QB365 Question Bank Software Study Materials

Coordinate Geometry Important 2 Marks Questions With Answers (Book Back and Creative)

9th Standard

Maths

Total Marks : 60

2 Marks

30 x 2 = 60

1) In which quadrant does the following points lie?(2, 5)

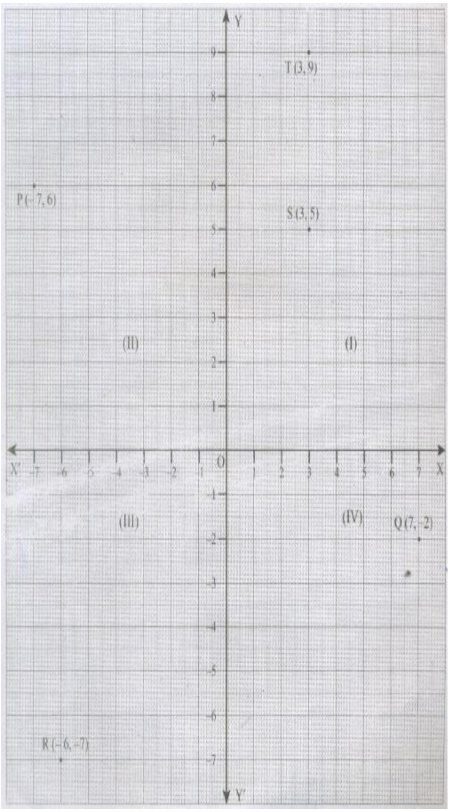
Answer : The x-coordinate is positive and y – coordinate is positive. So Point (2,5) lies in the I quadrant

2) In which quadrant does the following points lie?(–7, 3)

Answer : The x-coordinate is negative and y – coordinate is positive. So, Point(–7,3) lies in the II quadrant

3) Plot the following points in the coordinate system and identify the quadrants
P(–7, 6), Q(7, –2), R(–6, –7), S(3, 5) and T(3, 9)

Answer :



(i) P (-7, 6) lies in the II quadrant because the x-coordinate is negative and y-coordinate is positive

(ii) Q (7, -2) lies in the IV quadrant because the x-coordinate is positive and y-coordinate is negative

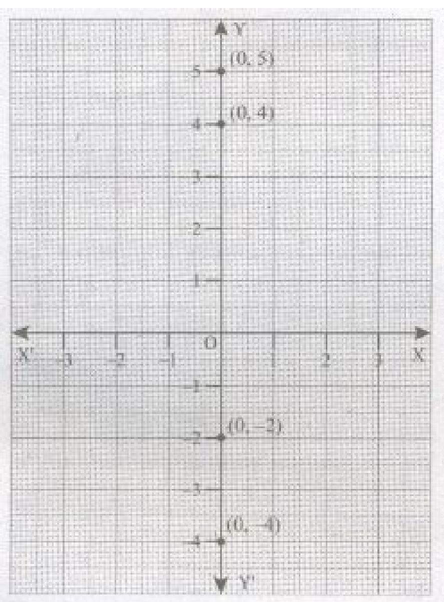
(iii) R (-6, -7) lies in the III quadrant because the x-coordinate is negative and y-coordinate is negative

(iv) S (3, 5) lies in the I quadrant because the x-coordinate is positive and y-coordinate is also positive

(v) T (3, 9) lies in the I quadrant because the x-coordinate is positive and y-coordinate is also positive

4) Plot the following points in the coordinate plane and join them. What is your conclusion about the resulting figure?
(0, –4) (0, –2) (0, 4) (0, 5)

Answer :

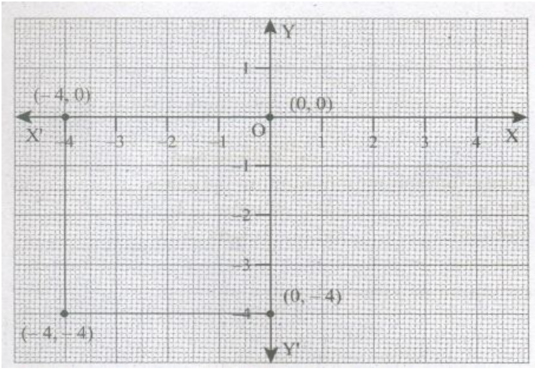


The line is on the y - axis

5) Plot the following points in the coordinate plane. Join them in order. What type of geometrical shape is formed?

