Cairo Governorate
Nozha Directorate of Education
Nozha Language Schools
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Department : Math
Form : 3rd prep.
Sheet

Alg.

Sheet (1)

[1] Find the values of a and b in each of the following if :

1) (a , b) = (-5 , 9)

2) (a – 2 , b + 1) = (2 , - 3)

3) (6 , b – 3) = (2 – a , -1)

4) (3 , b) = (5 a – 1 , 4 a)

[2] If X = {1 , 2} , Y = {3 , 4 , 5} find X × Y and represent it by :

a) An arrow diagram b) Graphical diagram

[3] If X = {a , b} , find X^2 and represent it by an arrow diagram

[4] Complete the following :

1) If X = {1 , 2 , 3} , Y = {4} , then X × Y = ……..

2) If X = {5 , 6} , Y = {a} , then Y × X = ……

3) If X = {1 , 2} , then X × Ø = ……

4) {2 , 3} × {4 , 5} = …….

5) If X^2 = {(1 , 1) , (1 , 2) , (2 , 1) , (2 , 2)} , then X = ……

6) If X × Y = {(2 , 5) , (3 , 5)} , then (3 , 2) ∈ ……..

7) If (X – 1 , 11) = (8 , Y + 3) , then $\sqrt{X+2Y}$ = ……..

[5] Choose the correct answer from those given :

1) If : (5 , x – 8) = (y + 1 , - 5) , then x + y = ……

a) 4 b) 5 c) 6 d)7

2) {3} × {3} = ……

a) {9} b) {3} c) {(3 , 3)} d) 9

3) If $n(X) = 3$, $n(X \times Y) = 12$, then $n(Y)$ = ……..

a) 4 b) 9 c) 15 d) 36

4) If $n(X^2) = 4$, $n(X \times Y) = 8$, then $n(Y^2)$ = ……

a) 1 b) 4 c) 16 d) 64

5) If $X = \{3 , 4\}$, then $n(X \times \emptyset)$ = ……

a) zero b) 1 c) 2 d) $\emptyset$

[6] If $X = \{2 , -1\}$, $Y = \{4 , 0\}$, $Z = \{4 , 5 , -2\}$, find :

a) $X \times Y$ b) $Y \times Z$ c) X^2

d) $n(X \times Z)$ e) $n(Y^2)$ f) $n(Z^2)$

[7] If $X = \{2 , 3\}$, $Y = \{3 , 4 , 5\}$, find

a) $X \times Y$ and represent it by an arrow diagram and a Cartesian diagram .

b) $n(X \times Y)$ c) $n(Y^2)$ d) $(X \times Y) \cap Y^2$

[8] If $X = \{3 , 4\}$, $Y = \{4 , 5\}$ and $Z = \{6 , 5\}$, then find :

a) $X \times (Y \cap Z)$ b) $(X - Y) \times Z$ c) $(X - Y) \times Y \, (Y - Z)$

[9] If $X = \{1\}$, $Y = \{2 , 3\}$, $Z = \{2 , 5 , 6\}$

Represent each of X , Y and Z by venn diagram , then find :

First : a) $X \times Y$ b) $Y \times Z$ c) $X \times Z$ d) Y^2

Second : $(X \times Y) \cup (Y \times Z)$

Third : $X \times (Y \cap Z)$

Fourth : $(X \times Y) \cap (X \times Z)$

Fifth : $(Z - Y) \times (X \cup Y)$

Sheet (2)

[1] Choose the correct answer from those given :

1) If the point (X , 2) lies on Y – axis , then X = ……..

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

2) If the point (5 , b – 7) is located on the X – axis , then b = ……..

a) 2 b) 5 c) 7 d) 12

3) If the point (-4 , Y) lies on the X – axis , then 2 Y – 1 = ……

a) 1- b) 1 c) -8 d) -9

4) If the point (X – 4 , 2 – X) where X ∈ Z is located on the third quadrant then X equals ……

a) 2 b) 3 c) 4 d) 6

Sheet (3)

[1] Choose the correct answer from those given :

1) If F is a function from the set X to the set Y , then : X is called ……

a) the range of the function F b) the domain of the function F

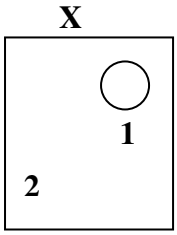
c) The codomain of the function F d) the rule of the function F

2) If F is a function from the set X to the set Y , then : Y is called ……..

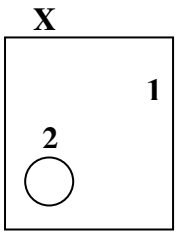
a) the domain of the function . b) the codomain of the function .

c) the range of the function . d) the rule of the function .

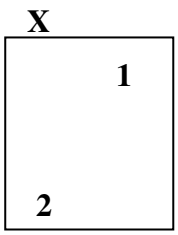
3) If X = {1 , 2} , then the arrow diagram which represents a function on X is …….



