MT

2018 ___ ___ 1100 **Seat No.** | | | | | | | |

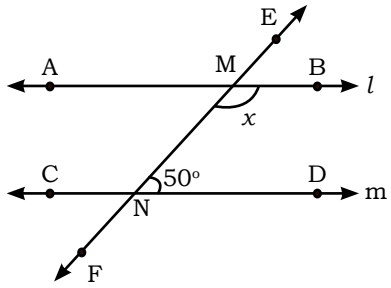
MT - GEOMETRY - SEMI PRELIM - II : PAPER - 3

Time : 2 Hours **(Pages 5)** **Max. Marks : 40**

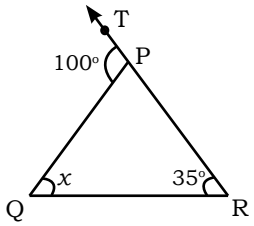
Q.1. (A) Solve the following : (Any 4) **4**

1. Find d(A, B), if co-ordinates of A and B are – 2 and 5 respectively.

2. In the adjoining figure,
line l | | line m
Find : x



3. In the adjoining figure,
find the value of x



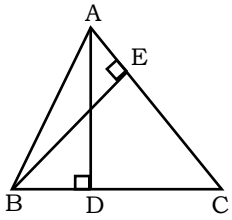
4. Find the value of A: sin A = cos (A – 30)

5. Find perimeter of a semicircle whose radius is 21 cm $\left(\pi = \frac{22}{7}\right)$

6. In ΔABC, if AB > AC, then state with reason, relation between $\angle C$ and $\angle B$.

Q.1. (B) Solve the following : (Any 2) **4**

1. In ΔABC, seg AD and seg BE are altitudes and AE = BD. Prove seg AD ≅ seg BE.

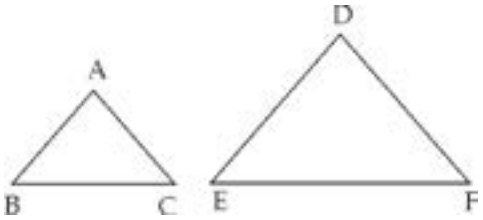


2. If $\angle A = 30^\circ$, show that $\frac{2\tan A}{1-\tan^2 A} = \sqrt{3}$

3. Find the slant height of a cone, if its total surface area is 7128 sq. cm and radius of base is 28 cm. $\left(\pi = \frac{22}{7}\right)$

Q.2. (A) Solve the following MCQs : **4**

1. ΔABC and ΔDEF are equilateral triangles. A(ΔABC) : A(ΔDEF) = 1 : 2. If AB = 4, then what is the length of DE ?

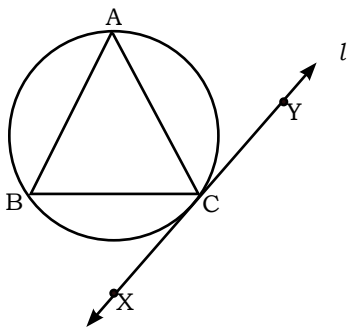


(A) $2\sqrt{2}$ (B) 4 (C) 8 (D) $4\sqrt{2}$

2. $1 + \tan^2\theta = ?$
(A) $\cot^2\theta$ (B) $\operatorname{cosec}^2\theta$ (C) $\sec^2\theta$ (D) $\tan^2\theta$

3. The ratio of circumference and area of a circle is 2 : 7. Find its circumference.
(A) 14π (B) $\frac{7}{\pi}$ (C) 7π (D) $\frac{14}{\pi}$

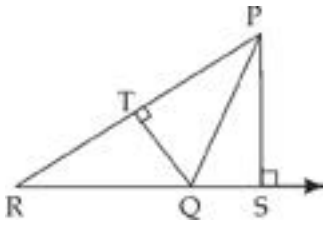
4. For line l to be tangent at C, $\angle A \cong$ _____



(A) ∠ACY (B) ∠ABC (C) ∠BCX (D) ∠ACB

Q.2. (B) Solve the following : (Any 2) **4**

1. In the adjoining figure,
seg PS ⊥ ray RQ,
seg QT ⊥ seg PR.
If RQ = 6, PS = 6 and
PR = 12 then find QT.

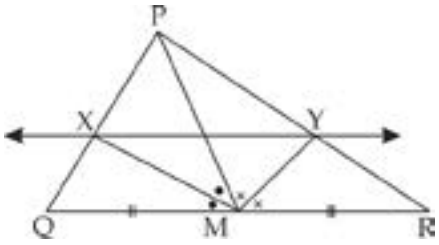


2. Radius of a circle is 10 cm. Measure of an arc of the circles 54°. Find the area of the sector associated with the arc. (π = 3.14)

3. Draw a circle of diameter 6.4 cm.

Q.3. (A) Solve the following activity : (Any 2) **4**

1. In ΔPQR, seg PM is a median.
Angle bisectors of ∠PMQ and ∠PMR intersect side PQ and side PR in point X and Y respectively.
Prove that XY || QR.
Complete the proof by filling the boxes.