(0, 0) (–4, 0) (–4, –4) (0, –4)

Answer :



The geometrical shape of the figure is square

6) Find the distance between the following pairs of points. (1, 2) and (4, 3)

Answer : Distance between the points (1, 2) and (4, 3)

= $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

= $\sqrt{(4-1)^2+(3-2)^2}=\sqrt{3^2+1^2}$

= $\sqrt{9+1}=\sqrt{10}$ = units

7) Find the distance between the following pairs of points. (3,4) and (– 7, 2)

Answer : Distance between the points (3,4) and (- 7, 2)

2	104
2	52
2	26
	13

= $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

= $\sqrt{(-7-3)^2+(2-4)^2}=\sqrt{(-10)^2+(-2)^2}$

= $\sqrt{100+4}=\sqrt{104}=\sqrt{2^2\times 2\times 13}$

= $2\sqrt{26}$ units

8) Find the distance between the following pairs of points.(a, b) and (c, b)

Answer : Distance between the two points (a, b) and (c, b)

= $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

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

= c - a units

9) Find the distance between the following pairs of points. (3,– 9) and (–2, 3)

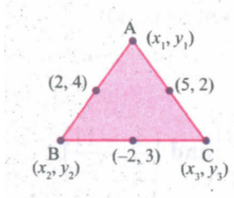
Answer : Distance between the two points (3,- 9) and (-2, 3)

= $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

= $\sqrt{(-2-3)^2+(3+9)^2}=\sqrt{(-5)^2+(12)^2}$

=$\sqrt{25+144}=\sqrt{169}$ = 13 units

10) The mid-point of the sides of a triangle are (2, 4), (−2, 3) and (5, 2). Find the coordinates of the vertices of the triangle.

Answer : 

Mid point

$$M(x,y) = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

Mid point AB(2, 4)= $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\frac{x_1+x_2}{2} = 2 \Rightarrow x_1 + x_2 = 4 \quad \ldots(1)$

$\frac{y_1+y_2}{2} = 4 \Rightarrow y_1 + y_2 \quad \ldots(2)$

Mid point of BC (-2, 3) = $\left(\frac{x_2+x_3}{2}, \frac{y_2+y_3}{2}\right)$

$\left(\frac{x_2+x_3}{2}\right) = -2 \Rightarrow x_2 + x_3 = -4 \quad \ldots(3)$

$\left(\frac{y_2+y_3}{2}\right) = 3 \Rightarrow y_2 + y_3 = 6 \quad \ldots(4)$

Mid point of AC (5, 2) = $\left(\frac{x_1+x_3}{2}, \frac{y_1+y_3}{2}\right)$

$\left(\frac{x_1+x_3}{2}\right) = 3 \Rightarrow x_1 + x_3 = 10 \quad \ldots(5)$

$\frac{y_1+y_3}{2} = 3 \Rightarrow y_1 + y_3 = 4 \quad \ldots(6)$

$(1) - (3) \Rightarrow x_1 + x_2 = 4$

$x_3 + x_2 = -4$

$x_1 - x_3 = 8$

$(5) \Rightarrow x_1 + x_3 = 10$

$x_1 - x_3 = 8$

$2x_1 = 18$

$x_1 = 9$

Substitue x_1 = 9 in (5)

9 + X_3 = 10

X_3 = 1

Substitue X_1 = 1 in(3)

$x_2 + 1 = -4 \Rightarrow x_2 = -5$

similarly $(2) - (4) \Rightarrow y_1 + y_2 = 8$

$y_3 + y_2 = 6$

$y_1 - y_3 = 2$

$(6) \Rightarrow y_1 + y_3 = 4$

$2y_1 = 6$

$y_1 = 3$

substitute y_1 = 3 in (6)

$3 + y_3 = 4$

$y_3 = 1$

substitute y_3 = 1 in (4)

$1 + y_2 = 6$

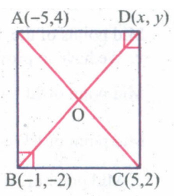
$y_3 = 5$

∴ The vertices of the triangle A(x_1 y_1) = (9, 3)

B (x_2 y_2) = (-5, 5)

C($x_3 y_3$) = (1, 1)

11) The points A(−5, 4) , B(−1, −2) and C(5,2) are the vertices of an isosceles rightangled triangle where the right angle is at B. Find the coordinates of D so that ABCD is a square.

