A

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SECOND TERMINAL EVALUATION 2024-2025
MATHEMATICS

E-1003

Class : 10

Time : $2\frac{1}{2}$ hours

Score : 80

Instructions

- There is a 'cool off' time of 15 minutes in addition to the writing time. Use this time to get familiar with questions and plan your answers.
- Read the instructions carefully before answering the questions.
- Keep in mind, the score and time while answering the questions. Give explanations wherever necessary.
- No need to simplify irrationals like $\sqrt{2}, \sqrt{3}, \pi$ etc., using approximations unless you are asked to do so.

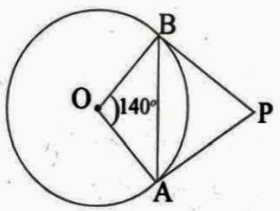
Answer any 3 Questions from 1 to 4. Each question carries 2 scores. **(3 x 2 = 6)**

1. a) What is the 10th term of the arithmetic sequence 5, 10, 15, ... ?
   b) Which is the first perfect square number of this sequence ?

2. a) Which of the following is the co-ordinate of a point on the x axis ?
   (0, 6), (2, 6), (6, 0), (−2, 3)
   b) Find the distance between the points (1, 7) and (5, 7).

3. PA and PB are tangents to a circle with centre O.
   $\angle AOB = 140°$

   a) What is $\angle APB$?
   b) What is $\angle PAB$?



4. All edges of a square pyramid are of equal length. Sum of all edges is 72 centimetres.
   a) What is the total number of edges of a square pyramid ?
   (4, 6, 8, 10)
   b) What is the length of a base edge of the given square pyramid ?

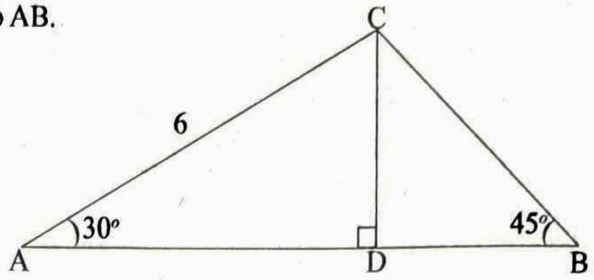
Answer any 4 Questions from 5 to 10. Each question carries 3 scores. **(4 x 3 = 12)**

5. A box contains paper slips numbered 1, 2, 3, 4, 5 and another box contains paper slips numbered 1, 2, 3. Without looking into it, one paper slip is taken from each box
   a) What is the probability that both the numbers are equal ?
   b) What is the probability that both are prime ?

6. In the figure, CD is perpendicular to AB.
AC = 6 centimetres,
$\angle A = 30^o$, $\angle B = 45^o$

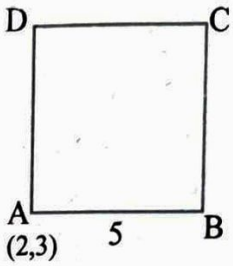
a) What is the length of CD ?
(3, 6, $3\sqrt{3}$, $6\sqrt{3}$)

b) Find the length of AB.



7. In the figure, the sides of the square ABCD are parallel to the co-ordinate axes. The length of a side of the square is 5 units.

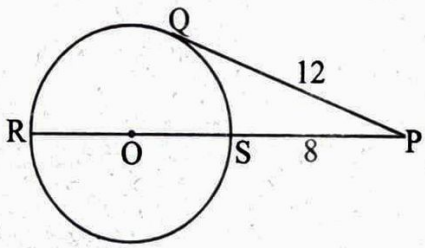
Write the co-ordinates of the points B, C and D.



8. Draw a circle of radius 3 centimetres. Mark a point 6.5 centimetres away from the centre of the circle. Draw tangents from this point to the circle.

9. The base edge of a square pyramid is 20 centimetres and its slant height is 26 centimetres.
a) What is the height of the pyramid ?
(12 centimetres, 13 centimetres, 24 centimetres, 28 centimetres)
b) Find the volume of the square pyramid .

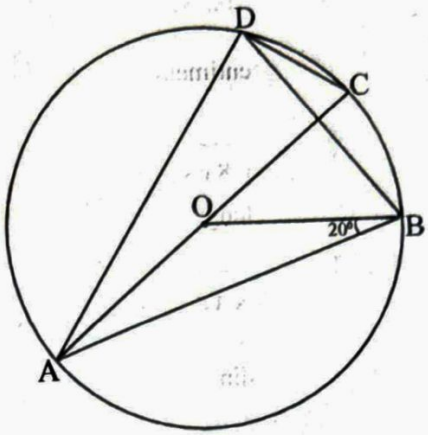
10. PQ is a tangent from the point P to the circle with centre O.
PS = 8 centimetres and
PQ = 12 centimetres
a) What is the length of PR ?
(8 cm, 12 cm, 18 cm, 20 cm)
b) What is the length of RS ?
c) What is the radius of the circle ?



