SUMMATIVE ASSESSMENT - II - 2016 - 2017

CLASS-X - MATHS - PAPER-II

Part - A & B

KEY

Class : X **Part - A** **Marks : 60**

Section - I (Each question carries 1 mark)

1. Given points A(2, 5); B (6, 1)

Distance between two points AB $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $\left.\right\} \frac{1}{2}m$

$= \sqrt{(6-2)^2 + (1-5)^2}$

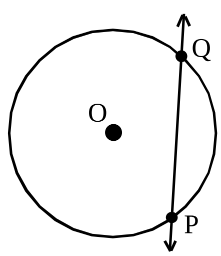
$= \sqrt{(4)^2 + (-4)^2}$

$= \sqrt{16+16}$ $\left.\right\} \frac{1}{2}m$

$= \sqrt{32}$

$= 4\sqrt{2}$ units 1m

2. **A.A Law of Similarity :**
If two angles of one triangle are respectively equal to the two angles of another triangle, then the two triangles are similar. 1m

3. 

4. Cos (A+B) = Cos A + Cos B is not right $\left.\right\} \frac{1}{2}m$
Let us take A = 60°; B = 30° then

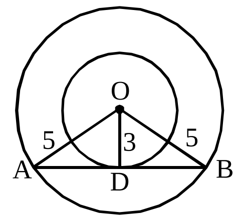
Cos (A+B) = Cos (60°+30°) = Cos 90° = 0

Cos A + Cos B = Cos 60° + Cos 30° = $\frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3}+1}{2}$ $\left.\right\} \frac{1}{2}m$

$\therefore$ Cos (A+B) $\neq$ Cos A + Cos B

Section - II (Each question carries 2 marks)

5. Let 'O' be the centre of the two concentric circles.



'AB' is the chord of the larger circle which touches the smaller circle

OA = OB = 5cm (radii of larger circle)

OD = 3cm (radius of smaller circle)

and OD $\perp$ AB

Since OAB is an isosceles triangle,
OD bisects AB $\quad \frac{1}{2}$

$\therefore$ AD = DB

In ΔOAD, by phythagoras theorem

$$AD = \sqrt{OA^2 - OD^2} = \sqrt{5^2 - 3^2} = 4 \quad 1$$

$$AB = AD + DB = 4 + 4 = 8 \text{ cm} \quad \frac{1}{2}$$

2m

6. Given that $\cos A = \frac{12}{13}$

$$\sin A = \sqrt{1 - \cos^2 A} = \sqrt{1 - \frac{12^2}{13^2}} = \frac{5}{13} \quad \frac{1}{2}$$

$$\operatorname{Cosec} A = \frac{1}{SinA} = \frac{13}{5} \quad \frac{1}{2}$$

$$\operatorname{Cot} A = \frac{SinA}{CosA} = \frac{5/\cancel{13}}{12/\cancel{13}} = \frac{5}{12} \quad 1$$

2m

7. Median $= l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h \quad 1$

Where l = lower boundary of median class
n = number of observations
cf = cumulative frequency of class preceeding the median class
f = frequency of median class
h = size of the median class $\quad 1$

2m

8. Given that $\Delta ABC \sim \Delta DEF$

and in ΔABC, Sin $= \frac{3}{5} = \frac{opposite\ side\ to\ \theta}{hypotenuse}$ $\Big\}\ \frac{1}{2}$

In ΔDEF, tan $\theta = \frac{9}{12} = \frac{opposite\ side\ to\ \theta}{Adjacent\ side\ to\ \theta}$ $\Big\}\ \frac{1}{2}$

$\therefore$ 3 and 9 are corresponding sides $\Big\}\ \frac{1}{2}$

$\therefore \frac{Area\ of\ \Delta ABC}{Area\ of\ \Delta DEF} = \frac{3^2}{9^2} = \frac{9}{81} = \frac{1}{9}$

$\therefore$ Ratio of areas of ΔABC and $\Delta DEF = 1 : 9$ $\Big\}\ \frac{1}{2}$ 2m

9. Given that DE || AB in ΔABC
and by thales theorem,

$\frac{CD}{AD} = \frac{CE}{BE}$ $\Big\}\ \frac{1}{2}$

$\Rightarrow \frac{x+3}{8x+9} = \frac{x}{3x+4}$ $\Big\}\ \frac{1}{2}$

$\Rightarrow (x+3)(3x+4) = x(8x+9)$

$\Rightarrow 3x^2 + 13x + 12 = 8x^2 + 9x$

$\Rightarrow 5x^2 - 4x - 12 = 0$

$\Rightarrow (x-2)(5x+6) = 0$

$\Rightarrow x = 2$ or $x = -\frac{6}{5}$ $\Big\}\ \frac{1}{2}$

Since length is non negative, $x = 2$ $\Big\}\ \frac{1}{2}$ 2m

Section - III (Each question carries 4 marks)