Answer : 

In squares the diagonals are equal and bisect each other

∴ Mid point of BD = Mid point of AC

$$\left(\frac{-1+x}{2}, \frac{-2+y}{2}\right) = \left(\frac{-5+5}{2}, \frac{4+2}{2}\right)$$

$\frac{-1+x}{2} = \frac{0}{2} \quad \frac{-2+y}{2} = \frac{6}{2}$

-1 + x = -2 + y = 6

x =1 y = 8

∴ The vertex D(x, y) = (1, 8)

12) The points A(−3, 6), B(0, 7) and C(1, 9) are the mid-points of the sides DE, EF and FD of a triangle DEF. Show that the quadrilateral ABCD is a parallellogram.

Answer : In a parallelogram diagonals bisect each other and diagonals are not equal.

Mid point of DE $= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

(-3, 6)$= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$\frac{x_1+x_2}{2} = -3 \quad \frac{y_1+y_2}{2} = 6$

$x_1 + x_2$ = -6........(1)

$y_1 + y_2$ = 12.......(2)

Mid point of EF$\left(\frac{x_2+x_3}{2}, \frac{y_2+y_3}{2}\right)$

(0, 7)=$\left(\frac{x_2+x_3}{2}, \frac{y_2+y_3}{2}\right)$

$\frac{x_2+x_3}{2} = 0 \quad \frac{y_2+y_3}{2} = 7$

x_2+x_3= 0.............(3)

Mid point of FD=$\left(\frac{x_3+x_1}{2}, \frac{y_3+y_1}{2}\right) = (-3, -2)$

$x_3 + x_1$ = -6.......(5)

$y_3 + y_1$ = -4..........(6)

$(1)-(3) \Rightarrow x_1 + x_2 = -6$
$\quad x_3 + x_2 = 0$
$\quad x_1 - x_3 = -6$
$(5) \Rightarrow x_1 + x_3 = -6$
$\quad 2x_1 = -12$
$\quad x_1 = -6$

$(2)-(4) \Rightarrow y_1 + y_2 = 12$
$\quad y_3 + y_2 = 14$
$\quad y_1 - y_3 = -2$
$(6) \Rightarrow y_1 + y_3 = -4$
$\quad 2y_1 = -6$
$\quad y_1 = -3$

∴ D (x_1, y_1) = (-6, -3)

Mid points of the diagonals are equal in parallelogram

∴ We have to prove this

Mid point of AC $= \left(\frac{(-3)+(-3)}{2}, \frac{6+(-2)}{2}\right) = \left(\frac{-6}{2}, \frac{4}{2}\right) = (-3, 2)$

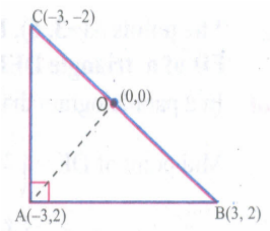
Mid Point of BD $= \left(\frac{-6+0}{2}, \frac{-3+7}{2}\right) = \left(\frac{-6}{2}, \frac{4}{2}\right) = (-3, 2)$

∴ Mid point of AC = Mid point of BD

∴ ABCD is a parallelogram

13) A(−3,2), B(3,2) and C(−3,−2) are the vertices of the right triangle, right angled at A. Show that the mid-point of the hypotenuse is equidistant from the vertices.

