

Secondary 4 Mathematics

2nd Term Pre-exam (Paper 2)

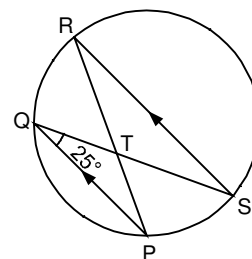
Time allowed: 45 minutes

Total Mark: 27

- Answer ALL questions. All the answers should be marked on the Answer Sheet.
- Note that you may only mark **ONE** answer to each question. Two or more answers will score **NO MARKS**.
- All questions carry equal marks. No marks will be deducted for wrong answers.

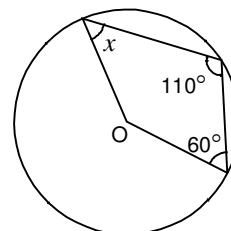
1. In the figure, chord PQ // chord SR. PR and QS intersect at T. If $\angle PQT = 25^\circ$, find $\angle PTQ$.

- A. 76°
- B. 105°
- C. 120°
- D. 130°



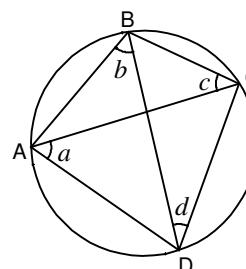
2. In the figure, O is the centre of the circle. Find x .

- A. 30°
- B. 40°
- C. 50°
- D. 60°



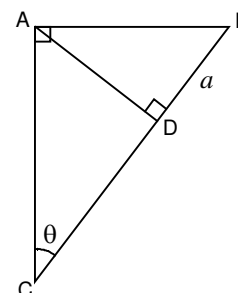
3. In the figure, ABCD is inscribed in a circle. $a + b + c + d =$

- A. 90° .
- B. 180° .
- C. 210° .
- D. 270°



4. In the figure, $DB = a$ and $\angle ACB = \theta$. Find CD.

- A. $a \sin \theta$
- B. $\frac{a \sin^2 \theta}{\cos \theta}$



C. $\frac{a \cos^2 \theta}{\sin^2 \theta}$

D. $\frac{a \cos^2 \theta}{\sin \theta}$

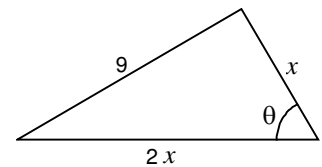
5. In the figure, if $\cos \theta = \frac{1}{2}$, find the value of x .

A. 3

B. $3\sqrt{3}$

C. 6

D. $6\sqrt{3}$



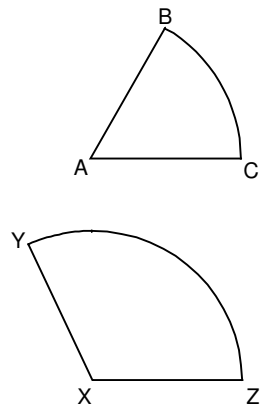
6. In the figure, ABC and XYZ are sectors of equal radii. If $\widehat{BC} : \widehat{YZ} = a : b$, find $\frac{\text{area of sector ABC}}{\text{area of sector XYZ}}$.

A. $\frac{b}{a}$

B. $\frac{a}{b}$

C. $\frac{2b}{a}$

D. $\frac{2a}{b}$



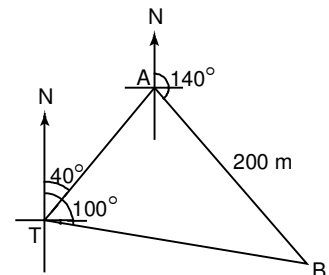
7. In the figure, the bearings of two cars A and B from a town T are 040° and 100° respectively. B is 200 m and at a bearing of 140° from A. Find the distance of B from T.

