{m_2}{m_1}=\dfrac{4}{8}=\dfrac{1}{2}$

$\therefore$ B divides $\overline{AC}$ by ratio 1 : 2 internally

Second : The length of the perpendicular

$=\dfrac{|2(-2)+3(-3)|}{\sqrt{(3)^2+(2)^2}}=\dfrac{13}{\sqrt{13}}=\sqrt{13}$ length unit

4 ⓒ **5** ⓒ

6

$\because \cot\theta+1=0 \qquad \therefore \cot\theta=-1$

$\therefore \tan\theta=-1$

$\therefore$ The smallest positive measure of $\theta=135°$

$\therefore$ The general solution : $\theta=\dfrac{3}{4}\pi+\pi n$ where $n\in\mathbb{Z}$

7 ⓒ **8** ⓓ

9

$A=\begin{pmatrix}2 & 4\\-4 & 3\end{pmatrix}$

$\therefore A^2-5A+22I=\begin{pmatrix}2 & 4\\-4 & 3\end{pmatrix}\begin{pmatrix}2 & 4\\-4 & 3\end{pmatrix}$

$-5\begin{pmatrix}2 & 4\\-4 & 3\end{pmatrix}+22\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix}$

$=\begin{pmatrix}-12 & 20\\-20 & -7\end{pmatrix}+\begin{pmatrix}-10 & -20\\20 & -15\end{pmatrix}$

$+\begin{pmatrix}22 & 0\\0 & 22\end{pmatrix}=\begin{pmatrix}0 & 0\\0 & 0\end{pmatrix}=O$

10 ⓒ **11** ⓑ

12

$\therefore$ The slope of the given straight line = 1

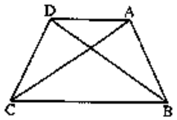
$\therefore$ The slope of its perpendicular = − 1

$\therefore$ The equation of the required line is $\dfrac{y-0}{x+2}=-1$

$\therefore y=-x-2 \qquad \therefore x+y+2=0$

13 ⓒ **14** ⓒ

15



In Δ ABC :

$\overrightarrow{AC}=\overrightarrow{AB}+\overrightarrow{BC}$ (Multiply by 2)

$\therefore 2\,\overrightarrow{AC}=2\,\overrightarrow{AB}+2\,\overrightarrow{BC} \qquad (1)$

$, $ in Δ ABD : $\overrightarrow{BD}=\overrightarrow{BA}+\overrightarrow{AD}$ (Multiply by 2)

$\therefore 2\,\overrightarrow{BD}=2\,\overrightarrow{BA}+2\,\overrightarrow{AD} \qquad (2)$

By adding (1) , (2) :

$2\,\overrightarrow{AC}+2\,\overrightarrow{BD}=\cancel{2\overrightarrow{AB}}+2\,\overrightarrow{BC}+\cancel{2\overrightarrow{BA}}+2\,\overrightarrow{AD}$

$=2\,\overrightarrow{BC}+2\,\overrightarrow{AD}=5\,\overrightarrow{AD}+2\,\overrightarrow{AD}$

$=7\,\overrightarrow{AD}$

16 ⓒ **17** ⓐ

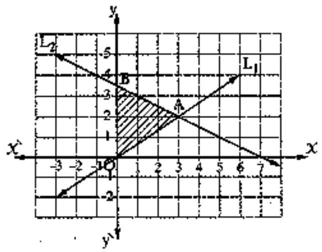
18

$\because x \geq 0$, $y \geq 0$ represented by $\overrightarrow{Ox} \cup \overrightarrow{Oy} \cup$ the first quadrant

$L_1 : 2x = 3y$ passes through (0 , 1) and (3 , 2)

, $L_2 : 2y + x = 7$ passes through (0 , 3.5) and (7 , 0)

$\therefore$ The solution set is the shaded region AOB



$\therefore [P]_O = 3(0) + 2(0) = 0$

, $[P]_A = 3(3) + 2(2) = 13$

, $[P]_B = 3(0) + 2(3.5) = 7$

$\therefore$ The maximum value of the objective function = 13 at the point (3 , 2)