Answer :



$= \left(\frac{2+(-3)}{2}, \frac{2+(-2)}{2}\right)$

$= \left(\frac{0}{2}, \frac{0}{2}\right) = (0, 0)$

Distance between two points

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$\bar{OA} = \sqrt{(-3-0)^2 + (2-0)^2}$

$= \sqrt{(-3)^2 + 2^2} = \sqrt{9+4} = \sqrt{13}$

$\bar{OB} = \sqrt{(-3-0)^2 + (2-0)^2} = \sqrt{9+4} = \sqrt{13}$

$\bar{OC} = \sqrt{(-3-0)^2 + (-2-0)^2} = \sqrt{9+4} = \sqrt{13}$

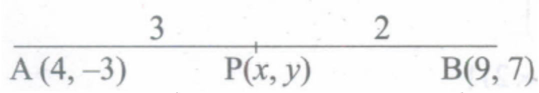
$\therefore \overline{OA} = \overline{OB} = \overline{OC}$ Hence Proved

14) Find the coordinates of the point which divides the line segment joining the points A(4,−3) and B(9,7) in the ratio 3:2.

Answer : x_1 y_1 x_2 y_2 m : n

A (4, -3), B (9, 7), 3 : 2

By section formula $P\left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right) = P(x, y)$



$P(x, y) = \left(\frac{3(9)+2(4)}{3+2}, \frac{3(7)+2(-3)}{3+2}\right)$

$= \left(\frac{27+8}{5}, \frac{21-6}{5}\right) = \left(\frac{35}{5}, \frac{15}{5}\right) = (7, 3)$

15) In what ratio does the point P(2, −5) divide the line segment joining A(−3, 5) and B(4, −9) .

Answer : x_1 y_1 x_2 y_2

A(-3, 5) B(4, -9) P(2, -5)

$$= P(x, y)\left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$$

$$P(2, -5) = \left(\frac{m\times 4+n(-5)}{m+n}, \frac{m\times(-9)+n(5)}{m+n}\right)$$

$$\left(\frac{4m-3n}{m+n}\right) = 2$$

4m -3n = 2m+ 2n

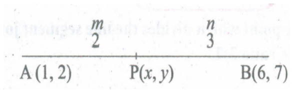
4m -2m = 2n + 3n

2m = 5n

$$\frac{m}{n} = \frac{5}{2}$$

∴ The ratio m : n = 5 : 2

16) Find the coordinates of a point P on the line segment joining A(1, 2) and B(6, 7) in such a way that AP = $\frac{2}{5}$AB

Answer : 

x_1 y_1 x_2 y_2

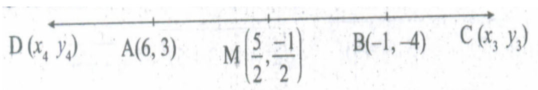
A(1, 2) B (6, 7)

$$= P(x, y)\left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$$

$$= \left(\frac{2\times 6+3\times 1}{2+3}, \frac{2\times 7+3\times 2)}{2+3}\right)$$

$$= \left(\frac{12-3}{5}, \frac{14+6}{5}\right) = \left(\frac{15}{5}, \frac{20}{5}\right) = (3, 4)$$

17) The line segment joining A(6, 3) and B(−1, −4) is doubled in length by adding half of AB to each end. Find the coordinates of the new end points.

Answer : 

$\bar{A}B = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2} = \sqrt{(-1-6)^2+(-4-3)^2}$

$= \sqrt{(-7)^2+(-7)^2} = \sqrt{49+49} = \sqrt{(49)2}$

$\frac{1}{2}AB = \frac{7\sqrt{2}}{2} = \frac{7\sqrt{2}}{\sqrt{2}\times\sqrt{2}} = \frac{7}{\sqrt{2}}$

$AB = \left(\frac{6+(-1)}{2}, \frac{3+(-4)}{2}\right) = \left(\frac{5}{2}, \frac{-1}{2}\right)$

Mid point of $AB = \left(\frac{6+(-1)}{2}, \frac{3+(-4)}{2}\right) = \left(\frac{5}{2}, \frac{-1}{2}\right)$