A. $\frac{200}{\sin 60^\circ}$ m

B. $\frac{200 \sin 50^\circ}{\sin 80^\circ}$ m

C. $\frac{200 \sin 80^\circ}{\sin 60^\circ}$ m

D. $\frac{200 \sin 70^\circ}{\sin 80^\circ}$ m

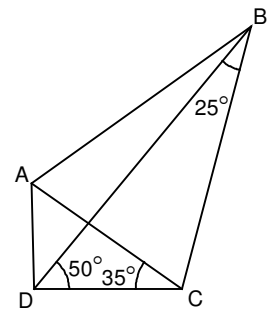


8. A tree 5 m tall has a shadow of length 12 m long. Find the angle of elevation of the sun correct to the nearest degree.

A. 23°
B. 25°
C. 65°
D. 67°

9. In the figure, $AC = 12$ cm and $BC = 18$ cm. Find the length of AD correct to the nearest cm.

A. 4 cm
B. 5 cm
C. 6 cm
D. 7 cm



10. If x, y, z are in arithmetic sequence, which of the following is/are true?

I. $x - 4, y - 4, z - 4$ are in arithmetic sequence.
II. $3x, 3y, 3z$ are in arithmetic sequence.
III. x^2, y^2, z^2 are in geometric sequence.

A. I only
B. I and II only
C. I and III only
D. II and III only

11. Given that the sixth and the ninth terms of a geometric sequence are $\frac{3}{2}$ and $\frac{3}{16}$ respectively, find the common ratio of the geometric sequence.

A. $\frac{1}{2}$
B. $-\frac{1}{2}$
C. 2
D. -2

12. It is given that a and d are the first term and the common difference of an arithmetic sequence respectively. If $T(5) = 23$ and $T(10) = 48$, find the values of a and d .
- A. $a = -3, d = 5$
B. $a = 5, d = 3$
C. $a = 3, d = 5$
D. $a = -5, d = 3$
13. There are nine terms in an arithmetic series. The sum of the first 5 terms and that of the last 5 terms are 55 and 135 respectively. Find the common difference.
- A. 4
B. 5
C. 6
D. 7
14. The sum to infinity of a geometric sequence is $\frac{21}{2}$ and the second term is $\frac{7}{3}$. Find the common ratio.
- A. $\frac{2}{3}$
B. $\frac{1}{3}$ or $\frac{2}{3}$
C. $\frac{1}{7}$
D. $\frac{1}{7}$ or $\frac{1}{9}$
15. Solve the inequality $(x - 1)^2 \leq (x + 2)^2$.
- A. $x \leq -\frac{1}{2}$
B. $x \geq -\frac{1}{2}$
C. $-2 \leq x \leq 1$
D. All values of x
16. If $p < q \leq 0$, then which of the following must be positive?

A. $q + p$

B. $\frac{1}{q} - \frac{1}{p}$

C. $q - p$

D. pq

17. How many positive integers x will satisfy the inequality $(x + 2)(x - 3) < 14$?

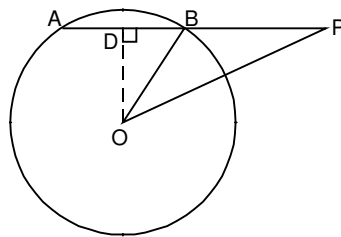
A. 6

B. 4

C. 9

D. 5

In the figure, O is the centre of the circle and $OD \perp AP$. If $AB = 8$ cm, $BP = 10$ cm and $OP = 15$ cm, find the radius of the circle



A. $\sqrt{3}$ cm

D. $\sqrt{17}$ cm

B. $\sqrt{5}$ cm

E. $3\sqrt{5}$ cm

C. $\sqrt{13}$ cm



SECTION B

18. The figure shows a right prism with a right-angled triangle as the cross-section. Find the angle between the line BF and the plane $ABCD$ correct to the nearest degree.