19 ⓒ **20** ⓐ

21

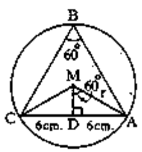
$m_1 = \frac{-1}{3}$, $m_2 = -2$

$\therefore \tan\theta = \left|\frac{-\frac{1}{3}+2}{1+\frac{2}{3}}\right| = 1$ $\therefore \theta = 45°$

$\therefore$ The measure of the angle between the two straight lines is 45°

22 ⓑ **23** ⓒ

24



$m(\angle AMC) = 2\,m(\angle B) = 120°$

In Δ AMD :

$m(\angle ADM) = 90°$

, $m(\angle AMD) = 60°$

$\therefore \sin 60° = \frac{6}{r}$

$\therefore r = \frac{6}{\sin 60°} = 4\sqrt{3}$ cm.

$\therefore$ The area of the minor circular segment whose chord $\overline{AC} = \frac{1}{2} \times (4\sqrt{3})^2 \times \left(\frac{120°}{180°}\pi - \sin 120°\right)$

$\simeq 29$ cm.

25 ⓓ **26** ⓓ **27** ⓒ **28** ⓓ

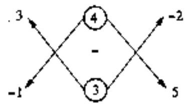
7 Port Said

1 ⓒ **2** ⓑ **3** ⓐ **4** ⓓ

5

$x = \frac{3 \times 3 - 4 \times -1}{3 - 4} = -13$

, $y = \frac{3 \times -2 - 4 \times 5}{3 - 4} = 26$



$\therefore$ the coordinates of the point C is (– 13 , 26)

6 ⓑ

7

$L_1 : x + 3y = 5$, $L_2 : 2x + 5y = 8$

$\therefore \begin{pmatrix} 1 & 3 \\ 2 & 5 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ 8 \end{pmatrix}$

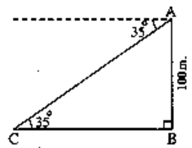
$\therefore \begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{\begin{vmatrix} 1 & 3 \\ 2 & 5 \end{vmatrix}}\begin{pmatrix} 5 & -3 \\ -2 & 1 \end{pmatrix}\begin{pmatrix} 5 \\ 8 \end{pmatrix} = \frac{1}{-1}\begin{pmatrix} 1 \\ -2 \end{pmatrix} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$

$\therefore x = -1$, $y = 2$

$\therefore$ The solution set = $\{(-1 , 2)\}$

8 ⓐ **9** ⓒ **10** ⓓ **11** ⓑ

12



$\tan 35° = \frac{100}{BC}$

$\therefore BC = \frac{100}{\tan 35°} \simeq 142.8$ m.

$\therefore$ The distance between the boat and the tower base $\simeq$ 142.8 m.

13 ⓑ

14

$\because$ The slope of the straight line = $\frac{3}{2}$

$\therefore$ The direction vector of the straight line = (2 , 3)

$\therefore$ The vector equation : $\vec{r} = (3 , -1) + k(2 , 3)$

, the parametric equation : $x = 3 + 2k$, $y = -1 + 3k$

The cartesian equation : $\frac{y+1}{x-3} = \frac{3}{2}$

$\therefore 2y + 2 = 3x - 9$

$\therefore$ The general form : $3x - 2y - 11 = 0$

15 ⓐ **16** ⓒ **17** ⓑ **18** ⓓ

19

$\because$ ABCD is a parallelogram $\therefore \overrightarrow{AB} = \overrightarrow{DC}$

, $\overrightarrow{AB} + \overrightarrow{AD} = \overrightarrow{AC}$

$\therefore \overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{DC} = \overrightarrow{AC} + \overrightarrow{AB} = 2\,\overrightarrow{AE}$

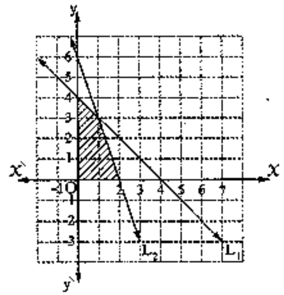
20 ⓐ

21

$x \geq 0$, $y \geq 0$ represented by $\overrightarrow{Ox} \cup \overrightarrow{Oy} \cup$ the first quadrant