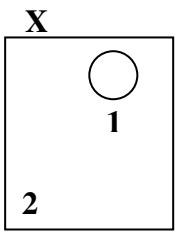
(a)



(b)



(c)



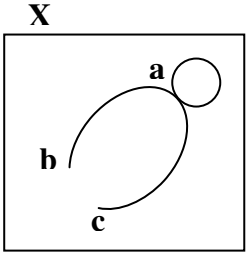
(d)

4) The opposite diagram represents

A function on X , its range is ……

a) {a} b) {a, b , c}

c) {a , b} d) {b , c}



[2] If $X = \{3 , 4 , 5\}$, $Y = \{4 , 6 , 8 , 10\}$ and R is a relation from X to Y where "a R b" means "$a = \frac{1}{2}$ b" for each $a \in X , b \in$

Write the set of the relation R and show that R is a function , then write its range .

[3] If $X = \{4 , 6 , 8 , 10\}$, $Y = \{ 2 , 3 , 4 , 5\}$ and R is a relation from X to Y , where " a R b " means " $a = 2b$ " for each $a \in X , b \in Y$

Write R and represent it by an arrow diagram .

[4] If $X = \{1 , 3 , 4 , 5\}$, $Y = \{1 , 2 , 3 , 4 , 5 , 6\}$ and R is a relation from X to Y , where " a R b " means " $a + b = 7$ " for each of $a \in X , b \in Y$

Write R and represent it by an arrow diagram and also by a Cartesian diagram .

[5] If $X = \{1 , 2 , 3\}$, $Y = \{2 , 3 , 7\}$ and R is a relation from X to Y , where " a R b " means " a + b = a prime number " for each $a \in X , b \in Y$

Write R and represent it by an arrow diagram . is R a function ?

[6] If $X = \{-2 , -1 , 1 , 2\}$, $Y = \{ \frac{1}{8} , \frac{1}{3} , 1 , 3 , 8 \}$ and R is a relation from X to Y ,

where " a R b " means " $a^3 = b$ " for each $a \in X , b \in Y$

Write R and represent it by an arrow diagram and also Cartesian diagram .

[7] If $X = \{2 , 5 , 8\}$ and $Y = \{10 , 16 , 24 , 30\}$ and R is a relation from X to Y where " a R b " means " a is a factor of b " for each $a \in X , b \in Y$

Write R and represent it by an arrow diagram and by Cartesian diagram . is R a function ? and why ?

[8] If $X = \{2 , 3 , 4\}$, $Y = \{6 , 8 , 10 , 11 , 15\}$ and R is a relation from X to Y , where " a R b " means " a is a factor of b " for each $a \in X , b \in Y$

write the relation R .

[9] If $X = \{6 , 4 , 2 , 0 , -2 , -4 , -6 \}$, and R is a relation on X where " a R b " means " a is the additive inverse of b " for each $a \in X$, $b \in X$

Write R and represent it by an arrow diagram and show with reason if R is a function or not ? and if R is a function , mention its range .

[10] If $X = \{0 , 1 , 2 , \frac{1}{2} \}$ and R is a relation on X where " a R b " means " a is the multiplicative inverse of b " for each $a \in X$, $b \in X$. write R and represent it by an arrow diagram and show if R is a function or not .

[11] If $X = \{1 , 2 , 4 , 6 , 10\}$ and R is a relation on X where " a R b " means " a is a multiple of b " for each $a \in X , b \in X$.

Write R and represent it by an arrow diagram and also by a Cartesian diagram.

is R is a function ? and why ?

Sheet (4)

[1] Choose the correct answer from those given :

1) The function F where (X) = 2 X – 3 X^4 + 1 is a polynomial function of …….degree

a) first b) second c) third d) fourth

2) The function F : F (X) = $(X - 5)^3$ is a polynomial function of ……..degree .

a) zero b) second c) third d) fourth

3) The function F : F (X) = X (X- 2 X2) is a polynomial of the …….degree .

a) first b) second c) third d) fourth

4) The function F : F (X) = X^2 $(X-3)^2$ is a polynomial of the …….degree .

a) first b) second c) third d) fourth

5) If : F (X) = X^2 – X + 3 , then : F (3) = ……

a) 3 b) 6 c) 9 d) 12

6) If : F (X) = a X + 6 , F (2) = 2 , then a = ……..

a) 2 b) -2 c) 4 d) 6

7) If : F (X) = X – 5 and $\frac{1}{2}$ F (a) = 3 , then a = …….

a) 2 b) 8 c) 11 d) 16

[2] Complete the following :

1) If (3 , y) $\in$ the set of the function F where F (X) = X + 2 , then y = ……..

2) If (a , a) $\in$ the set of the function F where F (X) = 2 X + 3 , then a = ……

[3] If : F (X) = 2 X^2 – 5 X + 2

a) Mention the degree of F b) Prove that : F (2) = F ($\frac{1}{2}$)

Sheet (5)

[1] Complete the following :

1) The function F : R $\rightarrow$ R where F (X) = 5 is represented by a straight line parallel to ……and intersects y-axis at the point …….

2) If F (X) = 3 , then F (5) + F (-5) = ……

3) If F (X) = 5 , then $\frac{F(5)}{F(10)}$ = ……

4) The liner function given by the rule = 2 X – 1 is represented graphically by a straight line intersecting the X-axis at the point ……..

5) The liner function given by the rule Y = 3 X + 6 is represent graphically by a straight line intersecting the X-axis at the point ……

6) The point of the vertex of the curve of the function F : F (X) = 2 X^2 – 4 X + 5 is ……

7) If (-2 , y) belongs to the curve of the function F : F (X) = X^2 + 1 , then : Y = ……..….