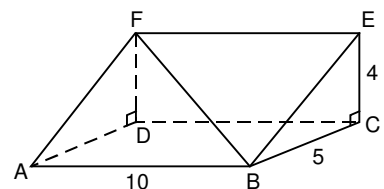
A. 20°

B. 30°

C. 35°

D. 40°

E. 50°



19. A blacksmith has 140 kg of iron, 90 kg of steel and 125 kg of copper. He makes two products A and B, and each requires the following quantities of materials:

Product	Iron (kg)	Steel (kg)	Copper (kg)
A	20	9	5
B	10	18	25

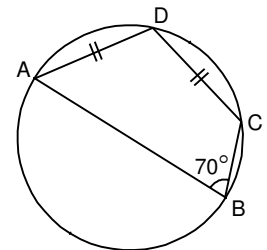
The profits on each unit of A and B made are \$30 and \$40 respectively. Suppose the blacksmith makes x units of A and y units of B, which of the following is not a constraint on x and y ?

- A. $x \geq 0$
 B. $3x + 4y \geq 0$
 C. $2x + y \leq 14$
 D. $x + 2y \leq 10$
 E. $x + 5y \leq 25$



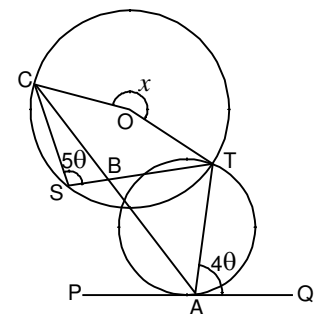
20. In the figure, a quadrilateral ABCD is inscribed in a circle with AB as diameter. If $AD = DC$ and $\angle CBA = 70^\circ$, find $\angle DAB$.

- A. 85°
 B. 75°
 C. 70°
 D. 65°
 E. 55°

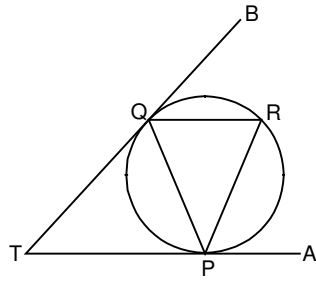


21. In the figure, O is the centre of the larger circle and PQ is a tangent to the smaller circle at A. ABC is a straight line. If $\angle QAT = 4\theta$ and $\angle CST = 5\theta$, find x .

- A. 200°
 B. 210°
 C. 220°
 D. 230°
 E. 240



22.



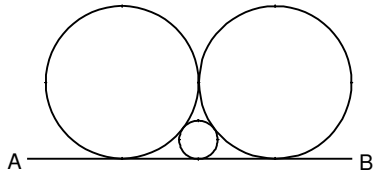
In the figure, TPA and TQB are tangents to the circle at P and Q respectively. If $\angle QTP = \angle QPR$, which of the following must be true?

- I. $PQ = PR$
- II. $\angle APR = \angle QRP$
- III. $\Delta TQP \sim \Delta PQR$

- A. I only
- B. III only
- C. I and II only
- D. I and III only
- E. I, II and III



23.



In the figure, the three circles touch one another. AB is their common tangent. If the two larger circles have the same area of $16\pi \text{ cm}^2$, the radius of the smaller circle is

- A. 1 cm.
- B. 1.2 cm.
- C. 1.4 cm.
- D. 1.6 cm.
- E. 1.8 cm.



24. The smallest value of $2^{\left(\frac{1}{2-\cos x}\right)}$ is

A. $\frac{1}{\sqrt{2}}$.

B. $\frac{1}{2}$.

C. $\sqrt[3]{2}$.

D. $\sqrt{2}$.

E. 2.



25. In the figure, OABC is a sector of radius $2r$. If $\angle AOC = \frac{\pi}{6}$, find the area of the shaded part.

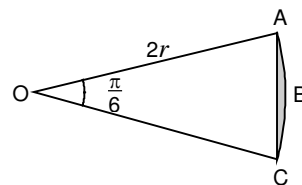
A. $\left(\frac{\pi}{6} - \frac{1}{2}\right)r^2$

B. $\left(\frac{\pi}{6} - 1\right)r^2$

C. $\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right)r^2$

D. $\left(\frac{\pi}{3} - \frac{1}{2}\right)r^2$

E. $\left(\frac{\pi}{3} - 1\right)r^2$



26. What is the least number of terms of the geometric series $2 + 8 + 32 + \dots$ that must be taken so that the sum is greater than 5 000?

A. 3

B. 4

C. 5

D. 6

E. 7



