Answers Paper-2

Q.1. (A) Choose the correct answer and write the letter of the alphabet of it : **4**

1. D) 4.2 cm 2. B) 3.2 cm 3. A) (2, -2) 4. C) 550 cm^2

B) Solve the following sub-questions : **4**

1) **Solution :** BD = 3, BC = 9

DC = BC - BD

DC = 9 - 3

DC = 6

$$\frac{A(\triangle ABD)}{A(\triangle ADC)} = \frac{BD}{DC} \quad \text{.... (Triangles having equal height)}$$

$$\frac{A(\triangle ABD)}{A(\triangle ADC)} = \frac{3}{6} = \frac{1}{2}$$

$A(\triangle ABD) : A(\triangle ADC) = 1 : 2$

2) **Solution :**

$12^2 = 144$ and $4^2 + 9^2 = 16 + 81 = 97$

$144 \neq 97$

$12^2 \neq 4^2 + 9^2$

By converse of Pythagoras theorem,

(4, 9, 12) is not a Pythagorean triplet

3) **Solution :** seg TH is tangent to the circle.

HA = 9 cm, HB = 4 cm

$HT^2 = HB \times HA$

$HT^2 = 9 \times 4$

$HT^2 = 36$

HT = 6 .....(Taking square root of both sides)

HT = 6 cm

4) **Solution :** Let $(3, -5) \equiv (x_1, y_1)$, $(4, 3) \equiv (x_2, y_2)$, $(11, -4) \equiv (x_3, y_3)$

By centroid formula,

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

$$= \left(\frac{3 + 4 + 11}{3}, \frac{-5 + 3 + (-4)}{3}\right)$$

$$= \left(\frac{18}{3}, \frac{-6}{3}\right)$$

$G = (6, -2)$

Q. 2 (A) Complete and write *any* <u>TWO</u> activities from the following : **4**

1) **Solution :** $l(WT) = 4.8$, $l(TX) = 8$, $l(YT) = 6.4$

Using property of intersecting secants,

$\therefore\ WT \times \mathbf{TX} = \mathbf{YT} \times TZ$

$\therefore\ 4.8 \times 8 = 6.4 \times TZ$

$$\therefore\ TZ = \frac{4.8 \times 8}{\mathbf{6.4}}$$

$\therefore\ l(TZ) = \mathbf{6\ units}$

2) **Solution :** LHS $= \tan^4\theta + \tan^2\theta$

$= \mathbf{(\tan^2\theta)^2} + \tan^2$ .....$[(a^2)^2] = a^4$

$= \mathbf{(\sec^2\theta - 1)}^2 + \sec^2\theta - 1$ .....$(1 + \tan^2\theta = \sec^2\theta)$

$= \sec^4\theta - \mathbf{2\sec^2}\theta + \mathbf{1} + \sec^2\theta - 1$

$= \sec^4\theta - \sec^2\theta$

3) **Solution :** Capacity of the bucket = Volume of frustum

$$= \frac{1}{3}\pi h\ \mathbf{(r_1^2 + r_2^2 + r_1 \times r^2)}$$

$$= \frac{1}{3} \times \frac{22}{7} \times 28\ (15^2 + 12^2 + 15 \times 12)$$

$$= \frac{22 \times 4}{3} \times (225 + 144 + 180)$$

$$= \frac{22 \times 4}{3} \times \mathbf{549}$$

$= 88 \times \mathbf{183}$

$= \mathbf{16104}\ cm^3 = 16.104$ litre

B) Solve *any* <u>FOUR</u> sub-questions from the following : **8**

1) **Ans :** In $\triangle LMN$, ray MT bisects $\angle LMN$.