Represent Graphically

[1] Represent the following function graphically , where $X \in R$:

a) $F(X) = 5$ b) $F(X) = -4$

[2] Represent each of the following linear function graphically and find the point of intersection of the straight line which represents each of them with the coordinate axes , where $X \in R$:

a) $F : F(X) = X + 2$ b) $F : F(X) = -2X + 3$

[3] Represent each of the following function graphically and from the graph , deduce the coordinates of the vertex of the curve and the equation of the line of symmetry and the maximum or minimum value of the function , where $X \in R$:

a) $F : F(X) = X^2 + 2X + 1$ taking $X \in [-4 , 2]$.

[4] Complete the following :

1) If : $X = \{1 , 3 , 5\}$, $F : X \rightarrow R$ and $F(X) = 2X + 1$, then the range of $F =$ …….

2) The liner function $F : F(X) = X + 7$ is represented by a straight line cuts X-axis at the point ……

3) The liner function $F : F(X) = 2X - 1$ is represented by a straight line cuts y-axis at the point …….

Unit (2)

Sheet (6)

[1] Complete the following :

1) The proportion is …….

2) If a , b , c and d are proportional quantities , then c is called ……

3) If the quantities a , b , c and d are proportional , then : $\frac{a}{b}$ = …….

4) The fourth proportional for the numbers 4 , 12 and 16 is ……

5) The second proportional for the numbers 2 , 4 and 6 is ……

6) The third proportional for the numbers 8 , 6 and 12 is ……..

7) The first proportional for the numbers 5 , 27 and 45 is …….

8) If 3 , 4 , X and 11 are proportional , then : X = ……..

9) If $7X = 3Y$, then : $\frac{X}{Y}$ = ……

10) If 5 a – 4 b = 0 , then : $\frac{a}{b}$ = ……..

11) If $\frac{5a-7b}{8a+11b} = 0$ then : $\frac{b}{a}$ = ……

12) If $9a^2 - 25b^2 = 0$ where $a \in R^+$ and $b \in R^+$, then : $\frac{a}{b}$ = …….

13) If $\frac{X}{Y} = \frac{2}{5}$, then : $\frac{2X}{2Y}$ = ……..

14) If $\frac{a}{2} = \frac{b}{3}$, then : $\frac{2a}{3b}$ = …….

[2] Choose the correct answer from those given :

1) If $\frac{3a}{5b} = \frac{1}{2}$, then : $\frac{a}{b}$ = …….

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

2) If : 5 a , 2 , 3 b , 7 are four proportional quantities , then : $\frac{a}{b}$ = ……..

a) $\frac{3}{7}$ b) $\frac{6}{35}$ c) $\frac{3}{5}$ d) $\frac{3}{2}$

3) If $\frac{a+2b}{a-b} = \frac{2}{3}$, then : $\frac{b}{a}$ = ……

a) $\frac{1}{8}$ b) 8 c) - $\frac{1}{8}$ d) – 8

[3] Find the value of X in each of the following , If :

1) (2 X – 3) : (X – 5) = 1 : 4

2) $(X^2 - 8) : (2X^2 + 1) = 1 : 3$

3) If $\frac{X+3Y}{2X-Y} = \frac{4}{3}$, find the ratio $X : Y$

4) If $X^2 - 4Y^2 = 3XY$, find X : Y

5) If $\frac{a}{b} = \frac{3}{4}$, then find the value of :

a) $\frac{4a+b}{2a-b}$ b) $\frac{b^2 - a^2}{a^2 - b^2}$

6) If $\frac{X}{Y} = \frac{2}{3}$, find the value of the ratio : $\frac{3X+2Y}{6Y-X}$

7) find the number that if it is added to each of the numbers 3 , 5 , 8 and 12 , it becomes proportional .

8) Prove that : a , b , c and d are proportional quantities if :

a) $\frac{a+b}{b} = \frac{c+d}{d}$ b) $\frac{a}{a-b} = \frac{c}{c-d}$

9) If a : b : c = 5 : 7 : 3 and a + b = 27.6 , find the value of each of : a , b and c .

10) If 2 a = 3 b = 4 c , find a : b : c

[4] Answer the following :

1) Find the number which if it is added to the two terms of the ratio 7 : 11 it will be 2 : 3

2) Find the number that if we subtract thrice of it from each of the two terms of the ratio $\frac{49}{69}$, the ratio becomes $\frac{2}{3}$

3) Find the number which if its square is added to each of the two terms of ratio 7 : 11 it becomes 4 : 5

4) Find the positive number which if we add its square to each of the two terms of ratio 5 : 11 it becomes 3 : 5

5) What is the number which is subtracted from the antecedent of the ratio 15 : 13 and added to its consequent to become 3 : 4

6) Two integers , the ratio between them is 3 : 7 and if we subtracted 5 from each term , the ratio between each of them becomes 1 : 3 , find the two umbers .

7) The ratio between two integers is $\frac{3}{4}$, if we add 4 to the small number and subtract 3 form the great number , the ratio will become 8 : 9 find the two numbers .

8) Two integers , the ratio between them is 2 : 3 , if you add to the first 7 and subtract from the second 12 , the ratio between them becomes 5 : 3 find the two numbers .

Sheet (7)

[1] Complete the following :

1) If $\frac{a}{b} = \frac{c}{d} = \frac{3}{5}$, then : $\frac{a+c}{b+d}$ = ……

2) If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{3}{5}$, then : $\frac{a-2c+e}{b-2d+f}$ = ……..