10 (a) Let the vertices of the parallelogram are

A (1, 2); B (4, y); C (x, 6); D (3, 5)

We know that mid points of the diagonals of a parallelogram are equal $\Big\}\ 1$

$\therefore$ Mid point of the diagonal AC = Mid point of the diagonal BD

$\Rightarrow \left(\frac{1+x}{2}, \frac{2+6}{2}\right) = \left(\frac{4+3}{2}, \frac{y+5}{2}\right)$ $\Big\}\ 1$

$\Rightarrow \frac{1+x}{2} = \frac{7}{2} \Rightarrow x = 6$ $\Big\}\ 1$

and $\frac{y+5}{2} = \frac{8}{2} \Rightarrow$ y = 3 $\Big\}\ \frac{1}{2}$ 4m

10 (b)

Class	Frequency	
30 – 39	2	
40 – 49	3	
50 – 59	20	f_0
$\boxed{60-69 \quad 31}$		f_1 modal class
70 – 79	17	f_2
80-89	10	
90-99	4	

Mode = $l + \left(\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$ } 1m

Here $l = \dfrac{60+59}{2} = 59.5;\ f_1 = 31;\ f_0 = 20;$

$f_2 = 17;$ h = 10 } 1m

$\therefore$ Mode $= 59.5 + \left(\dfrac{31-20}{62-20-17}\right) \times 10$ } 1m

$= 59.5 + \left(\dfrac{11}{25}\right) \times 10$

$= 59.5 + 4.4$ } 1m

$= 63.9$ 4m

11 (a) Given that OACB is a quadrant of a circle with centre 'O' and radius 3.5cm

$\therefore$ Area of the sector OACB $= \dfrac{x}{360^o} \times \pi r^2$

Here $x = 90o;\ \Pi = \dfrac{22}{7};\ \ r = 3.5$ } 1m

$\therefore$ Area of the sector OACB $= \dfrac{90^o}{360^o} \times \dfrac{22}{7} \times 3.5 \times 3.5$

$= \dfrac{1}{2} \times 11 \times 0.5 \times 3.5$

$= 9.625\ cm^2$ } $\frac{1}{2}$m

OBD is a right angled triangle with sides

OB = 3.5 and OD = 2 cm

$$\text{Ar. of } \Delta \text{OBD} = \frac{1}{2} \times \text{OB} \times \text{OD}$$

$$= \frac{1}{2} \times 3.5 \times 2 = 3.5 \text{ cm}^2 \quad \Bigg\} 1\frac{1}{2}\text{m}$$

$$\text{Area of shaded region} = \text{Ar. of OACB} - \text{Ar. } \Delta \text{OBD} \quad \Big\} \frac{1}{2}$$

$$= 9.625 - 3.5$$

$$= 6.125 \text{ cm}^2 \quad \Big\} \frac{1}{2}$$

4m

11 (b) (i) $$\frac{Sin\ 30^o + \tan\ 45^o - Co\sec\ 60^o}{Cot\ 45^o + Cos\ 60^o - Sec\ 30^o} = \frac{\frac{1}{2} + 1 - \frac{2}{\sqrt{3}}}{1 + \frac{1}{2} - \frac{2}{\sqrt{3}}} = 1 \quad \Big\} \text{2m}$$

(ii) $$2 \tan^2 45^o + \text{Cos}^2\ 30^o - \text{Sin}^2\ 30^o = 2\ (1)^2 + \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{1}{2}\right)^2 \quad \Big\} \text{1m}$$

$$= 2 + \frac{3}{4} - \frac{1}{4} = \frac{5}{2} \quad \Big\} \text{1m}$$

4m

12 (a) Given that A (0, 1), B (2, 1), C (0, 3) are the vertices of Δ ABC

$$\text{Ar. } \Delta \text{ABC} = \frac{1}{2} \left| \ x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) \ \right| \quad \Big\} \frac{1}{2}\text{m}$$