Answer any 8 Questions from 11 to 21. Each question carries 4 scores. **(8 x 4 = 32)**

11. 8 is added to the product of two consecutive even numbers gives 128.
a) Taking the first number as x, write the next number in terms of x.
b) Write a second degree equation using the given details.
c) What are the numbers ?

12. In the figure, O is the centre of the circle.
A, B, C and D are points on the circle.
$\angle ABO = 20^\circ$, $AB = AD$



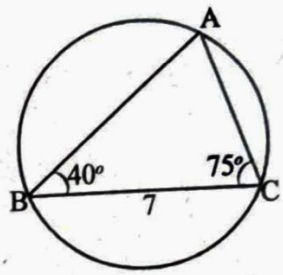
a) $\angle ADC =$ _____
(20^0, 40^0, 70^0, 90^0)

b) $\angle AOB =$ _____

c) $\angle ADB =$ _____

d) $\angle ACD =$ _____

13. In the figure, $\angle B = 40^\circ$, $\angle C = 75^\circ$
BC = 7 centimetres.



a) $\angle A =$ _____

b) Find the diameter of the circumcircle.

c) Find the length of AB and AC.

($\sin 40^\circ = 0.64$, $\sin 65^0 = 0.91$, $\sin 75^\circ = 0.97$)

14. A(−1, 2), B(7, 2), C(3, 5) are the co-ordinates of the vertices of a triangle.

a) Find the length of the sides of the triangle.

b) Write suitable name of this triangle ?
(Equilateral triangle, Isosceles triangle, Right-angled triangle)

15. Draw a circle of radius 3 centimetres. Draw a triangle of angles 70^0, 50^0 with all its sides touching the circle.

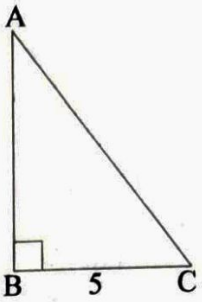
16. From a circle of radius 18 centimetres, a sector of central angle 140^0 is cut out and made into a cone.

a) What is the slant height of the cone ?

b) What is the radius of the cone ?

c) Find the curved surface area of the cone.

17. In the figure, ABC is a right angled triangle.



BC = 5 centimetres, $\sin A = \frac{5}{13}$

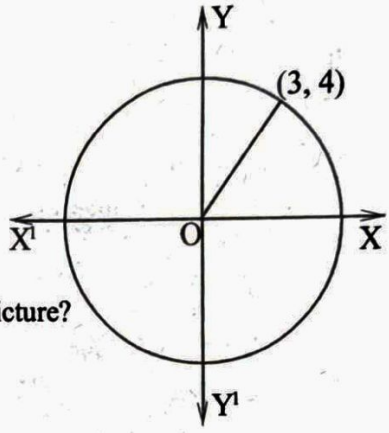
a) AC = _____
(5 cm, 8 cm, 13 cm, 18 cm)

b) Find length of AB.

c) $\tan A$ = _____

d) $\tan A \times \tan C$ = _____

18. The co-ordinates of a point on the circle with origin as centre is (3, 4).

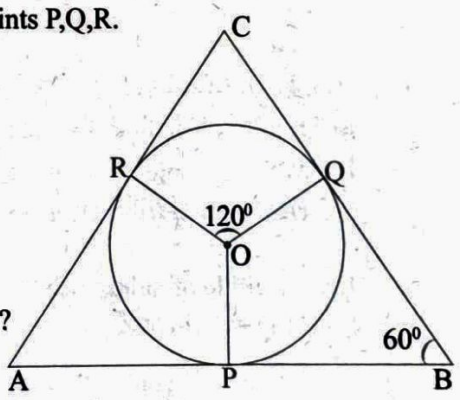


a) What is the radius of the circle ?

b) Write the co-ordinates of the points where the circle cuts the X axis.

c) What is the position of the point (–1, –5) in this picture? (inside the circle, on the circle, outside the circle)

19. The sides of ΔABC touches the circle at the points P,Q,R.
AP = PB = 5 centimetres,
$\angle B = 60^\circ$, $\angle QOR = 120^\circ$.