In ΔPMQ, ray MX bisects ∠PMQ

∴ $\frac{\square}{\square} = \frac{\square}{\square}$ ...(i) (Property of an angle bisector)

In ΔPMR, ray MY bisects ∠PMR

∴ $\frac{\square}{\square} = \frac{\square}{\square}$ ...(ii) (Property of an angle bisector)

But, $\frac{PM}{MQ} = \frac{PM}{MR}$ (M is the midpoint QR, hence MQ = MR)

$\therefore \quad \frac{PX}{XQ} = \frac{PY}{YR}$

$\therefore$ XY $\parallel$ QR

2. Show that : $\sqrt{\frac{1+\sin x}{1-\sin x}}$ = sec x + tan x.

LHS = $\sqrt{\frac{1+\sin x}{1-\sin x}}$

= $\sqrt{\frac{1+\sin x}{1-\sin x} \times \frac{\square}{\square}}$

= $\sqrt{\frac{\square}{\square}}$

= $\frac{1+\sin x}{\cos x}$

= $\frac{1}{\square} + \frac{\square}{\square}$

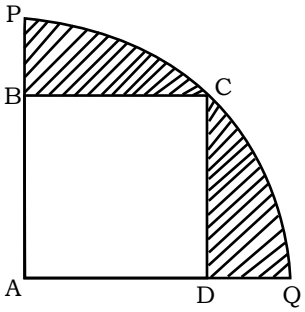
= sec x + tan x

$\therefore$ LHS = RHS

3. In the adjoining figure, square ABCD is inscribed in the sector A-PCQ.

Side of square ABCD is 20 cm.

Complete the following activity to find the area of shaded region.



Area of square = (side)^2 = $\square^{\,2}$ = $\square$ ...(i)

Radius of sector A – PCQ = Length of diagonal of square ABCD

= $20\sqrt{2}$ cm

Area of the shaded region

= Area of sector A – PCQ – Area of square ABCD

= A (A – PCQ) – A (□ABCD)

= $\left(\frac{\theta}{360} \times \pi \times r^2\right) -$ □^{2}

= $\frac{90}{360} \times 3.14 \times (20\sqrt{2})^2 - (20)^2$

= □ – □

= □

Q.3. (B) Solve the following : (Any 2) **4**

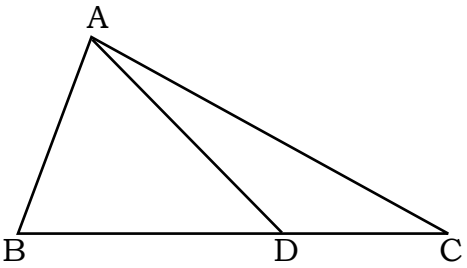
1. In Δ ABC, DE || BC. If DB = 5.4 cm, AD = 1.8 cm, EC = 7.2 cm then find AE.

2. If $\cot\theta = \frac{40}{9}$, find the value of cosec θ and $\sin\theta$.

3. The length, breadth and height of an oil can are 20 cm, 20 cm and 30 cm respectively. How much oil will it contain?
(1 litre = 1000 cm^3)

Q.4. Solve the following : (Any 3) **9**

1. In ΔABC point D on side BC is such that DC = 6, BC = 15.
Find A(ΔABD) : A(ΔABC) and A(ΔABD) : A(ΔADC)



2. Draw a circle with centre P and radius 3.4 cm. Take point Q at a distance 5.5 cm from the centre. Construct tangents to the circle from point Q.

3. Prove : $\sec^6 x - \tan^6 x = 1 + 3\sec^2 x \times \tan^2 x$

4. The radius of a metallic sphere is 9 cm. It was melted to make a wire of diameter 4 mm. Find the length of the wire.

Q.5 Solve the following : (Any 1) **4**

1. Prove : If a line parallel to a side of a triangle intersects the remaining sides in two distinct points, then the line divides the sides in proportion.

2. $\Delta ABC \sim \Delta LBN$. In ΔABC, AB = 5.1 cm, $\angle B = 40°$, BC = 4.8 cm, $\frac{AC}{LN} = \frac{4}{7}$. Construct ΔABC and ΔLBN.

Q.6 Solve the following : (Any 1) **3**

1. Two poles of heights 18 metre and 7 metre are erected on a ground. The length of the wire fastened at their tops in 22 metre. Find the angle made by the wire with the horizontal.

2. A washing tub in the shape of a frustum of a cone has height 21 cm. The radii of the circular top and bottom are 20 cm and 15 cm respectively. What is the capacity of the tub? ($\pi = \frac{22}{7}$)

Best Of Luck