3) If $\frac{4}{X} = \frac{7}{Y} = \frac{a}{Y-X}$, then : a = ……

4) If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, then : $\frac{5a+3c+.....}{5b+.....+4f} = \frac{a}{b}$

[2] If a , b , c and d are proportional quantities , prove that :

1) $\frac{5a+3c}{5b+3d} = \frac{3a-2c}{3b-2b}$

2) $\frac{3a-2c}{5a+3c} = \frac{3b-2d}{5b+3d}$

3) $\frac{ac}{bd} = (\frac{a-c}{b-d})^2$

4) $\sqrt{\frac{3a^2-5c^2}{3b^2-5d^2}} = \frac{a}{b}$ where a , b , c and d are positive quantities .

5) $\sqrt[3]{\frac{5a^3-3c^3}{5b^3-3d^3}} = \frac{a+c}{b+d}$

[3] If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ prove that :

1) $\frac{a+5c}{b+5d} = \frac{c-3e}{d-3f}$

2) $\frac{2a+7c-4e}{2b+7d-4f} = \frac{a-8e}{b-8f}$

[4] If $\frac{a}{4X+Y} = \frac{b}{X-4Y}$, prove that : $\frac{a+b}{5X-3Y} = \frac{a-b}{3X+5Y}$

[5] If $\frac{x+y}{19} = \frac{y+z}{7}$, prove that : $\frac{x+2y+z}{13} = \frac{x-z}{6}$

[6] If $\frac{X}{a-b+c} = \frac{y}{b-c+a} = \frac{z}{c-a+b}$, prove that : $\frac{X+y}{a} = \frac{y+z}{b}$

[7] If $\frac{X}{2a+b} = \frac{y}{2b-c} = \frac{z}{2c-a}$, then prove that : $\frac{2X+y}{4a+4b-c} = \frac{2X+2y+z}{3a+6b}$

[8] If $\frac{a}{2X-y} = \frac{b}{2y-X}$, prove that : $\frac{2a+b}{a+2b} = \frac{X}{y}$

[9] If $\frac{a}{2X+y} = \frac{b}{3y-X} = \frac{c}{4X+5y}$, prove that : $\frac{a+2b}{4b+c} = \frac{7}{17}$

[10] If $\frac{a}{2} = \frac{b}{7} = \frac{c}{3}$, find the value of : $\frac{a+2b}{b-c}$

[11] If $\frac{X+y}{7} = \frac{y+z}{5} = \frac{z+X}{8}$, prove that : $\frac{X+y+z}{X-z} = 5$

[12] If $\frac{X}{y} = \frac{3}{4}$, $\frac{X}{z} = \frac{2}{5}$ and 3 X + 2y + z = 49 , find the value of each of : X , y and z

Sheet (8)

[1] Find the middle proportion between :

1) 3 , 27

2) 2 a , 8 ab^2

[2] If b is the middle proportion between a and c , prove that :

1) $\frac{a-b}{b-c} = \frac{a+3b}{3c+b}$

2) $(\frac{b-c}{a-b})^2 = \frac{c}{a}$

3) $\frac{a^2+b^2}{b^2+c^2} = \frac{a}{c}$

[3] If a , b , c and d are in continued proportion , prove that :

1) $\frac{a-2b}{b-2c} = \frac{3b+4c}{3c+4d}$

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

3) $\frac{ab-cd}{b^2-c^2} = \frac{a+c}{b}$

4) $\frac{a^2+b^2+c^2}{b^2+c^2+d^2} = \frac{ac}{bd}$

Sheet (9)

[1] Complete the following :

1) If X α y then : X = …….

2) If z = $\frac{m}{X^2}$ where m is a constant , then : z α …….

3) If y α X , then : $\frac{X_1}{X_2} = \frac{.....}{.....}$

4) If X varies inversely as y , then $\frac{y_1}{y_2} = \frac{.....}{.....}$

5) If y = $\frac{3}{5}$ X , then : y α …….

6) If y α $\frac{5}{X}$, then : y varies inversely as …….

7) If X – 2 y = 0 , then : X α ……..

8) If 2 X y = 5 , then : X α ……..

9) If y α X and y = 2 as X = 8 , then : y = …… when X = 12

10) If y α $\frac{1}{X}$ and y = 3 as X = 20 , then : y = …….. when X = 12

11) If y α X and y = 2 as X = 4 , then : y = ……X

12) If α X and y = 6 as X = 4 , then : $\frac{y}{X}$ = …….. (in simples form)

[2] If y varies directly as X and y = 20 as X = 7

Find : X when y = 40

[3] If a varies inversely as b and a = 12 as b = 8 , find :

a) The value of a as b = 1.5

b) The value of b as a = 2

[4] If y α X and y = 14 when X = 42 , find :

a) The relation between X and Y

b) The value of y when X = 60

[5] If $X \propto \frac{1}{X}$ and y = 3 when $X = 2$, find :

a) The relation between X and y

B) The value of y when $X = 1.5$

[6] If $y \propto X^3$ and y = 46 as X = 2 , find the relation between X and find the value of y as $X = \frac{1}{2}$

[7] If $y^2 \propto X^3$, find the relation between X and y where y = 3 as X = 2

[8] If $y^2 \propto \frac{1}{\sqrt[3]{X}}$ and $X = 8$ as y = 3 , find X as y = 1.5

[9] If $y \propto (X+ 1)$, find the relation between X and y if X = 3 when y = 2

[10] If $\frac{21X - y}{7X - z} = \frac{y}{z}$, prove that : $y \propto z$

[11] If : $4 a2 + 9 b^2 = 12 a b$, prove that : a varies as b

[12] Connecting with physics :

A car moves with a uniform velocity where the distance varies directly with the time (t) . If the car covered a distance of 150 km. in 6 hours , find the distance covered by that car in 10 hours ?

