S 2031

SSLC EXAMINATION, MARCH - 2025

MATHEMATICS

(English)

Time : 2½ Hours

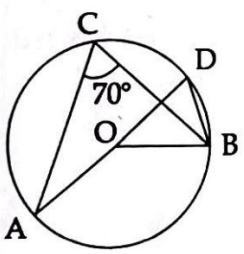
Total Score : 80

Instructions :

- Read each question carefully before answering.
- Give explanations wherever necessary.
- First 15 minutes is cool-off time. You may use this time to read the questions and plan your answers.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc., using approximations unless you are asked to do so.

Answer any three questions from 1 to 4. Each question carries 2 scores. Score 3x2=6

1. In the figure, O is the centre of the circle.
   If $\angle ACB = 70°$,



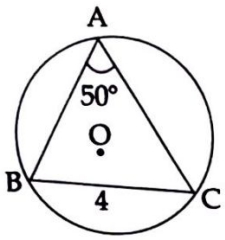
   (a) $\angle AOB =$ _____

   (b) $\angle ADB =$ _____

2. 3, 8, 13, ... is an arithmetic sequence.
   (a) What is the common difference ?
   (b) What is its 11^{th} term ?

3. Numbers from 1 to 20 are written on paper slips and put in a box. If a slip is to be taken from it without looking,
   (a) What is the probability that it is a prime number ?
   (b) What is the probability that it is a perfect square ?

Score

4. 

In the figure, O is the centre of the circle. If BC = 4 centimetre and $\angle A = 50°$, find the diameter of the circle.
($\sin 50° = 0.77$, $\cos 50° = 0.64$)

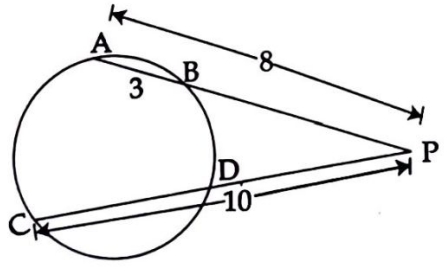
Answer any four questions from 5 to 10. Each question carries 3 scores. 4x3=12

5. 6 times of a natural number subtracted from the square of that number gives 187.
   (a) Form a second degree equation by taking the number as x.
   (b) Find the number.

6. (2, 5) and (3, 7) are two points on a line.
   (a) Find the slope of the line.
   (b) Write the equation of the line.

7. Consider the arithmetic sequence 2, 8, 14, ...
   (a) What is the remainder obtained when the terms of this sequence is divided by 6 ?
   (b) Is 176 a term of this sequence ? Why ?

8. In the figure PA = 8 centimetres, AB = 3 centimetres, PC = 10 centimetres.



   (a) Find the length of PB.
   (b) Find the length of PD.

9. A circle is drawn with (4, 3) as the centre and radius 5 units.
   (a) What is the distance from the centre of the circle to the x-axis ?
   (b) Write the coordinates of the points where the circle cuts the x-axis.

10. Draw a circle of radius 3 centimetres. Mark a point 9 centimetres away from the centre. Draw tangents from this point to the circle.

Score

Answer any eight questions from 11 to 21. Each question carries 4 scores. 8x4=32

11. Find the sum

(a) $1+2+3+.....+20$

(b) $5+10+15+.....+100$

(c) $8+13+18+.....+103$

(d) $4+9+14+.....+99$

12. Length of a rectangular hall is 5 metres more than the breadth. Diagonal is 10 metres more than the breadth.

(a) Taking breadth as x, write the measures of length and diagonal in terms of x.

(b) Form a second degree equation and find the length and breadth of the hall.

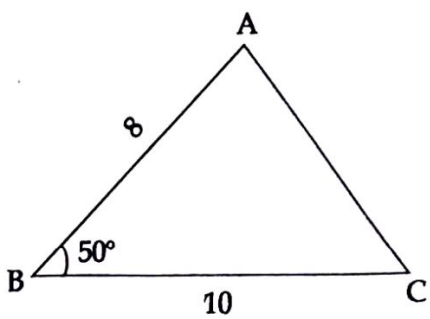
13. Coordinates of the points A and B are (3, 2) and (8, 7).

(a) Find the coordinates of the midpoint of the line joining the points A and B.

(b) If there is a point P with AP : PB = 2 : 3, find the coordinates of P.

14. Draw a rectangle of sides 7 centimetres and 3 centimetres and draw a square of equal area to it.

15.



In triangle ABC, AB = 8 centimetres, BC = 10 centimetres and $\angle B = 50°$

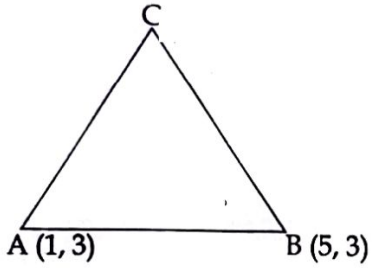
(a) Find the perpendicular distance from the vertex A to BC.

(b) Find the area of triangle ABC.

($\sin 50° = 0.77, \cos 50° = 0.64$)

Score

16. In the figure, triangle ABC is an equilateral triangle. Coordinates of A are (1, 3) and coordinates of B are (5, 3).

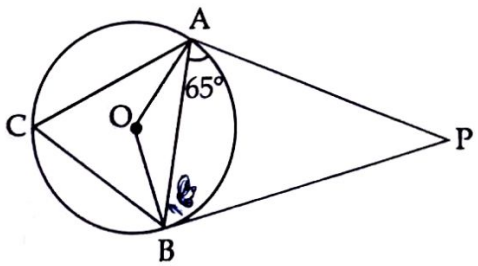


(a) Find the length of AB.
(b) Write the coordinates of the midpoint of AB.
(c) Find the coordinates of the vertex C.

