Self Assessment Model paper -2 (2025-26)

Class: X

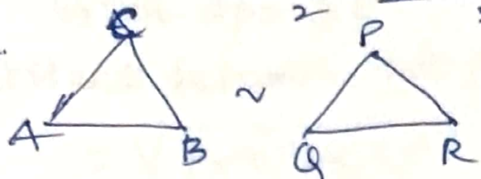
Key

Marks: 35

I

1. $S_n = \frac{n(n+1)}{2}$ [A]

$S_{100} = \frac{100(100+1)}{2} = \frac{100 \times 101}{2} = 5050$

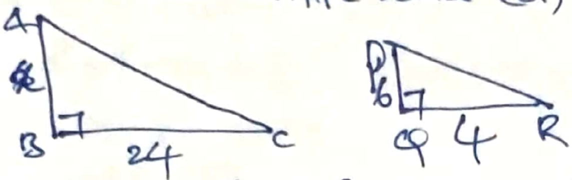
2.  [C]

$\frac{AB}{QR} = \frac{BC}{PR} = \frac{CA}{PQ}$

$\therefore \Delta PQR \sim \Delta CAB$

3. Common difference (d) $= a_2 - a_1 = 7 - 4 = 3$ [A]

Common difference (d) $= a_n - a_{n-1}$

4.  [B]

$\frac{x}{24} = \frac{6}{4} \Rightarrow 4x = 24 \times 6$

$x = \frac{24 \times 6}{4}$

$x = 36\,m$

5. $a = 7$, $a_4 = 19$

$a + 3d = 19$

$7 + 3d = 19$

$3d = 19 - 7$

$3d = 12$

$\boxed{d = 4}$

AP: $a_1, a_2, a_3, a_4 \ldots$

$a, a+d, a+2d, a+3d$

$7, 11, 15, 19 \ldots$

$\therefore$ AP: $7, 11, 15, 19 \ldots$

6. $\angle A = \angle P$, $\angle B = \angle Q$, $\angle C = \angle R$ [C]

$30^\circ = \angle P$, $\angle B = 90^\circ$, $60^\circ = \angle R$

$\angle A + \angle B + \angle C = 180^\circ$

$30^\circ + 90^\circ + \angle C = 180^\circ$

$120^\circ + \angle C = 180^\circ$

$\angle C = 60^\circ$

$\therefore \angle B + \angle R = 90^\circ + 60^\circ = 150^\circ$

7. $\frac{AD}{DB} = \frac{AE}{EC} \Rightarrow \frac{1.5}{3} = \frac{1}{EC} \Rightarrow 1.5\,EC = 3,\ EC = \frac{3}{1.5}$

$\therefore EC = 2$

[C]

II ⑧ Given points $A(2,-5)$ and $B(-2,9)$
$x_1\ y_1$

Let the point on the x-axis be $P(x,0)$
$x_2\ y_2$

Given $AP = BP$

Distance between two points $A(x_1,y_1)$ and $B(x_2,y_2)$

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

$$AP^2 = BP^2$$

$$\Rightarrow \left(\sqrt{(x-2)^2+(0-(-5))^2}\right)^2 = \left(\sqrt{(x-(-2))^2+(0-9)^2}\right)^2$$

$$\Rightarrow (x-2)^2+(0+5)^2 = (x+2)^2+(-9)^2$$

$$\Rightarrow \cancel{x^2}+4-4x+(5)^2 = \cancel{x^2}+4+4x+81$$

$$\Rightarrow 25-81 = 4x+4x$$

$$\Rightarrow -56 = 8x$$

$$\Rightarrow x = -7$$

$\therefore$ the point on the x-axis which is equidistant from $A(2,-5)$ and $B(-2,9)$ is $(-7,0)$

⑨ Basic proportionality Theorem (Thales theorem)

If a line is drawn parallel to one side of a triangle, to intersect the other two sides at distinct points, the other two sides are divided in the same ratio (proportional)

⑩ Let the points be $A(3,1)$, $B(6,4)$ and $C(8,6)$

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

$AB = \sqrt{(6-3)^2+(4-1)^2} = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18} = \sqrt{9\times2} = 3\sqrt{2}$

$BC = \sqrt{(8-6)^2+(6-4)^2} = \sqrt{2^2+2^2} = \sqrt{4+4} = \sqrt{8} = \sqrt{4\times2} = 2\sqrt{2}$

