CBSE Board
Class X Mathematics
Board Paper - 2012

Time: 3 hours Total Marks: 90

General Instructions:

1. **All** questions are **compulsory**.
2. The question paper consists of **34** questions divided into **four sections** A, B, C, and D.
3. **Section A** contains of **10** questions of 1 mark each, which are multiple choice type question, **Section B** contains of **8** questions of 2 marks each, **Section C** contains of **10** questions of 3 marks each and **Section D** contains of **6** questions of 4 marks each.
4. Question numbers **1 to 8** in **Section A** are multiple choice questions where you are to select **one** correct option out of the given four.
5. There is no overall choice. However, internal choice has been provided in **one** question of **2 marks**, **three** questions of **3 marks** each and **two** questions of 4 **marks** each. You have to attempt only one of the alternatives in all such questions.
6. Use of calculator is **not** permitted.

SECTION – A

1. The length of shadow of a tower on the plane ground is $\sqrt{3}$ times the height of the tower. The angle of elevation of sun is

   (A) 45^{o}

   (B) 30^{o}

   (C) 60^{o}

   (D) 90^{o}

2. If the area of a circle is equal to sum of the areas of two circles of diameters 10 cm and 24 cm, then the diameter of the larger circle (in cm) is

   (A) 34

   (B) 26

   (C) 17

   (D) 14

3. If the radius of the base of a right circular cylinder is halved, keeping the height the same, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is

(A) 1 : 2

(B) 2 : 1

(C) 1 : 4

(D) 4 : 1

4. Two dice are thrown together. The probability of getting the same number on both dice is:

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) $\frac{1}{6}$

(D) $\frac{1}{12}$

5. The coordinates of the point P dividing the line segment joining the points A(1, 3) and B(4, 6) in the ratio 2 : 1 are

(A) (2, 4)

(B) 3, 5)

(C) (4, 2)

(D) 5, 3)

6. If the coordinates of the one end of a diameter of a circle are (2, 3) and the coordinates of its centre are (-2, 5), then the coordinates of the other end of the diameter are:

(A) (-6, 7)

(B) (6, -7)

(C) (6, 7)

(D) (-6, -7)

7. The sum of first 20 odd natural number is

(A) 100

(B) 210

(C) 400

(D) 420

8. If 1 is a root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then ab equals

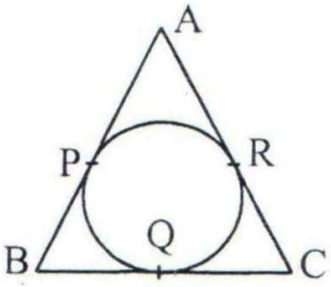
(A) 3

(B) $-\frac{7}{2}$

(C) 6

(D) -3

9. In Fig., the sides AB, BC and CA of a triangle ABC, touch a circle at P, Q and R respectively. If PA = 4 cm, BP = 3 cm and AC = 11 cm, then the length of BC (in cm) is



(A) 11

(B) 10

(C) 14

(D) 15

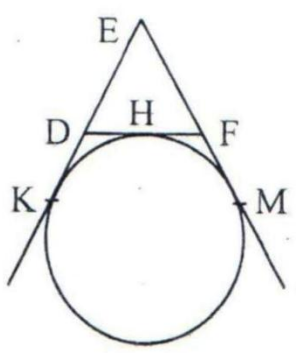
10. In Fig., a circle touches the side DF of ΔEDF at H and touches ED and EF produced at K and M respectively. If EK = 9 cm, then the perimeter of ΔEDF (in cm) is:

(A) 18

(B) 13.5

(C) 12

(D) 9



SECTION – B

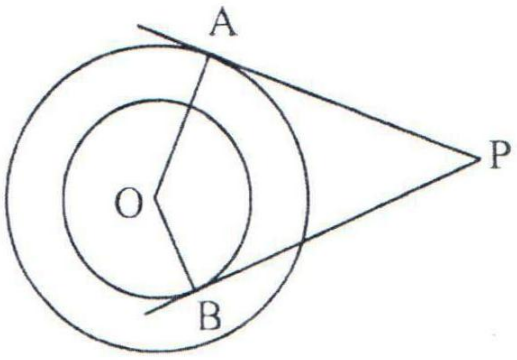
11. If a point A(0, 2) is equidistant from the points B(3, p) and C(p, 5) then find the value of p.

12. A number is selected at random from first 50 natural numbers. Find the probability that it is a multiple of 3 and 4.

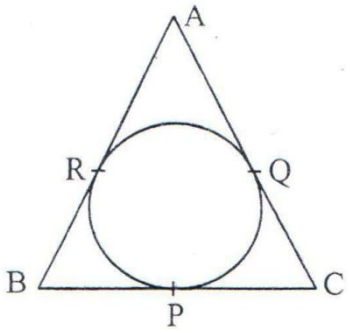
13. The volume of a hemisphere is $2425\frac{1}{2}$ cm^3. Find its curved surface area.