SinceC is at the distance $\frac{1}{2}$ AB from B

Midpoint of MC = B

$\left(\frac{\frac{5}{2}+x_3}{2}, \frac{\frac{-1}{2}+y_3}{2}\right) = (-1,-4)$

$\left(\frac{\frac{5}{2}+x_3}{2}\right) = -1$

$\frac{5}{2}+x_3 = -2$

$x_3 = -2-\frac{5}{2}$

$= \frac{-4-5}{2}$

$= \frac{-9}{2}$

$\therefore C(x_3, y_3) = \left(\frac{-9}{2}, \frac{-15}{2}\right)$

$\left(\frac{-\frac{1}{2}+y_3}{2}\right) = -4$

$|-\frac{1}{2}+y_3 = -8$

$y_3 = -8+\frac{1}{2}$

$= \frac{-16+1}{2}$

$= \frac{-15}{2}$

Similarly by Mid point of DM = A(6, 3)

$\left(\frac{x_4+\frac{5}{2}}{2}, \frac{y_4+\left(\frac{-1}{2}\right)}{2}\right) = (6,3)$

$\frac{x_4+\frac{5}{2}}{2} = 6$

$x_4+\frac{5}{2} = 12$

$x_4 = 12-\frac{5}{2} = \frac{24-5}{2} = \frac{19}{2}$

$\frac{y_4+\left(\frac{-1}{2}\right)}{2} = 3$

$y_4+\left(\frac{-1}{2}\right) = 6$

$y_4 = 6+\frac{1}{2} = \frac{12+102}{2} = \frac{13}{2}$

$\therefore$ The other end D (x_4, y_4)$= \left(\frac{19}{2}, \frac{13}{2}\right)$

18) Find the centroid of the triangle whose vertices are

(i) (2, −4), (−3, −7) and (7, 2)

(ii) (−5, −5), (1, −4) and (−4, −2)

Answer : x_1 y_1 x_2 y_2 x_3y_3

(2, -4) (-3, -7) (7, 2)

(i) Centroid G (x, y) $= \left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

$= \left(\frac{(2)+(-3)+7}{3}, \frac{(-4)+(-7)+(2)}{3}\right)$

$= \left(\frac{6}{3}, \frac{-9}{3}\right) = (2,-3)$

(ii) x_1 y_1 x_2 y_2 x_3y_3

(2, -4) (1, -4) (-4, -2)

Centroid G (x, y) $= \left(\frac{(-5)+1+(-4)}{3}, \frac{(-5)+(-4)+(-2)}{3}\right)$

$= \left(\frac{-8}{3}, \frac{-11}{3}\right)$

19) If the centroid of a triangle is at (4, −2) and two of its vertices are (3, −2) and (5, 2) then find the third vertex of the triangle.

Answer : Centroid G (x,y) = (4, -2)

two vertices (x_1, y_1) = (3, -2)

(x_2, y_2) = (5, 2), (x_3, y_3) =?

$$(4,-2) = \left(\frac{3+5+x_3}{3}, \frac{-2+2+y_3}{3}\right)$$

$$(4,-2) = \left(\frac{8+x_3}{3}, \frac{y_3}{3}\right)$$

$\frac{8+x_3}{3} = 4$ $\frac{y_3}{3} = -2$

8 + x_3 = 12 y_3 = -6

x_3 = 4

∴ The third vertex (x_3, y_3) = (4, -6)

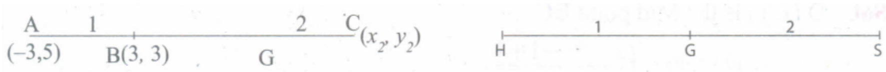
20) Orthocentre and centroid of a triangle are A(−3, 5) and B(3,3) respectively. If C is the circumcentre and AC is the diameter of this cicle, then find the radius of the circle.

