1. (c) $2=\sqrt{(x-3)^2+(2-4)^2} \Rightarrow 2=\sqrt{(x-3)^2+4}$
Squaring both sides
$4=(x-3)^2+4 \Rightarrow x-3=0 \Rightarrow x=3$

2. (c) Let $A(3,4)$ and $B(5,12)$ be the given points.
Let $C(x,y)$ be the mid-point of AB. Using mid-point formula, we have, $x=\frac{3+5}{2}=4$ and $y=\frac{4+12}{2}=8$
$\therefore$ $C(4, 8)$ are the co-ordinates of the mid-point of the line segment joining two points (3, 4) and (5, 12).

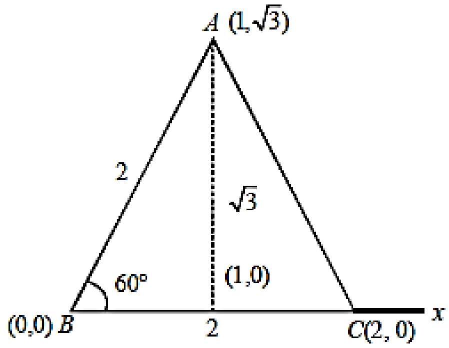
3. (b) **4.** (b)

5. (b) Ratio $=-\left(\frac{-1+1-4}{5+7-4}\right)=\frac{1}{2}$

6. (d) Mid point of A (3, 5) and C (7, 10) $= M\left(5,\frac{15}{2}\right)$
$\therefore$ Mid points of $BD = M\left(5,\frac{15}{2}\right)$
$B(-5,-4)$ and $D(x,y)$
$\therefore$ $\frac{-5+x}{2}=5$, $x=10+5=15$
$\frac{-4+y}{2}=\frac{15}{2}$, $y=15+4=19$
Co-ordinates of fourth vertex $D=(15, 19)$

7. (b) $x=\frac{2+5+3}{3}=\frac{10}{3}$ and $y=\frac{1+2+4}{3}=\frac{7}{3}$

8. (d) Clearly, the triangle is equilateral.



So, the incentre is the same as the centroid.
$\therefore$ Incentre $=\left(\frac{1+0+2}{3},\frac{\sqrt{3}+0+0}{3}\right)=\left(1,\frac{1}{\sqrt{3}}\right)$

9. (a) Centroid $=\left(\frac{3+7-2}{3},\frac{10+7+1}{3}\right)=\left(\frac{8}{3},6\right)$

10. (c) Let G be (X, Y), then $X=\{3+5+(-3)\}/3=5/3$
$Y=(7+5+2)/3=14/3 \Rightarrow G$ is $(5/3, 14/3)$

11. (b) Let the ratio be 4 : 3 or 4/3 : 1.
Now $X=\frac{\frac{4}{3}\times 2-5}{\frac{4}{3}-1}=\frac{\frac{8}{3}-5}{\frac{1}{3}}=\frac{-\frac{7}{3}}{\frac{1}{3}}=-7$
$Y=\frac{\frac{4}{3}x-3+5}{\frac{4}{3}-1}=\frac{1}{\frac{1}{3}}=3$. Hence $(-7, 3)$

12. (b)

13. (a) Mid-point of AC is $\left(\frac{1+x}{2},\frac{2+6}{2}\right)$ *i.e.,* $\left(\frac{1+x}{2},4\right)$;
Mid-point of BD is $\left(\frac{4+3}{2},\frac{y+5}{2}\right)$
Since for a || gm, diagonals bisect each other
$\therefore$ $\frac{1+x}{2}=\frac{7}{2}$ and $\frac{y+5}{2}=4 \Rightarrow x=6,\ y=3$

14. (d) **15.** (c) **16.** (d) **17.** (b) **18.** (a)
19. (c) **20.** (d) **21.** (c) **22.** (a) **23.** (c)

24. (c) Let the required ratio be $k:1$
Then, $2=\frac{6k-4\times 1}{k+1} \Rightarrow k=\frac{3}{2}$
$\therefore$ The required ratio is $\frac{3}{2}::1 \Rightarrow 3:2$
Also, $y=\frac{3\times 3+2\times 3}{3+2}=3$

25. (d) **26.** (d) **27.** (c)

28. (c) The equilateral Δ has its sides equal.
Hence the distance between the vertices should be equal.
$a=\sqrt{2^2+2^2}=\sqrt{(\sqrt{3}+1)^2+k(k-1)^2} \Rightarrow k=\sqrt{3}$

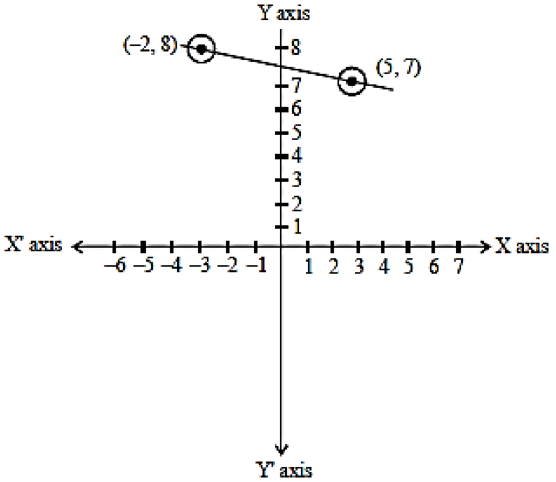
29. (a) Find the three lengths separately
$AB=6,\ BC=\sqrt{3^2+(3\sqrt{3})^2}=6$,
$AC=\sqrt{3^2+(3\sqrt{3})^2}=6$
Hence, the point are the vertices of equilateral triangle.