Here $A \begin{pmatrix} 0, & 1 \\ x_1 & y_1 \end{pmatrix}$; $B \begin{pmatrix} 2, & 1 \\ x_2 & y_2 \end{pmatrix}$; $C \begin{pmatrix} 0, & 3 \\ x_3 & y_3 \end{pmatrix}$;

$$\text{Ar. } \Delta \text{ABC} = \frac{1}{2} \left| \ O\ \ (1-3) + 2\ \ (3-1) + 0\ \ (1-2) \ \right|$$

$$= \frac{1}{2} |4| = 2 \text{ sq. units} \quad \Bigg\} \text{1m}$$

Mid point of B (2, 1); C (0, 3) is $D = \left(\frac{2+0}{2}, \frac{1+3}{2}\right) = (1, 2)$

Mid point of C (0, 3); A (0, 1) is $E = \left(\frac{0+0}{2}, \frac{3+1}{2}\right) = (0, 2)$

Mid point of A (0, 1); B (2, 1) is $F = \left(\frac{0+2}{2}, \frac{1+1}{2}\right) = (1, 1)$

$\Bigg\}$ 1m

Ar. of $D\begin{pmatrix}1, & 2\\ x_1 & y_1\end{pmatrix}$, $E\begin{pmatrix}0, & 2\\ x_2 & y_2\end{pmatrix}$, $F\begin{pmatrix}1, & 1\\ x_3 & y_3\end{pmatrix}$ is

$$\text{Ar. } \Delta DEF = \frac{1}{2} \left| 1\ (2-1) + 0\ (1-2) + 1\ (2-2) \right|$$

$$= \frac{1}{2}\left|1\right| = \frac{1}{2} \text{ sq. units}$$ 1m

$$\therefore 4\,(\text{Ar. } \Delta DEF) = 4\left(\frac{1}{2}\right) = 2 = \text{Ar. } \Delta ABC$$ $\frac{1}{2}$ 4m

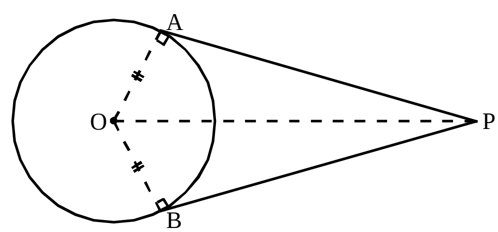
12 (b) Given : A circle with Centre 'O', 'P' is a point lying outside the circle and PA and PB are two tangents to the circle from 'P'. 1m

To prove : PA = PB

Proof : Join OA, OB and OP

$\angle OAP = \angle OBP = 90^o$

(Angle between radii and tangents) 1m



In ΔOAP and ΔOBP,

OA = OB (radii of same circle)

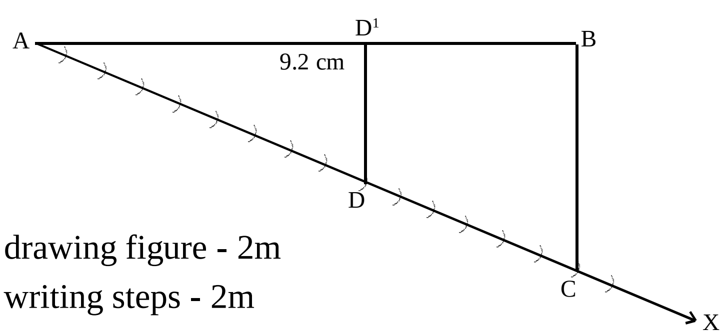
OP = OP (common) 1m

$\therefore \Delta OAP \cong \Delta OBP$ (R.H.S. Congruency)

PA = PB 1m

Hence proved. 4m

13 (a)



For drawing figure - 2m

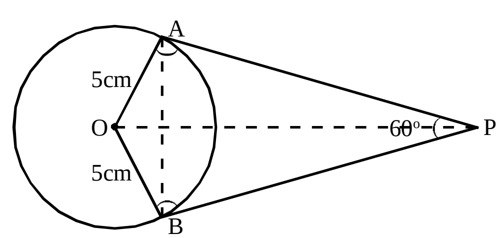
For writing steps - 2m

13 (b) For drawing rough sketch - 1m

For construction - 2m

For writing steps - 1m

4m



Rough Sketch

SUMMATIVE ASSESSMENT - II - 2016 - 2017

CLASS-X - MATHS - PAPER-II

KEY

Class : X	**Part - B**	**Marks : 20**

III.

14. C
15. B
16. A
17. A
18. C
19. D
20. C
21. D
22. A
23. C
24. A
25. A
26. C
27. B
28. A
29. A
30. A
31. D
32. B
33. D