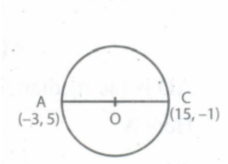
Answer : H = A (-3, 5)

G = B (3, 3)

S = Circumcentre (C)

G divides Hand S in the ratio 2 :1





m : n = 1 : 2

$A(x_2, y_1)$ = (-3, 5)

$C(x_2, y_2) = (x_2, y_2)$

P (x, y) = (3, 3)

$\therefore\ P(x,y) = \left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$

$(3,3) = \left(\frac{1x^2+2(3)}{2+1}, \frac{1(y_2)+2(5)}{2+1}\right)$

$(3,3) = \left(\frac{x_2-6}{3}, \frac{y_2+10}{3}\right)$

$\frac{x_2-6}{3} = 3$

x_2 - 6 = 9

x_2 = 9 + 6

x = 15

$\frac{y_2+10}{3} = 3$

y_2+10 = 9

y_2 = 9-10

y_2 = -1

$\bar{AC} = \sqrt{(5-(-3))^2 + (-1-5)^2}$

$= \sqrt{8^2 + (-6)^2} = \sqrt{324+36}$

$= \sqrt{360} = \sqrt{36 \times 10} = 6\sqrt{10}$

radius = $\frac{1}{2}$AC

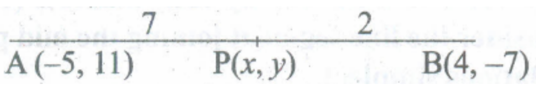
$= \frac{1}{2} \times 6\sqrt{10} = 3\sqrt{10}$units.

Radius $= \frac{3}{2}\sqrt{10}$ or $3\sqrt{\frac{10}{4}}$

$= 3\sqrt{\frac{5}{2}}$ units

∵ AC is a diametre of circle

21) Find the coordinates of the point which divides the line segment joining A(−5,11) and B(4,−7) in the ratio 7:2.

Answer : 

x_1 y_1

Here (-5,11)

x_2 y_2

(4,-7)

m n

7 : 2

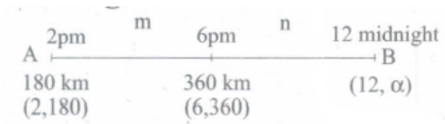
$= P(x,y)\left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$

$= \left(\frac{7\times4+2\times-5}{7+2}, \frac{7\times-7+2\times11)}{7+2}\right)$

$= \left(\frac{28-10}{9}, \frac{-49+22}{9}\right)$

$= \left(\frac{18}{9}, \frac{-27}{9}\right) = (2,-3)$

22) A car travels at an uniform speed. At 2 pm it is at a distance of 180 km and at 6pm it is at 360 km. Using section formula, find at what distance it will reach 12 midnight.

Answer : 

Dividing point $(x,y) = \left(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n}\right)$

$(6,360) = \left(\frac{m\times12+n\times2}{m+n}, \frac{m\alpha+n\times180}{m+n}\right)$

$\Rightarrow \frac{12m+2n}{m+n} = 6$

12m + 2n = 6m + 6n

12m - 6m = 6n -2n

6m=4n

$\frac{m}{n} = \frac{4}{6}\ \frac{2}{3}$

m=$\frac{2}{3}$n ...(1)

$\Rightarrow \frac{m\alpha+180n}{m+n} = 360$ ...(2)

$\Rightarrow \frac{\frac{2}{3}n\alpha+180n}{\frac{2}{3}n+n} = 360$

$\Rightarrow \frac{\left(\frac{2}{3}\alpha+180\right)n}{\left(\frac{2}{3}+1\right)n} = 360$

$\Rightarrow \frac{2}{3}\alpha+180 = 360\times\frac{2}{3}+360$ (120 120)

$\Rightarrow \frac{2}{3}\alpha = 240+360-180$

$\frac{2}{3}\alpha = 600-180$

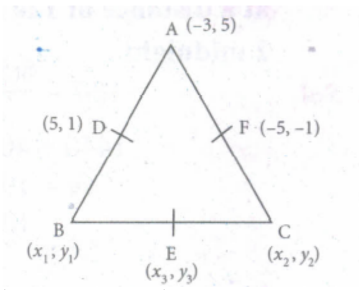
$\frac{2}{3}\alpha = 420$

$\alpha = 420\times\frac{3}{2}$ (210) $\alpha = 420\times\frac{3}{2}$ (210)

α=630

∴The car will reach 630km at 12midnight

23) A, B and C are vertices of ΔABC. D, E and F are mid points of sides AB, BC and AC respectively. If the coordinates of A, D and F are (-3, 5), (5, 1) and (-5, -1) respectively. Find the coordinates of B, C and E.