[13] Connecting with astronomy ;

If the weight of a body on the moon (W) is directly proportional with its weight on the ground (R) . If the body weight 84 kg. , on the ground and its weight on the moon is 14 kg. . What will its weight be on the moon if its weight on the ground is 144 kg. ?

Sheet (10)

Important Rules :

1) The standard deviation of set of values .

$$\sigma = \sqrt{\frac{\Sigma (x - \bar{x})^2}{n}}$$

2) The standard deviation of frequency distribution .

$$\sigma = \sqrt{\frac{k \times \Sigma (\bar{x} - x)^2}{\Sigma K}}$$

3) The standard deviation of frequency distribution of sets .

$$\sigma = \sqrt{\frac{k \times \Sigma (\bar{x} - x)^2}{\Sigma K}}$$

A) Complete the following :

1- The resources of collecting data are …… and ……. .

2- The personal interview is a ……. resource of collecting data .

3- Central agency for public mobilization and statistics is a …… resource of collecting data .

4- The suitable method for checking the production of a factory is ……

5- ……. Is secondary resource of collecting data .

6- Choosing a sample from the society's layers in statistics is called a …… sample .

7- Dispersion measurements are …….. and ……..

8- The simplest measure of the dispersion is …….

9- The difference between the greatest value and the smallest value in a set of values is called ……

10- The positive square root of the average of squares of deviation of the values from their mean is called ……..

11- If the standard deviation equals zero , then …….. .

12- The dispersion to any set equally values equals …… .

13- The mean of the set of the values : 7 , 5 , 9 , 11 and 3 is …….

14- The range of the set of the values : 6 , 5 , 9 , 4 and 12 is …….

15- The most repeated value in a set of values represents …….

16- If the mean of numbers : 3k – 3 , 3k – 1 , 2k + 1 , 2k + 3 and 2k + 5 is 13 , then k = …….

17- If $\Sigma (x - \overline{x})^2 = 36$ of a set of values and the number of these values = 9 , then the standard deviation = ……..

B) Calculate the standard deviation of the values : 8 , 9 , 7 , 6 and 5 .

C) The following tables shows the distribution of ages of 20 persons in years :

The age	15	20	22	23	25	30	Total
Number of persons	2	3	5	5	1	4	20

Find the standard deviation of the ages .

D)The following is the frequency distribution of weekly incentives of 100 workers in a factory :

Incentives in pounds	35-	45-	55-	65-	75-	85-
Number of workers	10	14	20	28	20	8

Find the standard deviation of this distribution .

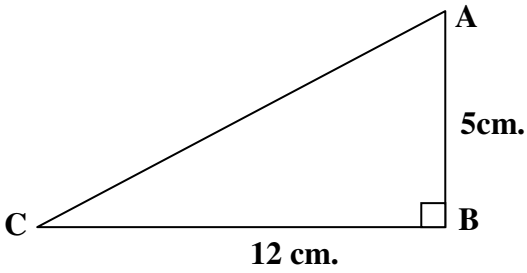
Geom.

Sheet (1)

[1] In the opposite figure :

If ABC is a right-angled triangle at B ,

then : sin A = ……..

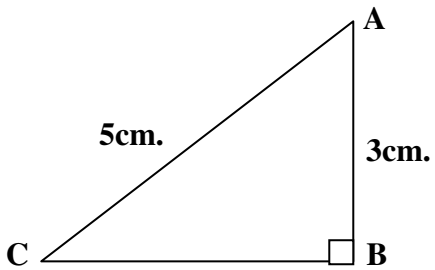


[2] In the opposite figure :

Δ ABC is a right-angled triangle at B ,

AB = 3 cm , AC = 5 cm ,

Then : sin C × cos C = ……



[3] If the ratio between the measures of two supplementary angles is 3 : 5 , find the measure of each one by degree measure .

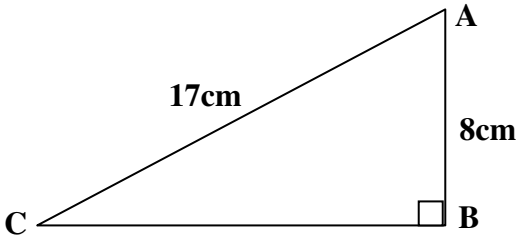
[4] In the opposite figure :

ABC is a right-angled triangle at B in which :

AB = 8 cm , AC = 17 cm.

Find each of :

Sin C , tan A , cos A , cos C , tan C , sin A



[5] XYZ is a right-angled triangle at Z where XZ = 7 cm. and XY = 25 cm.