$L_1 : x + y = 4$ represented by a solid line passes through (0 , 4) , (4 , 0)

$L_2 : 3x + y = 6$ represented by a solid line passes through (0 , 6) , (2 , 0)



$\therefore$ The solution set is the shaded region

22 ⓒ **23** ⓐ **24** ⓑ **25** ⓓ

26

The right hand side

$= \sin^2\theta(1 + \tan^2\theta)$

$= \sin^2\theta \times \sec^2\theta = \sin^2\theta \times \frac{1}{\cos^2\theta} = \tan^2\theta$

= the left hand side

27 ⓐ

28

The length of the perpendicular

$= \frac{|6(1) - 8(3) - 12|}{\sqrt{36 + 64}} = 3$ length unit

8 Matrouh

1 ⓓ **2** ⓒ **3** ⓓ

4

$\therefore \Delta = \begin{vmatrix} 3 & 1 \\ 2 & -1 \end{vmatrix} = -5$

, $\Delta_x = \begin{vmatrix} 0 & 1 \\ 5 & -1 \end{vmatrix} = -5$

, $\Delta_y = \begin{vmatrix} 3 & 0 \\ 2 & 5 \end{vmatrix} = 15$

$\therefore x = \frac{\Delta_x}{\Delta} = \frac{-5}{-5} = 1$, $y = \frac{\Delta_y}{\Delta} = \frac{15}{-5} = -3$

$\therefore$ The solution set = $\{(1 , -3)\}$

5 ⓑ **6** ⓑ **7** ⓐ **8** ⓐ **9** ⓐ

10 ⓒ **11** ⓐ **12** ⓐ **13** ⓓ **14** ⓒ

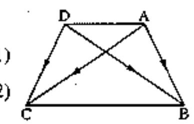
15 ⓑ **16** ⓐ

17

The length of the perpendicular

$= \frac{|3(2) + 4(-4) - 5|}{\sqrt{9 + 16}} = 3$ unit length

18



In Δ ABC :

$\overrightarrow{AB} = \overrightarrow{AC} + \overrightarrow{CB}$ (1)

In Δ DBC : $\overrightarrow{DC} = \overrightarrow{DB} + \overrightarrow{BC}$ (2)

By adding (1) , (2) :

$\therefore \overrightarrow{AB} + \overrightarrow{DC} = \overrightarrow{AC} + \cancel{\overrightarrow{CB}} + \overrightarrow{DB} + \cancel{\overrightarrow{BC}} = \overrightarrow{AC} + \overrightarrow{DB}$

19 ⓑ **20** ⓐ

21

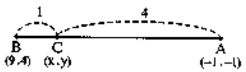
$m_1 = \frac{-6}{-3} = 2$, $m_2 = \frac{-1}{-3} = \frac{1}{3}$ $\therefore \tan\theta = \left|\frac{2 - \frac{1}{3}}{1 + \frac{2}{3}}\right| = 1$

$\therefore \theta = 45°$

$\therefore$ The measure of the acute angle between the two straight lines = 45°

22

$\because C \in \overline{AB}$, $AC = 4\,CB$



$\therefore \overline{AC} = 4\,\overline{CB}$

$\therefore \vec{C} - \vec{A} = 4\left(\vec{B} - \vec{C}\right)$

$\therefore \vec{C} - \vec{A} = 4\,\vec{B} - 4\,\vec{C}$

$\therefore 5\,\vec{C} = 4\,\vec{B} + \vec{A} = (36 , 16) + (-1 , -1) = (35 , 15)$

$\therefore \vec{C} = (7 , 3)$

$\therefore$ The coordinates of $C = (7 , 3)$

23

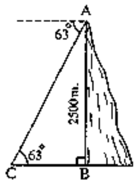
The left hand side

$= \sin^2\theta\,(1 + \tan^2\theta)$

$= \sin^2\theta \times \sec^2\theta = \dfrac{\sin^2\theta}{\cos^2\theta} = \tan^2\theta =$ the right hand side

24

Let AB represent the height of the hill , AC the distance between the point C and the observer A



$\therefore \sin 63° = \dfrac{2500}{AC}$

$\therefore AC = \dfrac{2500}{\sin 63°} \approx 2806$ m.

