THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

AIM HIGH, TOGETHER WE FLY

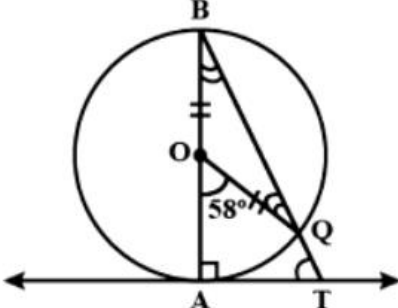| Date:06/11/24 GRADE: X	**MT - 03 (2024-25)** ANSWER KEY MATHEMATICS	Max marks: 20 Time: 50 Minutes

General Instructions:

1 All questions are compulsory.

2. Marks are indicated against each question.

Qn. No	QUESTIONS 1 TO 5 CARRY ONE MARK EACH	Marks allocated
1	In the given figure, PQ//AC. If BP = 4cm, AP = 2.4 cm and BQ = 5cm, then length of BC is a. **8 cm** b. 3 cm c. 0.3 cm d. $\frac{25}{3}$	1
2	In the given figure, if PT is a tangent of the circle with center O and $\angle TPO=25^0$ then the measure of x is: a. 25^0 b. 65^0 c. 90^0 d. **115^0**	1
3	The area of a semi – circle of diameter 'd' ? a. $\frac{1}{16} \Pi d^2$ b. $\frac{1}{4} \Pi d^2$ c. **$\frac{1}{8} \Pi d^2$** d. $\frac{1}{2} \Pi d^2$	1
4.	The radius of a sphere whose volume is 12 Π cm^3, is a. 3 b. $3\sqrt{3}$ c. **$3^{2/3}$** d. $3^{1/3}$	1

5	Assertion (A): In a circle of radius 6 cm, the angle of a sector is 60°. Then the area of the sector is 132/7 cm². Reason (R): Area of the circle with radius r is πr². (a) Both the statements – A and R are true, and R is the right explanation for A (b) Both the statements – A and R are true; R is not the correct explanation for A (c) A is true, but R is false (d) R is true, but A is false	1

	QUESTIONS 6 AND 7 CARRY TWO MARKS EACH	

6	A piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 60^0 at its Centre. Find the radius of the circle. Length of the wire (arc length) = 22 cm - Central angle (θ) = 60 degrees - We will use π = 22/7. Length of arc of a circle = **2 π r (θ/360°)** The radius of the circle is **21 cm**.	2

7	In given figure, AB is the diameter of a circle with center O and, AT is a tangent. If ∠AOQ = 58° find ∠ATQ $\angle ABQ = \frac{1}{2}\angle AOQ$ $\Rightarrow \frac{1}{2} \times 58 = 29$ ∠ A =90 (AT is a tangent) ∠ BAT+ ∠ ABT + ∠ ATQ = 180 (angle sum property of tri 90 +29 + ∠ ATQ = 180° ∠ ATQ = 180 - 119 ∠ ATQ = 61°	2

	QUESTIONS 8 AND 9 CARRY THREE MARKS EACH	

8	State and prove Basic Proportionality theorem If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio. Consider a triangle ΔABC, as shown in the given figure. In this triangle, we draw a line PQ parallel to the side BC of ΔABC and intersecting the sides AB and AC in P and Q, respectively. According to the basic proportionality theorem as stated above, we need to prove: AP/PB = AQ/QC	3

Join the vertex B of ΔABC to Q and the vertex C to P to form the lines BQ and CP and then drop a perpendicular QN to the side AB and also draw PM⊥AC as shown in the given figure.

