

1003-E

A

SECOND TERMINAL EXAMINATION - 2012

MATHEMATICS

Standard : X

Score : 80

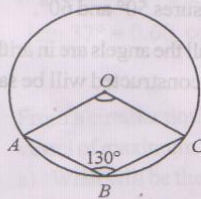
Time : 2½ hours

Instructions

- Answer the questions only after reading and understanding all questions.
- 15 minutes are given as cool-off time.
- Give explanations leading to the answer, wherever necessary.
- If any question has an "OR" in-between them, only one of them need be answered.
- Unless otherwise specified, approximate values of numbers like π , $\sqrt{2}$, $\sqrt{3}$ and so on need not be simplified

1. Can the difference of any two terms of the arithmetic sequence 10, 17, 24, ... be 100? Justify your answer. (2)

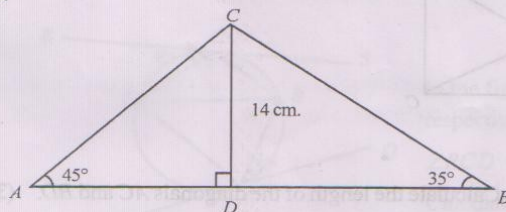
2.



In the figure A, B and C are the points on the circle with centre O . $\angle ABC = 130^\circ$. Find $\angle AOC$. (2)

3. Find the remainder on dividing $2x^3 - 3x^2 + 5x - 10$ by $(x - 2)$. (2)

4.

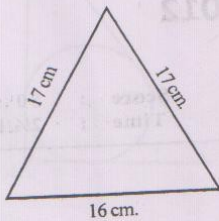


In $\triangle ABC$, $\angle A = 45^\circ$; $\angle B = 35^\circ$ and CD is the perpendicular from C to AB . $CD = 14$ centimetres. Calculate the length of AB .

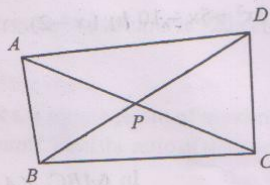
$[\sin 35^\circ = 0.57, \cos 35^\circ = 0.82, \tan 35^\circ = 0.70]$

(3)

5. One lateral face of a square pyramid is shown in the figure.

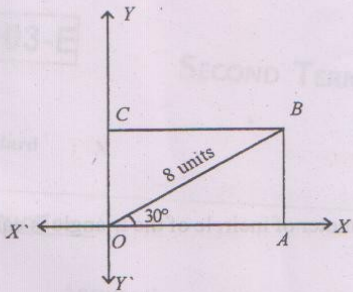


- (a) Find the slant height of the pyramid.
 (b) What will be the lateral surface area of the pyramid? (3)
6. Draw x -axis and y -axis in your answer sheet and mark the following points.
 $A(-3, 1)$; $B(6, 1)$; $C(3, 5)$ and $D(0, 5)$.
 Complete the quadrilateral $ABCD$ and suggest a suitable name for the quadrilateral. (3)
7. There are 6 black beads and 12 white beads in a box.
 (a) If you take one bead without looking into the box, what is the probability of getting a black bead?
 (b) Put one more black bead and another white bead into the box. Then take a bead from the box without looking into it. Does the probability of getting a black bead increase or decrease when compared to the probability of previous case? Justify your answer? (3)
8. Construct a triangle with inradius 3 centimetres and two angles with measures 50° and 60° . (3)
9. Students of a class constructed polygons with nine sides in such a way that all the angles are in arithmetic sequence. Dhanya said that the measure of one angle of all the polygons constructed will be same.
 (a) What is the sum of the measures of all the angles of each polygon?
 (b) What is the measure of the angle noticed by Dhanya? (3)
10. $ABCD$ is a cyclic quadrilateral. The diagonal BD bisects AC at P .



- $PC = 6$ centimetres and $PB = 4$ centimetres. Calculate the length of the diagonals AC and BD . (3)
11. The odd numbers from 1 to 50 are written on paper slips and kept in a box. The even numbers from 1 to 50 (including 50) are also written in paper slips and put in another box. Without looking into the box one slip is drawn from each box. Then,
 (a) What is the probability of getting perfect squares in both the paper slips?
 (b) What is the probability of getting multiples of 5 in both the paper slips? (3)

12.