Find the value of each of the following :

1) tan X × tan Y 2) $\sin^2 X + \sin^2 Y$

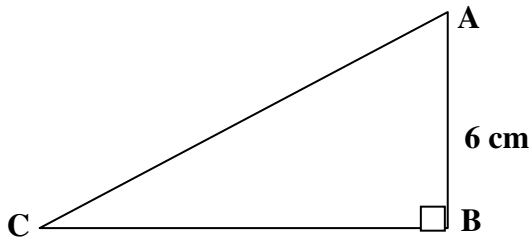
[6] XYZ is a right-angled triangle at Y , if YZ = 2 XY

Find the value of each of : tan Z , tan X , cos Z , cos X

[7] ABC is a right-angled triangle at B , if 2 AB = $\sqrt{3}$ AC

Find : the main trigonometrical of the angle C .

[8] In the opposite figure :



ABC is a right-angled triangle at B ,

AB = 6 cm , tan C = $\frac{3}{4}$, find :

1) The length of each of $\overline{BC}$ and $\overline{AC}$
2) Sin A + cos A

Sheet (2)

[1] Complete the following :

1) $\sin 45° =$ …….

2) $\cos 60° + \sin 30° =$ ……

3) $\sin 30° + \cos 60° - \tan 45° =$ ……..

4) $\sin 60° + \cos 30° + \tan 60° =$ …….

5) $\sin^2 45° + \cos^2 45° =$ ……

6) $\tan^2 60° + \cos 60° - \tan 45° =$ …….

7) $\tan 45° \times \sin 30° =$ …….

8) $4 \cos 30° \tan 60° =$ ……

[2] Without using the calculator , prove each of the following :

1) $\sin 60° = 2 \sin 30° \cos 30°$

2) $\cos 60° = 2 \cos^2 30° - 1$

3) $2 \cos^2 45° - 1 = 1 - 2 \sin^2 45°$

4) $\cos 60° = \cos^2 30° - \sin^2 30°$

5) $\tan 60° = \dfrac{2 \tan 30°}{1 - \tan^2 30°}$

[3] Choose the correct answer from those given :

1) If $\cos C = \frac{1}{2}$ where C is an acute angle , then : m ($\angle$C) = ……..

a) 30° b) 60° c) 45° d) 90°

2) If $\sin X = \frac{1}{2}$ where X is an acute angle , then : m ($\angle$X) = ……..

a) 30° b) 60° c) 45° d) 90°

3) If $\tan X = \frac{1}{\sqrt{3}}$ where X is an acute angle , then : $\tan 2X =$ ……

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

4) If X is the measure of an acute angle and $\sin X = \frac{1}{2}$, then : $\sin 2X =$ ……..

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

5) If 2 sin X = tan 60° where X is an acute angle , then : m ($\angle$X) = ……..

a) 30° b) 45° c) 60° d) 40°

6) If tan 2 X = $\frac{\sqrt{3}}{3}$ where 2 X is an acute angle , then : m ($\angle$X) = ……..

a) 15° b) 30° c) 60° d) 45°

7) If sin 2 X = $\frac{\sqrt{3}}{2}$, then : X = …… (where 2 X is an acute angle) .

a) 20° b) 30° c) 45° d) 60°

8) If cos $\frac{X}{2} = \frac{1}{2}$ where $\frac{X}{2}$ is an acute angle , then : m ($\angle$X) = ……..

a) 30° b) 45° c) 60° d) 120°

9) If cos (X + 10°) = $\frac{1}{2}$ where (X + 10°) is an acute angle , then X = …….

a) 30° b) 40° c) 50° d) 70°

10) If tan (X - 5°) = $\frac{1}{\sqrt{3}}$ where (X - 5°) is an acute angle , then : X = …….

a) 35° b)65° c) 60° d) 30°

11) If sin (X + 5°) = $\frac{1}{2}$ where (X + 5°) is the measure of an acute angle ,

then : tan (X + 20°) = …….

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

12) tan 75° = ……

a) $\frac{\cos 75°}{\text{Sin } 75°}$ b) $\frac{\sin 75°}{\cos 75°}$ c) 3 tan 25° d) 3 sin 25° cos 25°

[4] Find the value of X in each of the following :

1) tan X = 4 sin 30° cos 60° where X is an acute angle .

2) sin X = sin 60° cos 30° - cos 60° sin 30° where X is an acute angle .

3) 2 sin X = sin 30° cos 60° + cos 30° sin 60° where X is an acute angle .

[5] ABCD is trapezium in which : AD // BC and m ($\angle$ABC) = 90°

If AB = 12 cm , AD = 16 cm , and BC = 25 cm .

Find : 1) The length of DC 2) m ($\angle$C)

3) sin ($\angle$DCB) – tan ($\angle$ACB)

Sheet (3)

[1] Complete the following :

1) The distance between the two points (15 , 0) , (6 , 0) equals ……

2) The distance between the two points A (6 , 0) , B (0 , 8) = ……

3) The distance between the point (-3 , 4) and the point of origin = ……

4) If A (2 , -3) , B (-1 , 1) , then AB = ……..

5) If the distance between the two points (a , 0) , (0 , 1) is unit length , then a = ……

6) The radius length of the circle whose centre is (7 , 4) and passes through (3 , 1) equals ……

7) In the square ABCD if A (3 , 5) and B (4 , 2) , then the area of the square equals ……..area unit .

8) In the rhombus ABCD where A (-1 , 7) , B (-3 , 1) , then the perimeter of the rhombus equals ……..length unit .

