Answer & Solutions

Level-I

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)**

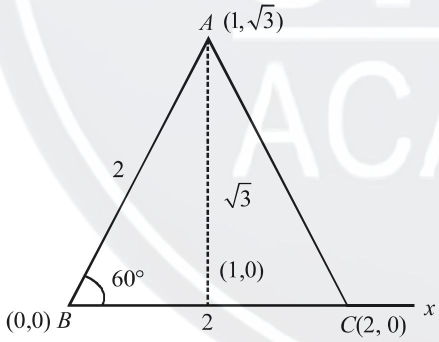
5. **(b)** Ratio $=-\left(\frac{-1+1-4}{5+7-4}\right)=\frac{1}{2}$

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 $D(x, y)$
$\therefore \frac{-5+x}{2}=5, \quad x=10+5=15$
$\frac{-4+y}{2}=\frac{15}{2}, \; y=15+4=19$
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 $X=\frac{\frac{4}{3}\times 2-5}{\frac{4}{3}-1}=\frac{\frac{8}{3}-5}{\frac{1}{3}}=\frac{-\frac{7}{3}}{\frac{1}{3}}=-7$

$Y=\frac{\frac{4}{3}x-3+5}{\frac{4}{3}-1}=\frac{\frac{1}{3}}{\frac{1}{3}}=3$. 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

$\Rightarrow \quad 9=\frac{1}{2}\{-3(-k)+1(3k)\}$

$\Rightarrow \quad 18=3k+3k$

$\Rightarrow \quad k=\frac{18}{6}=3$

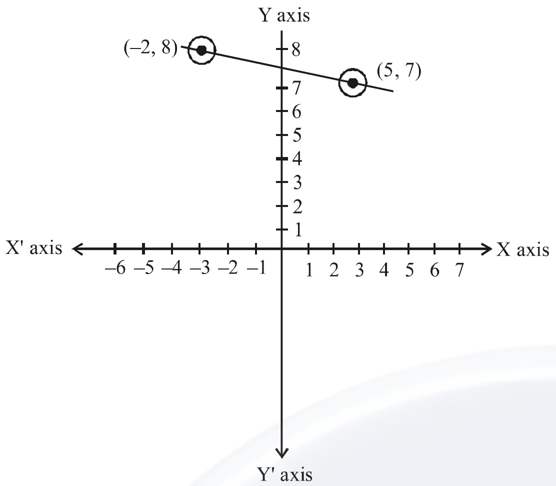
32. **(c)** Let $P(x, y)$ be the point of division that divides the line joining (3, –5) and (– 4, 7) in the ratio of $k:1$

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.