By the property of angle bisector,

$$\therefore\ \frac{ML}{MN} = \frac{LT}{TN}$$

$$\therefore\ \frac{6}{10} = \frac{LT}{8}$$

$$\therefore\ LT = \frac{6 \times 8}{10} = \frac{48}{10}$$

$\therefore\ LT = 4.8$

2) **Ans :** In $\triangle RST$, $\angle S = 90°$, $\angle T = 30°$,

$\angle R = 60°$ ...(Remaining angle)

$RS = \frac{1}{2} \times RT$ side opposite to 30^0

$\therefore RS = \frac{1}{2} \times 12$

$\therefore RS = 6$ cm

$TS = \frac{\sqrt{3}}{2} \times RT$ side opposite to 60^0

$\therefore RS = \frac{\sqrt{3}}{2} \times 12$

$\therefore RS = 6\sqrt{3}$ cm

3) **Ans :** Suppose C (x_1, y_1) and point D (x_2 , y_2)

$x_1 = -3a$, $y_1 = a$ and $x_2 = a$, $y_2 = -2a$

Using distance formula,

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

$\therefore d(CD) = \sqrt{[a - (-3a)]^2 + (-2a - a)^2}$

$\therefore d(CD) = \sqrt{(4a)^2 + (-3a)^2}$

$\therefore d(CD) = \sqrt{16a^2 + 9a^2}$

$\therefore d(CD) = \sqrt{25a^2}$

$\therefore d(CD) = 5a$

4) **Ans :** In given figure,

Seg AD $\perp$ tangent AC $\therefore \angle DAC = 90^0$ } Tangent theorem

Seg AB $\perp$ tangent BC $\therefore \angle DBC = 90^0$ }

$\angle ACB = 50^0$ ..... Given

Now in $\square$ABCD,

The sum of measure of all angles of quadrilateral is 360^0

$\therefore \angle DAC + \angle DBC + \angle ACB + \angle ADB = 360^0$

$\therefore 90^0 + 90^0 + 50^0 + \angle ADB = 360^0$

$\therefore 230^0 + \angle ADB = 360^0$

$\therefore \angle ADB = 360^0 - 230^0$

$\therefore \angle ADB = 130^0$

5) **Ans : LHS =** $\cos^2\theta (1 + \tan^2\theta)$

$= \cos^2 (\sec^2)$ ..... $(\because 1 + \tan^2\theta = \sec^2\theta)$

$= \cos^2\theta \times \frac{1}{\cos^2\theta}$ ..... $(\because \cos\theta = \frac{1}{\cos\theta})$

$= 1$

$=$ RHS

Q. 3 (A) Complete and write *any* ONE activity from the following : **3**

1) **Solution :** In $\triangle$ ABC, line DE || side BC ... [Given]

$\therefore \frac{AD}{\mathbf{DB}} = \frac{\mathbf{AE}}{EC}$ ... [Basic proportionality theorem]

$\frac{DB}{AD} = \frac{EC}{AE}$ ... [**By Invertendo**]

$\therefore \frac{DB + AD}{AD} = \frac{\mathbf{EC + AE}}{AE}$ ... [By Componendo]

$\therefore \dfrac{\mathbf{AB}}{AD} = \dfrac{AC}{\mathbf{AE}}$ ... [A-D-B and A-E-C]

$\therefore \dfrac{AD}{AB} = \dfrac{AE}{AC}$ ... [By invertendo]

2) **Solution :** Let A (3, 8) $\equiv (x_1, y_1)$ and B (-9, 3) $\equiv (x_2, y_2)$ are the given points.
We have to find a point on y-axis.
$\therefore$ Its x-co-ordinate will be **0**
Let the points A and B divide in ration $m : n$
By section formula for internal division.

$$x = \frac{mx_2 + \boldsymbol{nx_1}}{m+n}$$

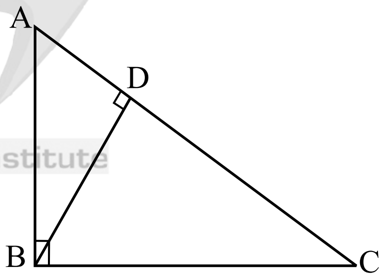
$$\therefore \ \mathbf{0} = \frac{m(-9) + n(3)}{m+n}$$

$\therefore$ **-9m** + 3n = 0
$\therefore$ 9m = **3n**

$$\therefore \ \frac{m}{n} = \frac{\mathbf{1}}{\mathbf{3}}$$

B) Solve *any* <u>TWO</u> sub-questions from the following : **6**

1) Prove : In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides.