$AC = \sqrt{(8-3)^2+(6-1)^2} = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50} = \sqrt{25\times2} = 5\sqrt{2}$

$AB+BC = 3\sqrt{2}+2\sqrt{2} = 5\sqrt{2} = AC$ $\therefore$ Given points are collinear

11. $\frac{AB}{DE} = \frac{2}{3}$, $\frac{AC}{DF} = \frac{42}{63} = \frac{2}{3}$, $\angle A = \angle D = 50^\circ$

$\therefore \triangle ABC \sim \triangle DEF$

Side-Angle-Side similarity criterion is satisfied by $\triangle ABC$ and $\triangle DEF$

III 12. Given $a_n = 3+2n$.

$a_1 = 3+2(1) = 3+2 = 5$

$a_2 = 3+2(2) = 3+4 = 7$

$a_3 = 3+2(3) = 3+6 = 9$

$\therefore$ AP: $5, 7, 9 \ldots$

$a = 5, d = a_2 - a_1 = 7-5 = 2, n = 24$

$S_n = \frac{n}{2}[2a + (n-1)d]$

$\Rightarrow S_{24} = \frac{24}{2}[2\times5 + (24-1)2]$

$= 12[10 + 23\times2]$

$= 12[10+46]$

$= 12(56)$

$= 672$

13. Grouped data:

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$$

Here, l = lower limit of the median class

n = sum of frequencies

cf = cumulative frequency of the class preceding the median class

f = frequency of the median class

h = class size.

14. Let the first cash prize awarded to students be x

$\therefore$ the 7 prizes are

$x,\ x-20,\ x-40,\ x-60,\ x-80,\ x-100,\ x-120$

Here $S_7 = 700$, $n=7$, $a=x$, $d=a_2-a_1$
$= x-20-x$
$= -20$

$S_n = \frac{n}{2}[2a+(n-1)d]$

$\Rightarrow 700 = \frac{7}{2}[2\times x+(7-1)(-20)]$

$\Rightarrow \cancel{700}^{100}\times\frac{2}{\cancel{7}} = [2x+6(-20)]$

$\Rightarrow 200 = 2x-120$

$\Rightarrow 320 = 2x$

$\Rightarrow x = 160$

$\therefore$, the ~~cost~~ value of each of the prizes

$=$ ₹160, ₹140, ₹120, ₹100, ₹80, ₹60, ₹40

15.

a) 15. Given Points are $A(2,-2)$ and $B(-7,4)$

Trisectional Points:- A point which divides the line segment in the ratio $1:2$ (or) $2:1$ is called the trisectional points.

i) Section formula $= \left(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2}\right)$

$m_1:m_2 = 1:2$ — points $A(\underset{x_1}{2}, \underset{y_1}{-2})$ and $B(\underset{x_2}{-7}, \underset{y_2}{4})$

A P Q. B

Point $P = \left(\frac{1(-7)+2(2)}{1+2}, \frac{1(4)+2(-2)}{1+2}\right)$

$= \left(\frac{-7+4}{3}, \frac{4-4}{3}\right) = \left(\frac{-3}{3}, \frac{0}{3}\right) = (-1,0)$

(ii) $m_1:m_2 = 2:1$

point $Q = \left(\frac{2(-7)+1(2)}{2+1}, \frac{2(4)+1(-2)}{2+1}\right)$

$= \left(\frac{-14+2}{3}, \frac{8-2}{3}\right) = \left(\frac{-12}{3}, \frac{6}{3}\right)$

$= (-4,2)$

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b)

Daily Expenditure (in ₹) (CI)	No. of house holds (f_i)	class mark x_i	$u_i = \frac{x_i - a}{h}$	$f_i u_i$
100 - 150	4	125	-2	-8
150 - 200	5	175	-1	-5
200 - 250	12	225 (a)	0	0
250 - 300	2	275	1	2
300 - 350	2	325	2	4
	$\Sigma f_i = 25$			$\Sigma f_i u_i = -7$

$$\text{Mean} = a + \frac{\Sigma f_i u_i}{\Sigma f_i} \times h$$

$$= 225 + \frac{-7}{25} \times 50$$

$$= 225 - 14$$

$$= ₹\,211$$

∴ The mean daily expenditure on food = ₹ 211

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