[2] Prove that :

1) The points A (4 , 3) , B (1 , 1) and C (-5 , -3) are collinear .

2) Prove that the triangle with vertices of points : A (5 , -5) , B (-1 , 7) and C (145 , 15) is a right-angled triangle at B , then calculate its area .

3) The points A (0 , 1) , B (4 , 5) , C (1 , 8) and D (-3 , 4) are vertices of a rectangle and find its diagonal length .

4) ABCD is a quadrilateral where A (5 , 3) , B (6,-2) , C (1 ,-1) and D (0 , 4)
Prove that : ABCD is a rhombus , then find its area .

5) The points A (-2 , 5) , B (3 , 3) and C (-4 , 2) are non-collinear and if D (-9 , 4) ,
Prove that : The figure ABCD is a parallelogram .

6) ABCD is a quadrilateral where A (2 , 4) , B (-3 , 0) , C (-7 , 5) and D (-2 , 9)
Prove that : The figure ABCD is a square .

7) The points A (3 , -1) , B (-4 , 6) and C (2 , -2) lie on the same circle whose centre is M (-1 , 2) , then find the circumference of the circle where $\pi = 3.14$

[3] If the distance between the two points A (0 , K) and B (4 , 0) is 5 length units .
Find : The value of K .

[4] Find the value of a in each of the following cases :

1) If the distance between the two points (a , 7) , (-2 , 3) equals 5 length units .

2) If the distance between the two points (a , 7) , (3 a – 1 , - 5) equals 13 length units .

Sheet (4)

[1] Find the coordinates of the midpoint of AB in each of the following cases :

1) A (3 , 5) , B (7 , 1)

2) A (5 , -3) , B (-1 , 3)

3) A (-5 , 4) , B (5 , -4)

4) A (0 , 4) , B (8 , 0)

[2] If the point (X , 0) is the midpoint of the line segment whose ends are (1 , -5) and (2 , 5) , find the value of X

[3] If the point (5 , 3) is the midpoint of AB where its terminals are A (15 , y) and B (-5 , -2) , find the value of y .

[4] If the point (5 , 3) is the midpoint of $\overline{AB}$ where its terminals are A (15 , y) and B (-5 , -2) , find the value of y

[5] Find the value of each of X and y if the point (3 , -2) is the midpoint of the line segment drawn between the two points (X , 2) , (3 , y)

[6] Prove that the points A (3 , -2) , B (-5 , 0) , C (0 , -7) and D (8 , -9) are the vertices of a parallelogram .

[7] If the points A (3 , 2) , B (4 ,-3) , C (-1 , -2) and D (-2 , 3) are vertices of the rhombus . Find :

1) The coordinates of the point of intersection of the two diagonals .

2) The area of the rhombus ABCD .

[8] ABCD is a square whose vertices are A (0 , 5) , B (3 , 2) , C (0 , -1) and D (X , y) respectively .

Find the coordinates of the point D .

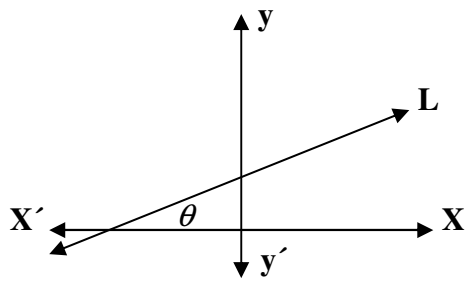
[9] Prove that : The points A (6 , 0) , B (2 , -4) , C (-4 , 2) are the vertices of a right-angled triangle at B , then find the coordinates of D that make the figure ABCD a rectangle .

Sheet (5)

[1] Complete the following :

1) In the opposite figure :

The slope of the straight line L equals ……..



2) The condition of parallelism of two straight lines whose slopes are m_1 , and m_2 is ……. While the condition of their perpendicularity is ……

3) The slope of the straight line parallel to X-axis = ……..

4) The slop of the straight line parallel to y-axis = ……..

5) The slope of the straight line which makes with the positive direction of X-axis a positive angle of measure 45° equals …….

6) If $\overleftrightarrow{AB}$ // $\overleftrightarrow{CD}$ and the slope of $\overleftrightarrow{AB} = \frac{2}{3}$, then : the slope of $\overleftrightarrow{CD}$ equals ……..

7) If $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ and the slope of AB = $\frac{1}{2}$, then the slope of $\overleftrightarrow{CD}$ equals …….

8) The slope of the straight line which is parallel to the straight line passing through the two points (2 , 3) and (-2 , 3) equals …….

9) If ABCD is a square whose diagonals $\overline{AC}$ and $\overline{BD}$ where A (3 , 5) and C (5 , -1) , then the slope of $\overleftrightarrow{BD}$ = …….

10) If the straight line AB is parallel to the X-axis where A (8 , 3) and B (2 , K) , then K = ……

11) If the straight line CD is parallel to the y-axis where C (M , 4) and D (-5 , 7) , then M = …….

[2] Prove that : The straight line which passes through the two points (4 , 2) and (5 , 6) is parallel to the straight line which passes through the two points (0 , 5) and (-1 , 1) .

[3] Prove that : The straight line passing through the two points A (-3 , 4) and C (-3 , -2) is perpendicular to the straight line passing through the two points B (1 , 2) and D (-3 , 2)

[4] Find the slope of the straight line which is perpendicular to the straight line which passes through the two points A (2 , -3) , B (3 , 5) .