17. Diameters of two hemispheres are in the ratio 3 : 2.
(a) Write the ratio of their radii.
(b) Write the ratio of their volumes.
(c) If the volume of the first hemisphere is 108 cubic centimetres, what is the volume of the second ?

18. A box contains red and blue beads. 16 out of them are red. If the probability of getting a red bead is $\frac{2}{3}$,
(a) What is the total number of beads ?
(b) What is the probability of getting a blue bead ?
(c) If 4 red beads are removed from the box, what is the probability of getting a red bead ?

19



In the figure, O is the centre of the circle. PA and PB are tangents, $\angle PAB = 65°$. Find the measures of the angles below :
(a) $\angle PBA =$ _____
(b) $\angle AOB =$ _____
(c) $\angle P =$ _____
(d) $\angle ACB =$ _____

Score

20. If $p(x) = x^2 - 7x + 12$.

(a) What is p(3) ?

(b) Write a first degree factor of $p(x) - p(3)$.

(c) Find the solutions of $p(x) - p(3) = 0$.

21. A tent in the shape of a square pyramid has length of the base edge 12 metres and height 8 metres.

(a) Find the slant height.

(b) What is the cost of the canvas to make the tent at a rate of 340 rupees per square metre ?

Answer any six questions from 22 to 29. Each question carries 5 scores. **6x5=30**

22 6^{th} term of an arithmetic sequence is 27 and 16^{th} term is 67.

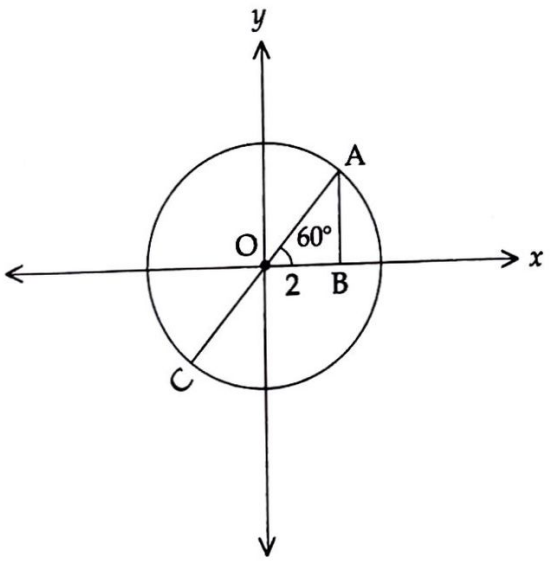
(a) Find the common difference of this sequence.

(b) Find its first term.

(c) Write its algebraic form.

(d) Find the sum of first 31 terms of this sequence.

23.



In the figure, a circle is drawn with origin as the centre. A is a point on the circle. $\angle AOB = 60°$; OB = 2 units.

(a) Write the coordinates of A.

(b) What is the radius of the circle ?

(c) Write the equation of the circle.

(d) Write the coordinates of the point C on the circle.

Score

24. The base radius of a solid metal cone is 12 centimetres and height 18 centimetres. It is melted and recast into spheres of radius 3 centimetres.

(a) What is the volume of the cone ?

(b) What is the volume of one sphere ?

(c) Find the number of spheres.

25. The table below shows the workers of a factory sorted according to their wages.

Daily Wages	Number of Workers
300 - 400	11
400 - 500	8
500 - 600	10
600 - 700	13
700 - 800	7
Total	**49**

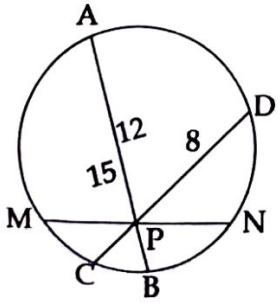
(a) If the workers are arranged in order of their wages, which position of the worker is taken as the median wage ?

(b) According to the assumption, what is the daily wage of 20^{th} worker ?

(c) Find the median wage.

26. Draw a circle of radius 2 centimetres. Draw a triangle with two of the angles 55° and 75° with all its sides as the tangents of the circle.

27. In the figure, the chords AB, CD and MN intersect at P. PA = 12 centimetres, AB = 15 centimetres, PD = 8 centimetres.



(a) Find the length of PC.

(b) Find the length of CD.

(c) If PM = PN, find the length of MN.

Score

28. A boy standing away from the foot of a building sees the top of the building at an angle of elevation 35°. Stepping 25 metres forward he sees the top of the building at an angle of elevation 70°. Height of the boy is 1.6 metre.

(a) Draw a rough figure based on the given details.

(b) What is the distance between the boy and the building when he sees the top at an elevation of 70° ?

(c) Find the height of the building.

($\sin35° = 0.57$, $\cos35° = 0.81$, $\tan35° = 0.70$, $\sin70° = 0.94$, $\cos70° = 0.34$, $\tan70° = 2.7$)

29. In trigonometry the reciprocals of sin and cos are called cosecant and secant. The reciprocal of tan is called cotangent. They are shortened as cosec, sec and cot.

Hence, $\operatorname{cosec} x = \frac{1}{\sin x}$, $\sec x = \frac{1}{\cos x}$, $\cot x = \frac{1}{\tan x}$

Answer the following questions based on the above details.

(a) $\sin x \times \operatorname{cosec} x =$ _____

(b) $\operatorname{cosec} 60° =$ _____

(c) $\cot 45° =$ _____

(d) What is $\sec 60° - \operatorname{cosec} 30°$?

$\left(1, 0, \frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

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