Proof

Now the area of ΔAPQ = 1/2 × AP × QN (Since, area of a triangle= 1/2× Base × Height)

Similarly, area of ΔPBQ= 1/2 × PB × QN

area of ΔAPQ = 1/2 × AQ × PM

Also, area of ΔQCP = 1/2 × QC × PM .... (1)

Now, if we find the ratio of the area of triangles ΔAPQ and ΔPBQ, we have

$$\frac{Area\ of\ \triangle APQ}{Area\ of\ \triangle PBQ} = \frac{\frac{1}{2} \times AP \times QN}{\frac{1}{2} \times PB \times QN} = \frac{AP}{PB}$$

Similarly,

$$\frac{Area\ of\ \triangle APQ}{Area\ of\ \triangle QCP} = \frac{\frac{1}{2} \times AQ \times PM}{\frac{1}{2} \times QC \times PM} = \frac{AQ}{QC} \cdots (2)$$
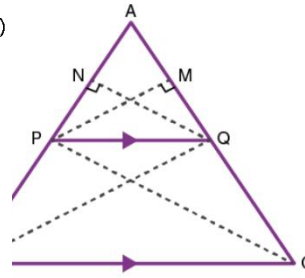
According to the property of triangles, the triangles drawn between the same parallel lines and on the same base have equal areas.

Therefore, we can say that ΔPBQ and QCP have the same area.

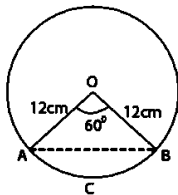area of ΔPBQ = area of ΔQCP ....(3)

Therefore, from the equations (1), (2) and (3) we can say that,

AP/PB = AQ/QC

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9 — Find the area of the minor segment of a circle of radius 12 cm, when its central angle is 60^0. Also find the area of the corresponding major segment. (Use π = 3.14 and √3 = 1.73) — **3**

Given that, radius of a circle (r) = 12 cm

And central angle of sector OBCA (θ) = 60°

∴ Area of sector OBCA
= $\frac{\pi r^2}{360} \times θ$ [here, OBCA = sector and ABCA = segment]

$\frac{3.14 \times 12 \times 12}{360°} \times 60°$

= 3.14 × 2 × 12

= 3.14 × 24 = 75.36cm²

Since, ΔOAB is an isosceles triangle.

Let ∠OAB = ∠OBA = $θ_1$

and OA = OB = 12cm

∠AOB = θ = 60°

∴ ∠OAB + ∠OBA + ∠AOB = 180°
[∵ Sum of all interior angles of a triangle is 180°]

⇒ $θ_1 + θ_1$ + 60° = 180°

⇒ $2θ_1$ = 120°

⇒ $θ_1$ = 60°

∴ $θ_1$ = θ = 60°
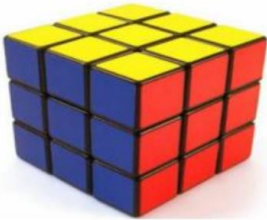
So, the required ΔAOB is an equilateral triangle.

Now, area of ΔAOB = $\frac{\sqrt{3}}{4}$(side)²

[∵ area of an equilateral triangle = $\frac{\sqrt{3}}{4}$(side)²]

= $\frac{\sqrt{3}}{4}$(12)²

= $\frac{\sqrt{3}}{4}$ × 12 × 12 = 36√3cm²

Now, area of the segment of a circle i.e

ABCA = Area of sector OBCA - Area of ΔAOB

= (75.36 − 36√3)cm²

Hence, the required of segment of a circle is: (75.36 − 36√3)cm².

Required area of minor segment

= 13.08 cm²

Area of circle = 3.14 x 12 x 12 = 452.16 cm²

Area of major segment = 439.08 cm²

10	**Case Study:** On a Sunday, your Parents took you to a fair. You could see lot of toys displayed, and you wanted them to buy a RUBIK's cube and strawberry ice-cream for you. Observe the figures and answer the questions:-

1. The length of the diagonal if each edge measures 6cm is

a) 3√3

b) 3√6

c) √12

d) 6√3

2. Volume of the solid figure if the length of the edge is 7cm is

a) 256 cm^3

b) 196 cm^3

c) 343 cm^3

d) 434 cm^3

3. What is the curved surface area of hemisphere (ice cream) if the base radius is 7cm?

a) 309 cm^2

b) 308 cm^2

c) 803 cm^2

d) 903 cm^2

4. Slant height of a cone if the radius is 7cm and the height is 24 cm____

a) 26cm

b) 25 cm

c) 52 cm

d) 62cm

5. The total surface area of cone with hemispherical ice cream is

a) 858 cm^2

b) 885 cm^2

c) 588 cm^2

d) 855 cm^2