Given : In $\Delta ABC, \angle ABC = 90^0$

To Prove : $AC^2 = AB^2 + BC^2$

Construction : Draw seg BD $\perp$ hypotenuse AC
and A-D-C.

Proof : In ΔABC, seg BD $\perp$ hypotenuse AC ....(construction)

$\therefore \ \Delta ABC \sim \Delta ADB$ ....(similarity in right angled triangle)

$\therefore \ \dfrac{AB}{AD} = \dfrac{AC}{AB}$ ....(corresponding sides of similar triangles)

$\therefore \ AB^2 = AC \subset AD$ ....(1)

Similarly, we have $\Delta ABC \sim \Delta BDC$

$\therefore \ \dfrac{BC}{DC} = \dfrac{AC}{BC}$ ....(corresponding sides of similar triangles)

$\therefore \ BC^2 = AC \subset DC$ ....(2)

By adding (1) and (2)

$\therefore AB^2 + BC^2 = AC \times AD + AC \times DC$
$= AC\ (AD + DC)$
$= AC \times AC$ ....(A-D-C)
$= AC^2$

$\therefore AB^2 + BC^2 = Ac^2$

2) **Ans :** Chord AB ≅ Chord CD ....(Given)

Arcs subtended by congruent chords are congruent

$\therefore$ (arc ACB) ≅ m(arc DBC)

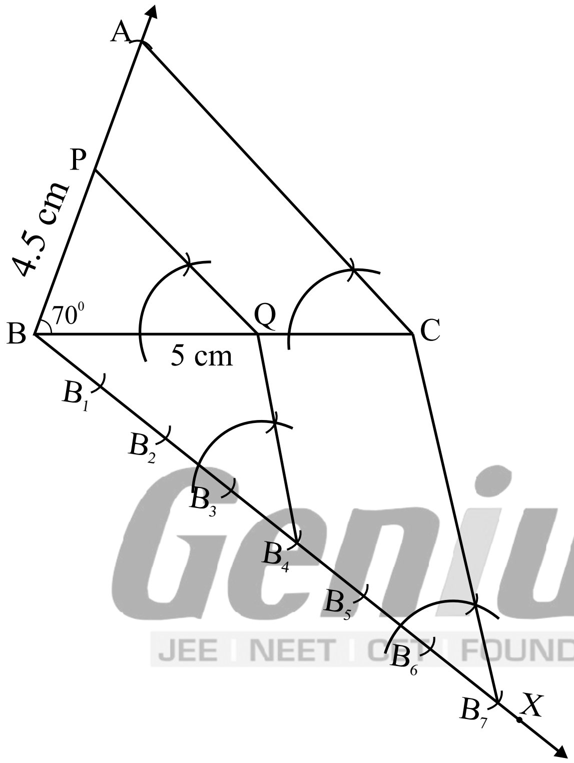
$\therefore$ m(arc AC) + m(arc CB) = m(arc BD) + m(arc CB)

$\therefore$ m(arc AC) = m(arc BD)

$\therefore$ arc AC ≅ arc BD

Hence proved.

3) **Ans :**



4) **Ans :**

Given : Radius of tablet (r_1) = 7mm = 0.7 cm

Thickness of tablet (h_1) = 5 mm = 0.5 cm

Radius of wrapper (r_2) = $\frac{14 \text{ mm}}{2}$ =7 mm = 0.7 cm

Height of wrapper (h_2) = 10 cm

Volume of tablet = $\pi r_1^2 h_1$

$\therefore$ Volume of tablet = $\pi \times (0.7)^2 \times 0.5$

$\therefore$ Volume of tablet = $\pi \times 0.7 \times 0.7 \times 0.5 \text{ cm}^3$

$\therefore$ Volume of wrapper = $\pi r_2^2 h_2$

$\therefore$ Volume of wrapper = $\pi \times (0.7)^2 \times 10$

$\therefore$ Volume of wrapper = $\pi \times 0.7 \times 0.7 \times 10 \text{ cm}^3$

Total number of tablets = $\frac{\text{Volume of wrapper}}{\text{Volume of tablet}}$

$$= \frac{\cancel{\pi} \times \cancel{0.7} \times \cancel{0.7} \times 10}{\cancel{\pi} \times \cancel{0.7} \times \cancel{0.7} \times 0.5}$$

$$= \frac{10}{0.5} = \frac{100}{5}$$

$$= 20$$

Number of tablets wrapped in the wrapper is 20.