Answer : 

$(5,1)=\left(\frac{x_1-3}{2},\frac{y_1+5}{2}\right)$

$\frac{x_1-3}{2}=5,\quad \frac{y_1+5}{2}$

x_1- 3 = 10, y_1+ 5 = 2

x_1 = 13, y_1 = -3

B(13, -3)

$(-5,-1)=\left(\frac{-3+x_2}{2},\frac{5+y_2}{2}\right)$

$\frac{-3+x_2}{2}-5,$

-3 + x_2 = - 10

X_2 = -7,

C (-7, -7)

$\frac{5+y_2}{2}=-1$

5+ y_2 = -2

y_2 = -7

$(x_3,y_3)=\left(\frac{13+(-7)}{2},\frac{-3+(-7)}{2}\right)=(3,-5)$

24) If A (10, 11) and B (2 ,3) are the coordinates of end points of diameter of circle. Then find the centre of the circle.

Answer : Centre of the circle $=\left(\frac{10+2}{2},\frac{11+3}{2}\right)=(6,7)$

25) Using section formula, show that the points A (7, -5), B (9, -3) and C (13, 1), are collinear.

Answer : $(9,-3)=\left(\frac{m(12+n(7)}{m+n},\frac{m(1)+n(-5)}{m+n}\right)$

$\frac{13m+37n}{m+n}=9$

13m + 7n = 9m + 9n

4m = 2n

$\frac{m}{n}=\frac{2}{4}=\frac{1}{2}$

$\frac{m-5n}{m+nn}=-3$

m -5n = -3m -3n

m + 3m= 5n-3n

4m=2n

$\frac{m}{n}=\frac{2}{4}=\frac{1}{2}$

26) A car travels, at an uniform speed. At 2 pm it is at a distance of 5 km at 6 pm it is at a distance of 120 km. Using section formula, find at what distance it will reach 2 midnight.

Answer : $120=\frac{8(50)+4(y)}{12}$

1440 = 400 + 4y

4y = 1040

$y=\frac{1040}{4}=260\ km$

27) Find the centroid of the triangle whose vertices are (2, -5), (5, 11) and (9, 9)

Answer : $G\left(\frac{x_1+x_2+x_3}{3},\frac{y_1+y_2+y_3}{3}\right)=\left(\frac{2+5+9}{3},\frac{-5+11+9}{9}\right)=\left(\frac{16}{3},5\right)$

28) Find the distance between the points (-4, 0) and (3, 0).

Answer : The points (-4, 0),(3, 0) lie on the x axis

Hence $\mathrm{d}=|x_1-x_2|=(3-(-4)|=|3+4|=7$

$\mathrm{d}=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$=\sqrt{(3+4)^2+0^2}=\sqrt{49}=7$

29) The radius of a circle with centre at the origin is 10 units. Write the coordinates of the points where the circle intersects the axes. Find the distance between any to such points.

Answer : Given C(0, 0), r =10 units

It is clearly that P (0, 0). Q (0, 10)

$\therefore \mathrm{d}=\sqrt{(0-10)^2 t+(10-0)^2}$

$=\sqrt{(100)+100}=\sqrt{200}=10 \sqrt{2}$ units

30) Find the centroid of the triangle whose vertices are A (4, -6), B (3, - 2), C (5, 2).

Answer : The centroid G (x, y) of a triangle whose vertices are

$\left(x_1, y_1\right),\left(x_2, y_2\right),\left(x_3, y_3\right)$ is given by

$\mathrm{G}(x, \mathrm{y})=\mathrm{G}\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

$\left(x_1 \mathrm{y}_1\right)=(4,-6) ;\left(x_2 \mathrm{y}_2\right)=(3,-2) ;\left(x_3 \mathrm{y}_3\right)=(5,2)$

The centroid of the tirangle whose vertices are

(4, -6), (3, - 2), (3, 2)

$G(x, y)=G\left(\frac{4+3+5}{3}, \frac{-6-2+2}{3}\right)$

= G(4, -2)