

PVG's  
**Muktangan English School & Jr. College, Pune - 9**  
**Terminal Examination (2024-25)**  
**Standard - X**

Subject - MATHEMATICS (Part II)

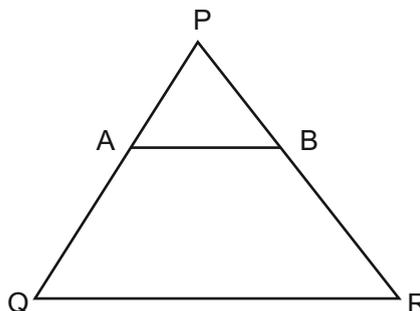
Marks - 40

Date - 15-10-2024

Time - 8.00 a.m. to 10.00 a.m.

**Q.I (A) Attempt the following by choosing the correct alternatives given and write the correct alternative alphabet. [e.g. 1-(A)] (4)**

- 1) In the adjoining figure,  
 if  $AB \parallel QR$ ,  
 then which of the following  
 statements are true.



- (A)  $\frac{PQ}{PB} = \frac{PR}{PB}$       (B)  $\frac{PA}{AQ} = \frac{PB}{BR}$   
 (C)  $\frac{PA}{PR} = \frac{PB}{PQ}$       (D)  $\frac{PQ}{PA} = \frac{AB}{PB}$
- 2) The curved surface area of a cylinder is  $440 \text{ cm}^2$  and its radius is 5 cm.  
 Find its height.  
 (A)  $\frac{44}{\pi} \text{ cm}$       (B)  $22 \pi \text{ cm}$       (C)  $44 \pi \text{ cm}$       (D)  $\frac{22}{\pi} \text{ cm}$
- 3)  $\text{Cosec } 45^\circ = \dots\dots\dots$   
 (A)  $\frac{1}{\sqrt{2}}$       (B)  $\sqrt{2}$       (C)  $\frac{\sqrt{3}}{2}$       (D)  $\frac{2}{\sqrt{3}}$
- 4) In,  $\triangle ABC$ ,  $AB = 3\sqrt{3} \text{ cm}$ ,  $AC = 6 \text{ cm}$ ,  $BC = 3 \text{ cm}$ . Find the measure of  $\angle A$ .  
 (A)  $90^\circ$       (B)  $45^\circ$       (C)  $30^\circ$       (D)  $60^\circ$

**Q.I (B) Attempt the following subquestions. (4)**

- 1) In a right angled triangle, if sum of the squares of the sides making right angle is 169, then what is the length of the hypotenuse ?
- 2) What is the formula to find the total surface area of cuboid ?
- 3) If  $\tan\theta = \frac{12}{5}$  and  $\cos\theta = \frac{5}{13}$  then find  $\sin\theta$ .
- 4) Draw a line segment AB of 7 cm and construct a perpendicular line through the point P where  $AP = 2 \text{ cm}$ . (A-P-B)

**Q.II (A) Attempt any two of the following activities by filling in the boxes. (4)**

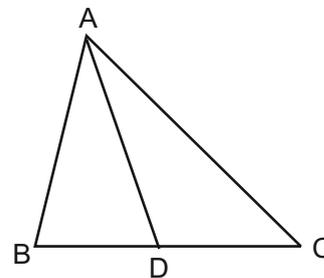
- 1) In  $\triangle ABC$ , B-D-C and  $BD = 7$ ,  $BC = 20$ , then find the ratio  $\frac{A(\triangle ABD)}{A(\triangle ADC)}$

Solution :

In  $\triangle ABC$ ,  $BD = 7$ ,  $BC = 20 \therefore DC = \boxed{\phantom{00}}$  ..... [B-D-C]

$$\frac{A(\triangle ABD)}{A(\triangle ADC)} = \boxed{\phantom{00}} \quad (\text{Reason : } \boxed{\phantom{00}})$$

$$\therefore \frac{A(\triangle ABD)}{A(\triangle ADC)} = \boxed{\phantom{00}}$$



- 2) Observe the adjoining figure and find the slant height ( $l$ )

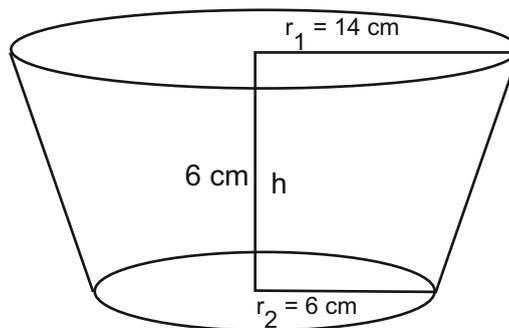
Solution :

$$\text{Slant height of frustum} = \sqrt{h^2 + \boxed{\phantom{00}}^2}$$

$$l = \sqrt{\boxed{\phantom{00}}^2 + \boxed{\phantom{00}}^2}$$

On solving,

$$l = \boxed{\phantom{00}} \text{ cm}$$



- 3) Find the value of  $6 \tan^2\theta - \frac{6}{\cos^2\theta}$

Solution :

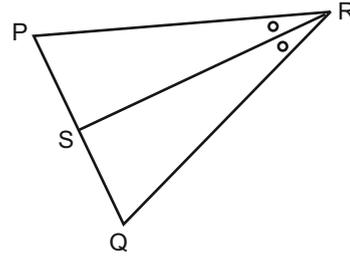
$$\begin{aligned} 6 \tan^2\theta - \frac{6}{\cos^2\theta} &= 6 \left( \tan^2\theta - \frac{1}{\boxed{\phantom{00}}} \right) \\ &= 6 ( \tan^2\theta - \boxed{\phantom{00}} ) \text{ ..... (by writing reciprocal)} \\ &= 6 \boxed{\phantom{00}} \text{ ..... } (\because 1 + \tan^2\theta = \sec^2\theta) \end{aligned}$$

$$\therefore 6 \tan^2\theta - \frac{6}{\cos^2\theta} = \boxed{\phantom{00}}$$

**Q.II (B) Attempt any four of the following subquestions : (8)**

- 1) Find the height of an equilateral triangle having side  $2a$ .
- 2) Construct a tangent to a circle with radius  $3 \text{ cm}$  at any point  $P$  on it.
- 3) If  $\sin\theta = \frac{20}{29}$  then find  $\cos\theta$ .
- 4) The radius of the sphere is  $7 \text{ cm}$ , Find its surface area.

