CLASS X
SAMPLE PAPER-041
MATHEMATICS

Time : 3 Hrs   M.M. 80

General Instructions:
(i)   All questions are compulsory.
(ii) The question paper consists of 34 questions divided into four sections –A, B, C and D.
      Section Acontains10 questions of 1mark each, Section B is of 8 questions of 2 marks each,
      Section C is of 10 questions of 3 marks each and section D is of 6 questions of 4 marks
      each.
(iii) There is no overall choice. However, an internal choice has been provided in one
      question of two marks each, three questions of three marks each and two questions
      of six marks each.
(iv) In question on construction, the drawing should be neat and exactly as per the given
      measurements.
(v)   Use of calculator is not permitted.

SECTION A

1. The number of real roots of the equation $(x - 1)^2 + (x - 2)^2 + (x + 3)^2 = 0$ is…..
    (a) 2   (b) 1   (c) 0   (d) 3
2. 15th term of the sequence $x - 7, x - 2, x + 3,……$ is
    (a) x+63   (b) x+73   (c) x+83   (d) x+53

3. In figure PQ and PR are tangents to the circle
    with centre O such that $\angle QPR = 50^o$ then
    $\angle OQR$ is equal to
    (a) 25° (b) 30° P $\angle$ 50°
    (c) 40° (d) 50°

    Q

    O

    R
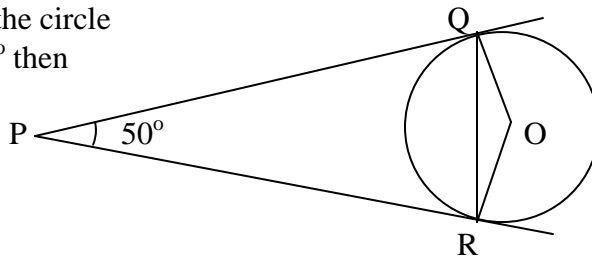
4. The mid point of the line segment AB
   in given fig. is (4, - 3). The respective
   coordinates of A and B are
   (a) (8, 0) and (0, 6)   (b) (-8, 0) and (0, 6)
   (c) (6, 0) and (0, 8)   (d) (8, 0) and (0, - 6)
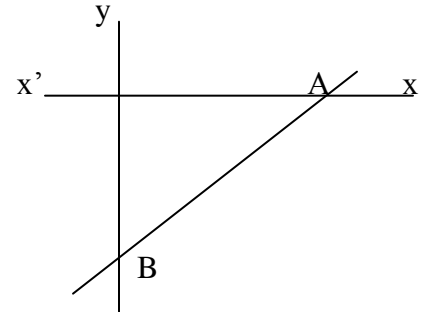
5. If the area of a circle is 154cm^2, then its perimeter is
   (a) 11cm   (b) 22cm   (c) 44cm   (d) 55cm

6. The length of an arc that subtends an angle of 24° at the centre of a circle with 5 cm
   radius is
   (a) $\frac{2\pi}{3}$ cm   (b) $\frac{3\pi}{2}$ cm   (c) $\frac{\pi}{3}$ (d) $\frac{5\pi}{23}$ cm

7. If radii of the two concentric circles are 15cm and 17cm, then the length of each chord of
   one circle which is tangent to other is
   (a) 8cm   (b) 16cm   (c) 30cm   (d) 17cm

8. The ratio of the volume of a cube to that of a sphere which will exactly fit inside the cube is
   (a) $\pi : 8$ (b) π (c) $8 : \pi$ (d) $6 : \pi$

9. If the length of shadow cast by a pole is √3 times the length of the pole, then the angle of
   elevation of the sun is
   (a) 60° (b) 45° (c) 30° (d) 90°

10. A letter is chosen at random from the word "PROBABILITY". The probability that it is
    a vowel is
    (a) $\frac{1}{11}$ (b) $\frac{2}{11}$ (c) $\frac{3}{11}$ (d) $\frac{4}{11}$

SECTION B

11. Comment upon the nature of roots of each of the quadratic equation 2x^2 + 12x + 18 = 0.

12. In the given figure a circle touches the side
    BC of ∆ABC at P and touches AB and AC
    produced   at Q and R respectively.   If
    AQ = 5cm , find the perimeter of ∆ABC.
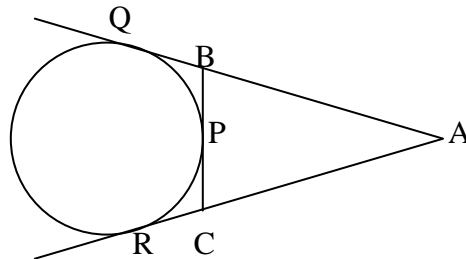
13. In the given fig. ABCD is a square of side 4cm. Find the area of shaded region.
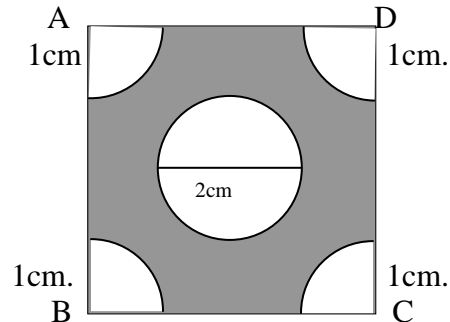
14. For what value of n are the nth terms of two AP's 63,65,67,……. and 3,10,17,…… equal.