$\therefore$ The distance between the point and the observer ≈ 2806 m.

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25 (b)

26

$X - AB = \begin{pmatrix} 1 & 0 \\ -3 & 2 \end{pmatrix}$

$X = \begin{pmatrix} 1 & 0 \\ -3 & 2 \end{pmatrix} + \begin{pmatrix} 2 & 0 \\ 1 & 3 \end{pmatrix}\begin{pmatrix} -1 & 2 \\ 3 & 1 \end{pmatrix}$

$X = \begin{pmatrix} 1 & 0 \\ -3 & 2 \end{pmatrix} + \begin{pmatrix} -2 & 4 \\ 8 & 5 \end{pmatrix} = \begin{pmatrix} -1 & 4 \\ 5 & 7 \end{pmatrix}$

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27 (a)　　**28** (b)

Answers of Multiple Choice Final Examinations

Model 1

(1) (d)	(2) (d)	(3) (a)	(4) (c)	(5) (b)
(6) (d)	(7) (d)	(8) (b)	(9) (a)	(10) (a)
(11) (d)	(12) (c)	(13) (b)	(14) (d)	(15) (c)
(16) (c)	(17) (a)	(18) (d)	(19) (c)	(20) (d)
(21) (b)	(22) (d)	(23) (c)	(24) (d)	(25) (a)
(26) (c)	(27) (b)	(28) (b)	(29) (b)	(30) (b)
(31) (a)	(32) (c)	(33) (d)	(34) (c)	(35) (d)
(36) (d)	(37) (a)	(38) (a)	(39) (a)	(40) (d)

Model 2

(1) (a)	(2) (d)	(3) (c)	(4) (c)	(5) (c)
(6) (d)	(7) (a)	(8) (c)	(9) (c)	(10) (a)
(11) (b)	(12) (a)	(13) (b)	(14) (b)	(15) (d)
(16) (b)	(17) (b)	(18) (d)	(19) (c)	(20) (a)
(21) (a)	(22) (c)	(23) (c)	(24) (c)	(25) (c)
(26) (a)	(27) (d)	(28) (b)	(29) (d)	(30) (a)
(31) (d)	(32) (d)	(33) (c)	(34) (c)	(35) (a)
(36) (c)	(37) (c)	(38) (c)	(39) (c)	(40) (b)

Model 3

(1) (c)	(2) (c)	(3) (b)	(4) (d)	(5) (d)
(6) (d)	(7) (d)	(8) (b)	(9) (c)	(10) (d)
(11) (b)	(12) (d)	(13) (c)	(14) (d)	(15) (c)
(16) (c)	(17) (c)	(18) (d)	(19) (b)	(20) (a)
(21) (b)	(22) (c)	(23) (a)	(24) (d)	(25) (c)
(26) (a)	(27) (a)	(28) (d)	(29) (b)	(30) (c)
(31) (b)	(32) (c)	(33) (d)	(34) (c)	(35) (c)
(36) (d)	(37) (d)	(38) (c)	(39) (d)	(40) (a)

Model 4

(1) (b)	(2) (c)	(3) (d)	(4) (d)	(5) (b)
(6) (d)	(7) (a)	(8) (a)	(9) (a)	(10) (d)
(11) (b)	(12) (c)	(13) (c)	(14) (a)	(15) (c)
(16) (d)	(17) (b)	(18) (b)	(19) (b)	(20) (d)
(21) (d)	(22) (b)	(23) (b)	(24) (c)	(25) (b)
(26) (b)	(27) (d)	(28) (a)	(29) (b)	(30) (c)
(31) (d)	(32) (c)	(33) (a)	(34) (b)	(35) (b)
(36) (b)	(37) (d)	(38) (d)	(39) (c)	(40) (a)