Q. 4 Attempt *any* <u>TWO</u> sub-questions from the following : **8**

1) **Ans :** $\Delta RHP \sim \Delta NED$ .... [Given]

$$\frac{RH}{NE} = \frac{HP}{ED} = \frac{RP}{ND} = \frac{4}{3}$$ .... [corresponding sides of similar triangles]

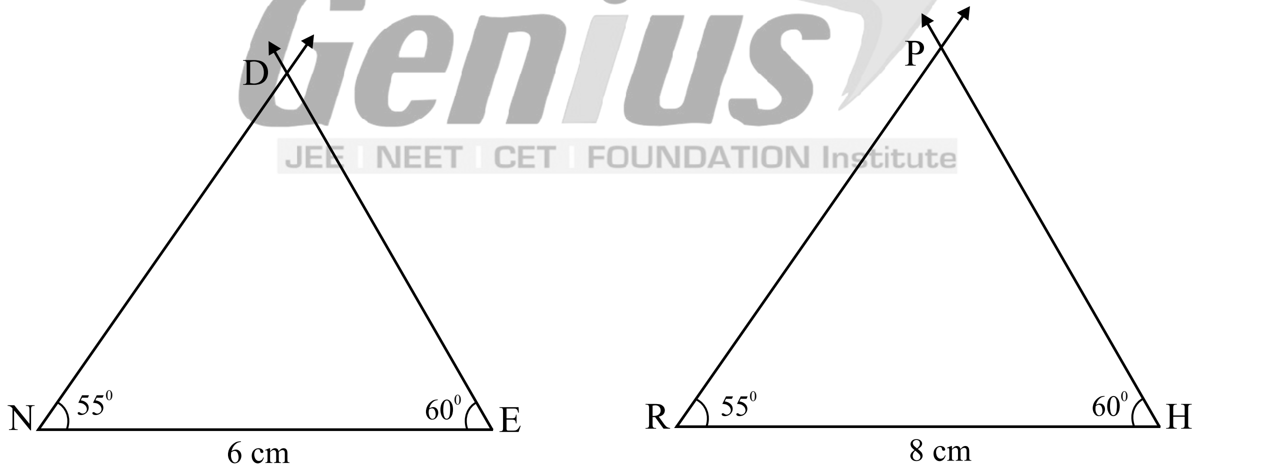
$$\therefore \frac{RH}{6} = \frac{HP}{ED} = \frac{RP}{ND} = \frac{4}{3}$$

$$\therefore \frac{RH}{6} = \frac{4}{3}$$

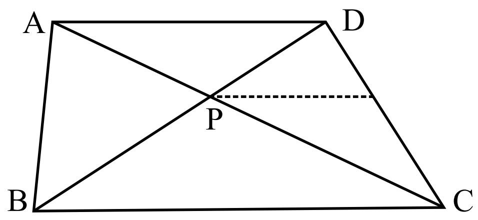
$$\therefore RH = \frac{4 \times 6}{3} = \frac{24}{3} = 8$$

$\therefore$ RH = 8 cm

$\left.\begin{array}{l} \angle N = \angle R = 55^0 \\ \angle E = \angle H = 60^0 \end{array}\right\}$ .... [corresponding angles of similar triangles]



2) **Given :** AD || BC



To prove : $\frac{AP}{PD} = \frac{PC}{BP}$

Construction : Draw line PF || side BC such that D-F-C

Proof : In BDC, seg PF || line BC ... [construction]