$\left[\text{Use } \pi = \frac{22}{7}\right]$

14. Tangents PA and PB are drawn from an external point P to two concentric circle with centre O and radii 8 cm and 5 cm respectively, as shown in Fig., If AP = 15 cm, then find the length of BP.

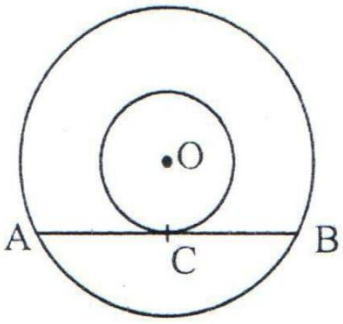


15. In fig., an isosceles triangle ABC, with AB = AC, circumscribes a circle. Prove that the point of contact P bisects the base BC.

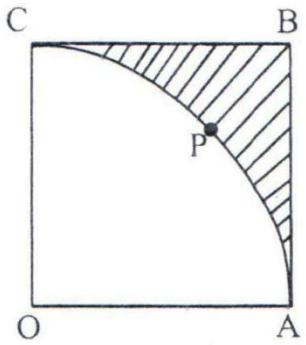


OR

In fig., the chord AB of the larger of the two concentric circles, with centre O, touches the smaller circle at C. Prove that AC = CB.



16. In fig., OABC is a square of side 7 cm. If OAPC is a quadrant of a circle with centre O, then find the area of the shaded region. $\left[\text{Use } \pi = \frac{22}{7}\right]$



17. Find the sum of all three digit natural numbers, which are multiples of 7.

18. Find the values (s) of k so that the quadratic equation $3x^2 - 2kx + 12 = 0$ has equal roots.

SECTION – C

19. A point P divides the line segment joining the points A(3, -5) and B(-4, 8) such that $\frac{AP}{PB} = \frac{K}{1}$. If P lies on the line x + y = 0, then find the value of K.

20. If the vertices of a triangle are (1, -3), (4, p) and (-9, 7) and its area is 15 sq. units, find the value (s) of p.

21. Prove that the parallelogram circumscribing a circle is a rhombus.

OR

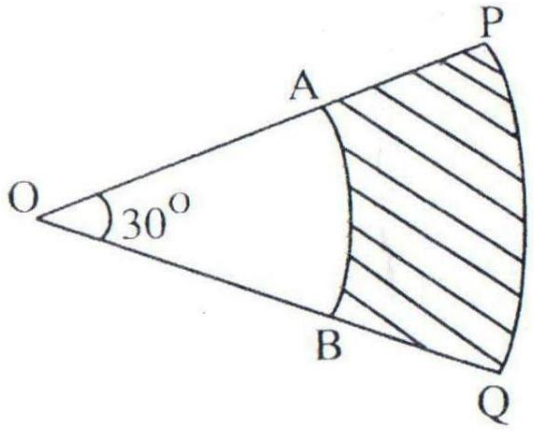
Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

22. From a solid cylinder of height 7 cm and base diameter 12 cm, a conical cavity of same height and same base diameter is hollowed out. Find the total surface area of the remaining solid. $\left[\text{Use } \pi = \frac{22}{7}\right]$

OR

A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, then find the radius and slant height of the heap.

23. In fig., PQ and AB are respectively the arcs of two concentric circles of radii 7 cm and 3.5 cm and centre O. If $\angle POQ = 30^o$, then the area of the shaded region. $\left[\text{Use } \pi = \frac{22}{7}\right]$



24. Solve for x: $4x^2 - 4ax + (a^2 - b^2) = 0$

Or

Solve for x: $3x^2 - \sqrt{6}x + 2 = 0$

25. A kite is flying at a height of 45 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string assuming that there is slack in the string.

26. Draw a triangle ABC with side BC = 6 cm, $\angle C = 30°$ and $\angle A = 105°$. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of ΔABC.

27. The 16^{th} term of an AP is 1 more than twice its 8^{th} term. If the 12^{th} term of the AP is 47, then find its nth term.

28. A card is drawn from a well shuffled deck of 52 cards. Find the probability of getting (i) a king of red colour (ii) a face card (iii) the queen of diamonds.

SECTION – D

29. A bucket is in the form of a frustum of a cone and its can hold 28.49 litres of water. If the radii of its circular ends are 28 cm and 21 cm, find the height of the bucket. $\left[\text{Use } \pi = \frac{22}{7}\right]$

30. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of depression from the top of the tower of the foot of the hill is 30°. If the tower is 50 m high, find the height of the hill.

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

OR

A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.

32. A shopkeeper buys some books for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Rs. 1 less. Find the number of books he bought.

OR

The sum of two number is 9 and the sum of their reciprocals is $\frac{1}{2}$. Find the numbers.

33. Sum of the first 20 terms of an AP is -240, and its first term is 7. Find its 24^{th} term.

34. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. $\left[\text{Use } \pi = \frac{22}{7}\right]$.