- 5) In  $\triangle PQR$ ,  
 seg RS bisects  $\angle R$   
 If  $PR = 15$ ,  $RQ = 20$   
 and  $PS = 12$ ,  
 then find  $SQ$ .



**Q.III (A) Attempt any one of the following activities.**

**(3)**

- 1) In the given figure, side of square ABCD is 7 cm and hence area is 49 sq.cm. With centre D and radius DA, sector D-AXC is drawn. Fill in the boxes to find out the area of shaded region.

Solution :

Area of sector (D-AXC) =  (formula)

$$= \frac{\text{input}}{360^\circ} \times \frac{22}{7} \times \text{input}$$

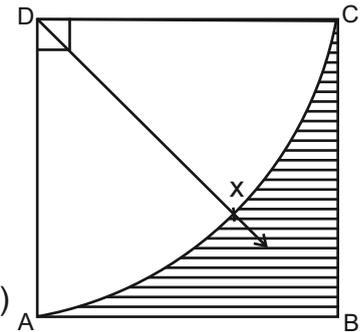
On solving,

Area of sector (D-AXC) =   $\text{cm}^2$

A(shaded region) =  $A(\square ABCD) - A(\text{sector D-AXC})$

$$= 49 - \text{input}$$

$$= \text{input} \text{ cm}^2$$



- 2) In the adjoining figure, seg PQ  $\parallel$  seg DE,  $\triangle FDE \sim \triangle FPQ$ .  $A(\triangle FPQ) = 20$  sq.units,  $PF = 2 DP$  then find  $A(\square DPQE)$  by completing the following activity.

Solution :

$A(\triangle FPQ) = 20$  sq units

$PF = 2DP$

If  $DP = x$  then  $PF = \text{input}$

$DF = DP + PF$  ..... (D-P-F)

$\therefore DF = \text{input}$

$$\frac{A(\triangle FDE)}{A(\triangle FPQ)} = \frac{\text{input}}{\text{input}} \text{ ..... (Theorem of areas of similar triangles)}$$

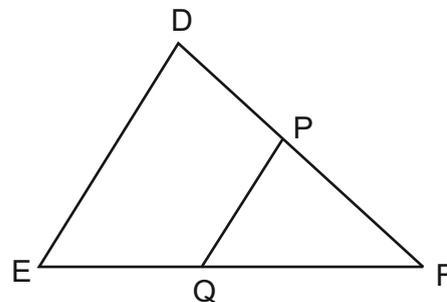
$$= \frac{\text{input}}{\text{input}}$$

$$\therefore A(\triangle FDE) = \frac{9}{4} \times A(\triangle FPQ)$$

$$= \text{input} \text{ sq. units (After solving)}$$

$$\therefore A(\square DPQE) = A(\triangle FDE) - A(\triangle FPQ)$$

$$= \text{input} \text{ sq.units (After solving)}$$

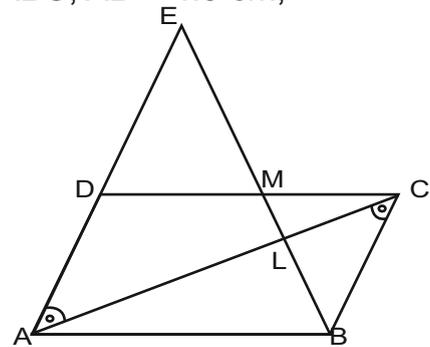


**Q.III (B) Attempt any two of the following subquestions. (6)**

- 1) Prove that : In a right angled triangle, if the altitude is drawn to the hypotenuse, then the two triangles formed are similar to the original triangle and to each other.
- 2) Prove that : The ratio of the intercepts made on a transversal by 3 parallel lines is equal to the ratio of the corresponding intercepts made on any other transversal by the same parallel lines.
- 3) Draw a circle of diameter 6.4 cm. Take a point R at a distance equal to its diameter from the centre. Draw tangents from point R.
- 4) In  $\Delta PQR$ , M is the midpoint of side QR. If  $PQ = 11$ ,  $PR = 17$  and  $QR = 12$ , find PM.

**Q.IV Attempt any two of the following subquestions. (8)**

- 1) Prove that  $\sec \theta + \tan \theta = \frac{\cos \theta}{1 - \sin \theta}$
- 2) Construct  $\Delta APQ$  where,  $\Delta APQ \sim \Delta ABC$ , In  $\Delta ABC$ ,  $AB = 4.5$  cm,  $BC = 5.2$  cm,  $AC = 5.8$  cm and  $\frac{AB}{AP} = \frac{3}{5}$
- 3) Through the mid point M of the side CD of a parallelogram ABCD the line BM is drawn intersecting AC at L and AD produced at E. Prove  $EL = 2BL$ .



**Q.V Attempt any one of the following subquestions. (3)**

- 1) Eliminate  $\theta$  , if  $x = r \sec \theta$  and  $y = r \tan \theta$  .
- 2) A sphere touches all the sides of the cube. Find the ratio of the volume of the sphere and the cube.