$\therefore \frac{DP}{PB} = \frac{DF}{FC}$ ... [By Basic proportionality theorem] (I)

Here line PF || side BC and line AD || line BC

$\therefore$ line PF || line AD ... (II)

In$\triangle$ACD, line PF || line AD

By basic proportionality theorem,

$\therefore \quad \frac{DP}{PB} = \frac{AP}{PC}$ ... (III)

From equation (I) and (III)

$\frac{PC}{PB} = \frac{AP}{DP}$

$\therefore \quad \frac{PC}{PB} = \frac{AP}{DP}$

Hence proved

3) **Ans :** Area of sector $x = \frac{\theta}{360^0} \times \pi r^2$

$\therefore$ Area of sector $x = \frac{90^0}{360^0} \times \frac{22}{7} \times (14)^2$ $\quad (\because PQ = 14)$

$\therefore$ Area of sector $x = \frac{1}{4} \times \frac{22}{7} \times 196$

$\therefore$ Area of sector $x = \frac{616}{4}$

$\therefore$ Area of sector $x = 154 \text{ cm}^2$

Area of sector $y = \frac{\theta}{360^0} \times \pi r^2$

$\therefore$ Area of sector $y = \frac{90^0}{360^0} \times \frac{22}{7} \times (7)^2$ $\quad (\because AR = QR - QA)$

$\therefore$ Area of sector $y = \frac{1}{4} \times 22 \times 7$

$\therefore$ Area of sector $y = 38.5 \text{ cm}^2$

Area of rectangle = $l \times b$

$\therefore$ Area of rectangle = PQ x QR

$\therefore$ Area of rectangle = 14 x 21

$\therefore$ Area of rectangle = 294 cm^2

Now, Area of sector z = Area of rectangle - (Area of sector x + area of sector y)

= 294 - (154 + 38.5)

= 294 - 192.5

$\therefore$ Area of sector $z = 101.5 \text{ cm}^2$

Q. 5 Attempt *any* ONE sub-question from the following : 3

1) seg PA $\cong$ seg PC ... (Tangent secant theorem)

$\therefore \angle PCA = \angle PAC$ ...(I)

$\therefore \angle APC = 50^0$

$\therefore \angle PCA + \angle PAC = 180^0 - \angle APC$

$= 180^0 - 50^0$

$= 130^0$

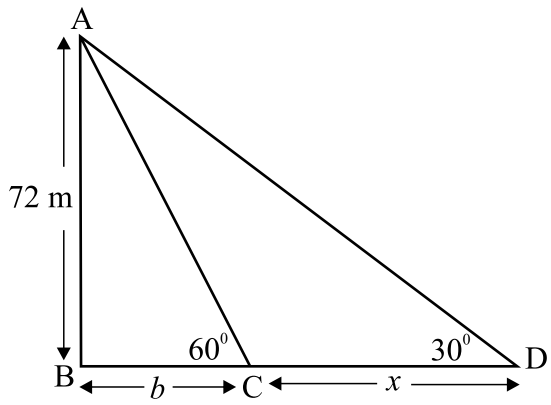
$\therefore \quad 2\angle PCA = 130^0$ ... from (I)

$\therefore \quad \angle PCA = 65^0$ ... (II)

But $\angle PCA = \angle ABC$ ... (angles inscribed in same arc)

$\therefore \angle ABC = 65^0$ ... from (II)

2) **Ans :** In figure AB is building. The persons standing on one side of the building are at C and D respectively. B-C-D



Height of building (h) = 72 m

The angle of elevation made by C is 60^0

and the angle of elevation made by B is 30^0

We know, $\tan 60^0 = \frac{AB}{BC}$

$\therefore BC = \frac{72}{\sqrt{3}} = 24\sqrt{3}$

$\tan 30^0 = \frac{AB}{BD}$ $\therefore BD = 72\sqrt{3}$

$CD = (BD - BC) = 72\sqrt{3} - 24\sqrt{3}$

$= 48\sqrt{3}$

$= 48 \times 1.73$

$\therefore$ The distance between the two persons is 83.04 m