In the figure O is the origin and $OABC$ is a rectangle. Length of the diagonal OB is 8 units. OB makes an angle 30° with the x -axis. Write the co-ordinates of the points, A , B and C . (3)

13. In a school assembly, 200 students are arranged in rows and columns. Number of columns is 1 more than 3 times the number of rows. Then,

- (a) Taking the number of rows as x , form a second degree equation. (4)
 (b) Find the number of students in a row. (4)

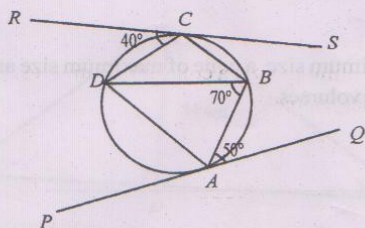
14. In $\triangle ABC$, $\angle B = 37^\circ$, $\angle C = 64^\circ$ and $AC = 12$ centimetres. Then,

- (a) Find the circumradius of $\triangle ABC$.
 (b) Find the length of AB . (4)
 [sin $37^\circ = 0.60$, cos $37^\circ = 0.80$, sin $64^\circ = 0.90$, cos $64^\circ = 0.44$]

15. From a circular tinsheet of radius 15 centimetres, a sector of central angle 288° is cut to make a conical vessel of maximum size. Then,

- a) What will be the radius of the vessel?
 b) Find whether this vessel would be sufficient to buy $1\frac{1}{2}$ litres of coconut oil? ($\pi \approx 3.14$) (4)

16.



In the figure, PQ and RS are tangents of the circle at A and C respectively.

$\angle RCD = 40^\circ$, $\angle ABD = 70^\circ$ and $\angle BAQ = 50^\circ$. Then, Calculate $\angle ADB$; $\angle CBD$; $\angle BDC$ and $\angle BCD$ (4)

17. $p(x) = 3x^3 - 13x^2 + kx + 12$. $(x - 2)$ is a factor of $p(x)$. Then,

- (a) Find the value of k and write $p(x)$.
 (b) Find the remainder when $p(x)$ is divided by $(x - 1)$
 (c) Which number is to be added to $p(x)$ to get a polynomial with factor $(x - 1)$? (4)

OR

Write $6x^2 - x - 2$ as a product of two first degree polynomials.

(4)

18.



In the figure $\angle A = 90^\circ$.

Prove that the length of diameter of incircle of the triangle is equal to $AB + AC - BC$ (4)

19. Sides of a rectangle are parallel to the axes. The co-ordinates of two opposite vertices of this rectangle are $(-5, 2)$ and $(7, 7)$. Then,
- What are the co-ordinates of the other two vertices? (4)
 - Find the length of the sides of the rectangle. (4)
 - Find the length of the diagonal. (4)
20. In $\triangle ABC$, $AB = 8$ centimetres, $\angle A = 70^\circ$ and $AC = 7$ centimetres. Construct the triangle and draw its incircle. Measure the inradius. (4)
21. A vertical tower stands on a horizontal place. A boy standing on the plane sees the top of a tower at an angle of elevation of 35° . By walking 25 metres towards the tower, he sees it at an angle of elevation of 50° . Then,
- Draw a rough figure and mark the measures. (4)
 - Find the height of the tower. (4)
- [$\sin 35^\circ = 0.57$, $\cos 35^\circ = 0.82$, $\tan 35^\circ = 0.70$, $\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.20$](5)

OR

- B. In $\triangle ABC$, $AB = 20$ centimetres, $BC = 25$ centimetres, $\angle B = 37^\circ$ and $\cos B = 0.8$. Then,
- Draw a rough figure using the above measures. (4)
 - Find the area of the triangle. (4)
 - Find the length of the side AC . (5)
22. Height of a cone is 15 centimetres and its volume is 320π cubic centimetres.
- Find the radius of the cone. (5)
 - Calculate the surface area of the cone. (5)
23. From three identical solid cubes, a square prism of maximum size, a cone of maximum size and a sphere of maximum size were cutoff. Find the ratio of their volumes. (5)

OR

Write $6x^2 - x - 2$ as a product of two first degree polynomials.