30. (c) $-\frac{3(1)+4(2)-7}{3(-2)+4(1)-7}=-\frac{4}{-9}=\frac{4}{9}$

31. (a) Let the vertices of the ΔABC be $A(-3,0)$, $B(3,0)$ and $C(0,k)$.
Given, area is 9
$\Rightarrow$ $9=\frac{1}{2}\{-3(-k)+1(3k)\}$
$\Rightarrow$ $18=3k+3k$
$\Rightarrow$ $k=\frac{18}{6}=3$

32. (c) Let $P(x,y)$ be the point of division that divides the line joining $(3,-5)$ and $(-4, 7)$ in the ratio of $k:1$
Now, $y=\frac{7k-5}{k+1}$ .... (i)
Since, P lies on $y=0$ or x-axis then, from eq. (i)
$0=\frac{7k-5}{k+1} \Rightarrow 7k=5 \Rightarrow k=\frac{5}{7}$

33. (c)



As indicated in the graph, the line passing through the points cuts Y-axis only.

Part-II

1. (a) **2.** (c) **3.** (d)

4. (a) $\frac{X_1+X_2}{2}=2$, $\frac{X_2+X_3}{2}=-1$, $\frac{X_3+X_1}{2}=4$

$\Rightarrow\ X_1=7,\ X_2=-3,\ X_3=1$

Similarly, y_1, y_2, y_3 can be found

5. (b) Let the point be (X, X), so according to the condition

$(X-1)^2+(X-0)^2=(X-0)^2+(X-3)^2$

$\Rightarrow\ 2X+1=-6X+9 \Rightarrow X=2$

Hence the point is (2, 2)

6. (c) $\frac{2\times 5+1(a)}{2+1}=4 \Rightarrow a=2$

and $\frac{2\times 7+1(b)}{2+1}=6 \Rightarrow b=4$

7. (b) The point of intersection will be obtained by simultaneously solving the two equations and then by the distance formula, distance can be found.

8. (d) Take points P one by one and see which one (0, – 1) satisfies.

9. (c) By the given condition $\frac{7+q+9}{3}=6$

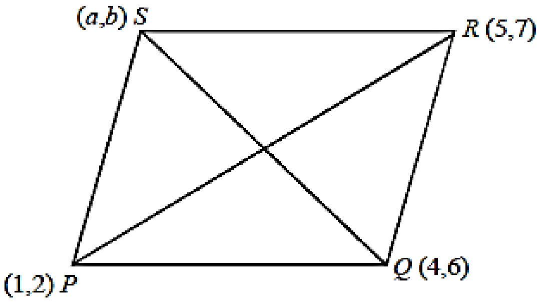
and $\frac{p-6+10}{3}=3$

$\Rightarrow\ q=2$ and $p=5 \quad \therefore p+q=5+2=7$

10. (c) Let fourth vertex be (x, y), then $\frac{x+8}{2}=\frac{2+5}{2}$

and $\frac{y+4}{2}=\frac{-2+7}{2} \Rightarrow x=-1,\ y=1$

11. (c) Diagonals cut each other at middle points.



Hence, $\frac{a+4}{2}=\frac{1+5}{2} \Rightarrow a=2$

$\frac{b+6}{2}=\frac{2+7}{2} \Rightarrow b=3$

12. (c) **13.** (c) **14.** (c)

15. (c) Let the point be $P(2X, X)$. The choices we are left with are (1, 2) and (2, 4).

$AP=\sqrt{(3-2X)^2+(1-X)^2}$,

$BP=\sqrt{(5-2X)^2+(3-X)^2}$

$AP=BP$. (only (4, 2) satisfies)

16. (d) We have the mid-point of diagonal = (1, – 1) which should be the mid point of the other two points as well and which is not satisfied by any given alternative.

17. (b) By using distance formula,

We have,

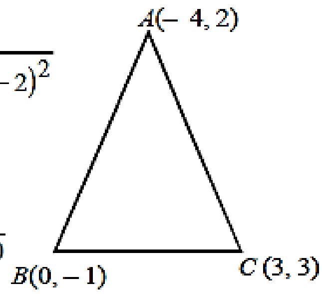
$AB=\sqrt{(0+4)^2+(-1-2)^2}$

$=\sqrt{16+9}=5$

$BC=\sqrt{9+16}=5$

$CA=\sqrt{49+(1)^2}=\sqrt{50}$

$=5\sqrt{2}$



Hence, required perimeter $=AB+BC+CA$

$=10+5\sqrt{2}$

18. (c) $x=4$ ...(1)

$y=3$ ...(2)

$3x+4y=12$ ...(3)

Putting $x=0$ in 3rd equation we get $y=3$

Putting $y=0$ in 3rd equation we get $x=4$

The triangle will be formed by joining the points (3, 0) and (0, 4).

So, base = 3 and altitude = 4

Area $=\frac{1}{2}\times b\times h \Rightarrow \frac{1}{2}\times 3\times 4=6$

19. (b) Putting $x=0$ in $4x+3y=12$ we get $y=4$

Putting $y=0$ in $4x+3y=12$ we get $x=3$

The triangle so formed is right angle triangle with points (0, 0) (4, 0) (0, 3)

So diameter is the hypotenus of triangle $=\sqrt{16+9}$

$=5$ unit

radius $=2.5$ unit

20. (a)

Area of ΔABC

$=\frac{1}{2}\times BC\times AC$

$=\frac{1}{2}\times(10-5)\times 4$

$=\frac{1}{2}\times 5\times 4$

Area = 10 sq unit.