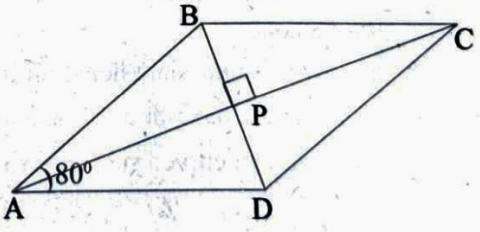


a) What is the measure of $\angle C$?

b) Find the perimeter of triangle ABC ?

c) Find the radius of incircle of triangle ABC ?

20. ABCD is a rhombus.
$\angle BAD = 80^0$, $AC = 10$ centimetres.



a) AP = _____

b) Find the length of PB.

c) Calculate the area of the rhombus ABCD.

Angle	sin	cos	tan
40^0	0.64	0.77	0.83
50^0	0.77	0.64	1.19

21. The volume and surface area of a solid metal sphere are numerically equal.
   a) What is the radius of the sphere ?
   b) By melting and recasting, howmany hemispheres of radius 1 centemetres can be made?

Answer any 6 Questions from 22 to 29. Each question carries 5 scores. **(6 x 5 = 30)**

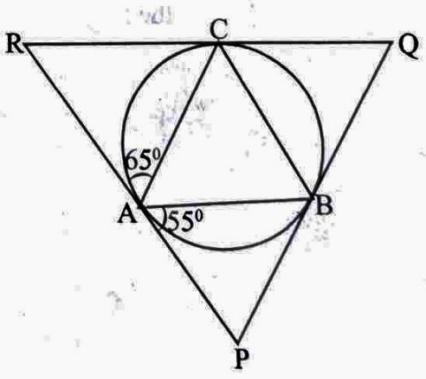
22. The algebraic form of an arithmetic sequence is $4n + 1$. Then,
   a) What is the first term ?
   b) What is the 21st term ?
   c) What is the sum of the first 21 terms ?
   d) What is the sum of the first 21 terms of the sequence obtained by adding 1 to each term of this sequence ?

23. A cylindrical vessal of radius 20 centimetres and height 30 centimetres is filled with water.
   a) How many litres of water can it hold?
   b) If a solid metal sphere of radius 15 centimetres is immersed into the vessal, how many litres of water remain in it ?

24. A man standing on the top of a building sees the top of a tower 40 metres away at an elevetion of 35^0 and sees the foot of the tower at a depression of 50^0.
   a) Draw a rough figure using the given data.
   b) What is the height of the building ?
   c) What is the height of the tower ?
   (tan $35^0 = 0.70$, tan $40^0 = 0.84$, tan $50^0 = 1.19$)

25. a) Draw X, Y axes and mark the following points.
   $(-3, 0), (3, 0), (6, 4), (0, 4)$
   b) Find the area of the quadrilateral formed by joining these points in order.

26. In the figure, PQ, QR and PR are tangents to the circle.
   $\angle RAC = 65^o$, $\angle PAB = 55^o$
   a) What is $\angle BAC$?
   $(50^0, 55^0, 60^0, 65^0)$
   b) What is $\angle ABP$?
   c) Find all the three angles of ΔPQR.



27. Draw a triangle of sides 6 centimetres, 7 centimetres and angle between them is 70^0. Draw its incircle and calculate its radius.

28. A toy is in the shape of a square pyramid. Its base perimeter is 96 centimetres and height is 9 centimetres.

a) What is the length of the base edge of the toy ?

b) What is the slant height of the toy ?

c) What is the cost of painting 100 such toys at the rate of 50 rupees per square metre ?

29. Read the mathematical ideas given carefully.

$1 = 1,\ 1+2 = 3,\ 1+2+3 = 6,$ .....

1, 3, 6, ... are known as triangular numbers.

1, 4, 9, ... are known as perfect square numbers.

Also,

$$1+2+3+ \ldots +n = n\left(\frac{n+1}{2}\right)$$

Answer the following questions based on the given pattern.

$1^3 = 1^2 = 1$

$1^3+2^3 = 3^2 = 9$

$1^3+2^3+3^3 = 6^2 = 36$

.....

.....

.....

a) Write the next line of the pattern.

b) What is the fifth triangular number ?

c) What is the perfect square number in the sixth line ?

d) $1^3+2^3+3^3+ \ldots +10^3 = (\_\_\_\_\_)^2$

e) $1^3+2^3+3^3+ \ldots +n^3 = \_\_\_\_\_$