[5] Prove that : The straight line passing through the two points (2 . -1) and (6 , 3) is parallel to the straight line that makes an angle of measure 45° with the positive direction of the X-axis .

[6] The triangle whose vertices are A (3 , -1) , B (X , 3) and C (5 , 3) is a right-angled triangle at A , find the value of X .

[7] If the straight line $\overleftrightarrow{AB}$ // the y-axis , where A (X , 7) and B (3 , 5) , then find the value of X .

[8] If the straight line $\overleftrightarrow{CD}$ // the X-axis where C (4 , 2) and D (-5 , y) , find the value of y

[9] If A (-1 , -1) , B (2 , 3) and C (6 , 0) , prove that triangle ABC is a right-angled triangle at B .

[10] Prove that : The point A (-1 , 1) , B (0 , 5) , C (4 , 2) and D (5 , 6) are the vertices of the parallelogram ABDC .

[11] Prove that : The point A (5 , 1) , B (1 , 5) , C (-1 , 3) and D (3 , -1) are vertices of the rectangle ABCD .

[12] Prove that : The point A (1 , 3) , B (6 , 4) , C (7 , 9) and D (2 , 8) are vertices of the rhombus ABCD .

[13] Prove that : The points A (-1 , -1) , B (2 , 3) , C (6 , 0) and D (3 , -4) are vertices of a square .

Sheet (6)

[1] Find the slope and the intercepted part of y-axis by each of the following straight lines :

1) $y = 5X - 3$

2) $2y + 3X = 8$

[2] Find the equation of the straight line if :

1) Its slope = 2 and intercepts from the positive part of y-axis 7 units .

2) Its slope = 1- and intercepts from the positive part of y-axis 3 units .

[3] Find the equation of the straight line if :

1) Which passes through the point and makes with the positive direction of X-axis a positive angle of measure 135° .

2) Which cuts a part of length 3 units from the negative part of y-axis and is parallel to the line whose equation : $2X - 3y = 6$.

3) Which is perpendicular to the straight line : $3X - 4y + 7 = 0$ and intercepts from the positive part of y-axis a part of length 6 units .

4) Which passes through the point (2 , -1) and its slope equals 2 .

5) Passing through the point (-2 , 3) and perpendicular to the straight line whose equation : $y = \frac{1}{2} X - 5$

6) Passing through the point (3 , -5) and it is parallel to the straight line : $X + 2y - 7 = 0$

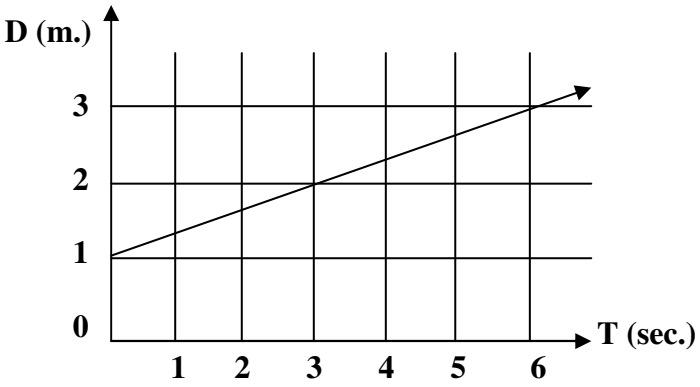
7) Which passes through the point (3 , 2) and parallel to the straight line passing through the two points (5 ,6) and (-1 , 2) .

8) Which passes through the two points (2 , -1) and (1 , 1)

9) The perpendicular to $\overline{AB}$ from its midpoint where A (1 , 3) and B (3 , 5) .

[4] In the opposite figure :

A particle moves with a constant speed (v) where the distance (d) is measured by meter and time (t) by second .

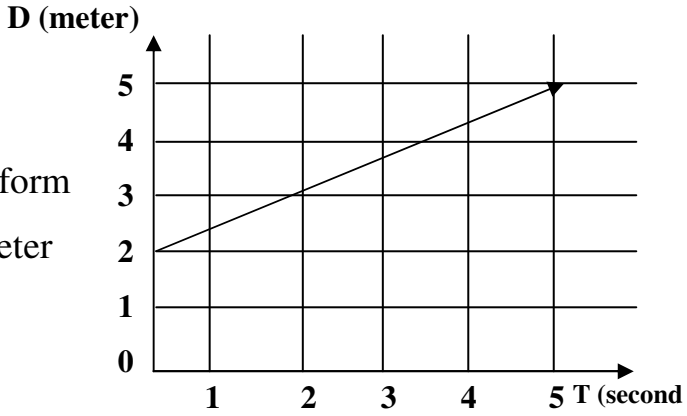


find the following :

1) The distance at the beginning of moving .
2) The velocity of the particle.
3) The equation of the straight line which represent the movement of the particle .
4) The time in which the particle covers a distance of 5 meters from the beginning of the movement .

[5] The opposite graph :

Represents the motion of a particle moving with uniform velocity (v) where the distance (d) is measured in meter and the time (t) in seconds .



Find :

1) The distance at the beginning of the motion .
2) The velocity of the particle .
3) The equation of the straight line representing the motion of the particle .
4) The covered distance after 4 seconds from the beginning of the motion .
5) The time in which the particle covers a distance of 3.5 meters from the beginning of the motion .