15. The king queen and jack of diamonds are removed from a pack of 52 cards and then the pack is well shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) Diamonds (ii) A Jack.

OR

In a leap year find the probability of getting 53 Saturdays.

16. The slant height of a frustum of a cone is 4cm and the perimeters (circumferences) of its circular ends are 18cm and 6cm. Find the curved surface area of the frustum.

17. Using distance formula, show that (3, 3) is the centre of the circle passing through the points (6, 2), (0, 4) and (4, 6). Find the radius of the circle.

18. Using the distance formula, prove that the points (0, 0), (2, 3) and (6, 9) lie on a straight line.

SECTION C

19. Find the sum of 3+11+19+………..+803.

OR

The sum of first 9 terms of an A.P. is 171 and that for the first 24 terms is 996. Find the A.P.

20. A box contains 25 cards, numbered from 1 to 25. A card is drawn from the box at random, Find the probability that the number on the drawn card is
(i) Even (ii) Prime and (iii) multiple of 6

21. A solid iron spherical ball is melted and recast into smaller balls of equal size. If the radius of smaller ball is 1/8th of the original ball. Find the number of smaller balls made. Assuming that there is no wastage of metal in the process.

22. Solve the equation by using the quadratic formula $9x^2 - 9(a+b) x + [2a^2 + 5ab + 2b^2] = 0$

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23. Construct a ΔABC in which AB=6.5cm, ∠B=60° and BC = 5.5cm. Also construct a triangle AB'C' similar to ΔABC, whose each side is $^3/_2$ times the corresponding side of the triangle ΔABC.

24. In the figure, PA and PB are two tangents Drawn to a circle with center O, from an external point P such that PA=5cm and ∠APB = 60°. Find the length of Chord AB.
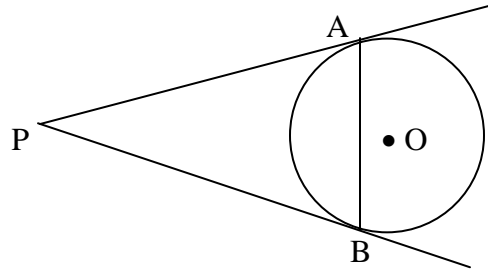
In fig. ABC is a right angled triangle with ∠B = 90° AB = 48cm. and BC = 14cm. With AC as diameter a semicircle is drawn and with BC as radius a quadrant of a circle is drawn. Find the area of the shaded region.
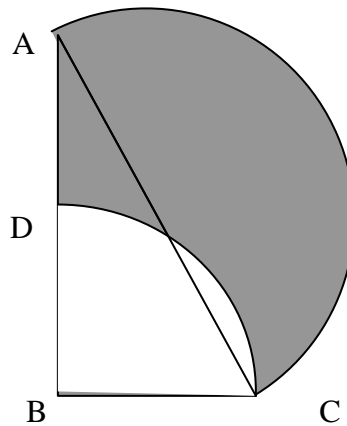
OR

PQRS is a diameter of a circle of radius 6cm. The lengths PQ, QR and RS are equal. Semicircles Are drawn on PQ and QS as diameters as shown in the figure. Find the perimeter of the shaded region.
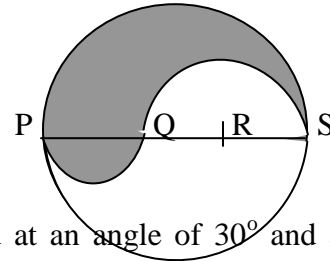
25. A tree is broken by the wind. The top struck the ground at an angle of 30° and at a distance of 30m from the root. Find the whole height of the tree.

26. Using the formula for area of a triangle, find the value of k for which the points A(2, 3), B(4, k) and C(6, -3) are collinear.

OR

The line-segment joining the points (3,-4) and (1,2) is trisected at the points P and Q. If the coordinates of P and Q are (p,-2) and (5/3,q) respectively, find the values of p and q.

27. The coordinates of the mid- point of the line joining the points (2p+2, 3) and (4, 2q+1) are(2p, 2q). Find the values of p and q.

SECTION D

28. A bucket is in the form of a frustum of a cone with a capacity of 12308.8cm³ of water. The radii of the top and bottom circular ends are 20cm. and 12cm. respectively. Find the height of the bucket and the area of the metal sheet used in making. (Use π = 3.14)

OR

A hollow cone is cut by a plane parallel to the base and the upper portion is removed. If the curved surface of the remainder is 8/9th of the curved surface of the whole cone. Find the ratio of the line segments into which the cone's altitude is divided by the plane.

29. From a window (60 meters high above the ground) of a house in a street the angle of elevation and depression of the top and the foot of the another house on opposite side of street are 60° and 45° respectively. Show that the height of the opposite house is 60(1+√3) meters.

30. A two digit number is such that the product of the digits is 14. When 45 is added to the number, then the digits are reversed. Find the number.

OR

Swati can row her boat at a speed of 5km/hr in still water. If it takes 1 hour more to row the boat 5.25 km upstream than to return downstream. Find the speed of stream.

31. The tangent at any point of a circle is perpendicular to the radius through the point of contact.

32. Find the sum of all three digit numbers which leave the remainder 2, when divided by 3.

33. A hemispherical tank full of water is emptied by a pipe at the rate of 25/7 litres per second. How much time will it take to half empty the tank, if the tank is 3 meters in diameter.

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