Model 5

(1) (c)	(2) (d)	(3) (d)	(4) (b)	(5) (c)
(6) (b)	(7) (d)	(8) (b)	(9) (b)	(10) (d)
(11) (b)	(12) (a)	(13) (c)	(14) (c)	(15) (d)
(16) (b)	(17) (b)	(18) (d)	(19) (c)	(20) (b)
(21) (b)	(22) (b)	(23) (a)	(24) (c)	(25) (d)
(26) (d)	(27) (d)	(28) (c)	(29) (a)	(30) (b)
(31) (c)	(32) (c)	(33) (c)	(34) (b)	(35) (a)
(36) (a)	(37) (b)	(38) (c)	(39) (d)	(40) (a)

Model 6

(1) (b)	(2) (d)	(3) (d)	(4) (b)	(5) (c)
(6) (c)	(7) (c)	(8) (d)	(9) (d)	(10) (c)
(11) (c)	(12) (a)	(13) (a)	(14) (b)	(15) (d)
(16) (d)	(17) (b)	(18) (a)	(19) (d)	(20) (c)
(21) (d)	(22) (c)	(23) (b)	(24) (c)	(25) (a)
(26) (b)	(27) (c)	(28) (c)	(29) (b)	(30) (c)
(31) (d)	(32) (c)	(33) (c)	(34) (a)	(35) (d)
(36) (c)	(37) (a)	(38) (d)	(39) (d)	(40) (c)

Model 7

(1) (b)	(2) (c)	(3) (d)	(4) (b)	(5) (a)
(6) (c)	(7) (c)	(8) (c)	(9) (d)	(10) (a)
(11) (b)	(12) (c)	(13) (c)	(14) (d)	(15) (c)
(16) (c)	(17) (d)	(18) (c)	(19) (c)	(20) (b)
(21) (d)	(22) (d)	(23) (c)	(24) (c)	(25) (c)
(26) (a)	(27) (d)	(28) (c)	(29) (b)	(30) (b)
(31) (a)	(32) (c)	(33) (d)	(34) (c)	(35) (a)
(36) (c)	(37) (c)	(38) (d)	(39) (c)	(40) (a)

Model 8

(1) (a)	(2) (a)	(3) (d)	(4) (a)	(5) (c)
(6) (b)	(7) (c)	(8) (a)	(9) (b)	(10) (c)
(11) (d)	(12) (a)	(13) (b)	(14) (c)	(15) (d)
(16) (c)	(17) (b)	(18) (b)	(19) (d)	(20) (c)
(21) (c)	(22) (b)	(23) (b)	(24) (d)	(25) (a)
(26) (a)	(27) (c)	(28) (c)	(29) (b)	(30) (d)
(31) (d)	(32) (b)	(33) (d)	(34) (a)	(35) (b)
(36) (d)	(37) (a)	(38) (a)	(39) (d)	(40) (a)

Model 9

(1) (d)	(2) (c)	(3) (d)	(4) (c)	(5) (c)
(6) (c)	(7) (a)	(8) (d)	(9) (d)	(10) (c)
(11) (c)	(12) (a)	(13) (b)	(14) (b)	(15) (d)
(16) (a)	(17) (b)	(18) (c)	(19) (c)	(20) (a)
(21) (a)	(22) (c)	(23) (d)	(24) (d)	(25) (a)
(26) (c)	(27) (b)	(28) (a)	(29) (b)	(30) (d)
(31) (d)	(32) (d)	(33) (a)	(34) (c)	(35) (b)
(36) (d)	(37) (c)	(38) (b)	(39) (d)	(40) (a)

Model 10

(1) (b)	(2) (c)	(3) (d)	(4) (b)	(5) (d)
(6) (d)	(7) (b)	(8) (c)	(9) (a)	(10) (b)
(11) (d)	(12) (c)	(13) (d)	(14) (c)	(15) (b)
(16) (a)	(17) (b)	(18) (c)	(19) (d)	(20) (d)
(21) (c)	(22) (a)	(23) (a)	(24) (d)	(25) (d)
(26) (b)	(27) (c)	(28) (c)	(29) (b)	(30) (a)
(31) (a)	(32) (b)	(33) (b)	(34) (b)	(35) (b)
(36) (d)	(37) (b)	(38) (b)	(39) (c)	(40) (a)