

Very Short Answer Type Questions[1 Mark each]

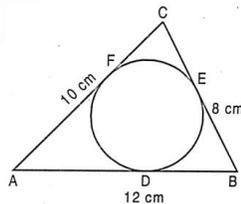
- If the equation $x^2 + 4x + k = 0$ has real and distinct roots, then k is _____.
- A circle touches all the four sides of a quadrilateral ABCD with $AB=6\text{cm}$, $BC=7\text{cm}$ and $CD=4\text{cm}$. Find AD.
- If the altitude of the sun is at 60° , then find the height of the vertical tower that will cast a shadow of length 30m.
- A letter is chosen at random from the letters of the word 'ASSASSINATION'. Find the probability that the letter chosen is a (i) vowel (ii) consonant.

Short Answer Type Questions - I [2 Marks each]

- Which term of the AP : 3, 15, 27, 39, . . . will be 132 more than its 54th term?
- Find the point on the x-axis, which is equidistant from the points (6, 3) and (3, 0).
- Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact.
- 2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.
- Solve: $2^{2x} - 3.2^{(x+2)} + 32 = 0$.
- In what ratio does the point (-4, 6) divide the line segment joining the points A(-6, 10) and B(3, -8)?

Short Answer Type Questions - II [3 Marks each]

- If -4 is a root of the quadratic equation $x^2 + kx - 4 = 0$ and the quadratic equation $x^2 + px + k = 0$ has equal roots, find the value of p and k .
- A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding: (i) minor segment (ii) major sector. (Use $\pi = 3.14$).
- Find the sum of all three digit positive numbers divisible by 6.
- From a window (h meters high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ and ϕ respectively. Show that the height of the opposite house is $h(1 + \tan \theta \cot \phi)$.
- From a metallic plate, which is square of side 10cm, a circular disc of diameter 3.5cm cut off. Find the weight of remaining part if 1 sq cm of the plate weighs 5gm.
- A circle is inscribed in a $\triangle ABC$ having sides 8cm, 10cm and 12cm as shown in figure. Find AD, BE and CF.



- Draw a circle of radius 5 cm. From a point 8 cm away from the centre, construct a pair of tangents to the circle and measure of their lengths.

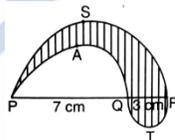
18. A game consists of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh will win the game if all the tosses show the same result, (ie., either all three heads or all three tails) and loses the game otherwise. Find the probability that Ramesh will lose the game.
19. Find the centre of a circle passing through the points (6, - 6), (3, - 7) and (3, 3).
20. If a cone cut into two parts by a horizontal plane passing through the midpoints of its axis, find the ratio of the volume of the upper part and the cone.

Long Answer Type Questions [4 Marks each]

21. A plane left 40 minutes late due to bad weather and in order to reach destination, 1600km away in time, it had to increase its speed by 400km/hr from its usual speed. Find its usual speed.
22. Sum of the first p, q and r terms of an A.P. are a, b and c respectively. Prove that:

$$\frac{a}{p}(q-r) + \frac{b}{q}(r-p) + \frac{c}{r}(p-q) = 0.$$

23. Prove that the intercept of a tangent between two parallel tangents to a circle subtends a right angle at the centre.
24. Construct a triangle ABC of sides 4cm, 5cm and 6 cm. Then construct another triangle similar to it whose sides are $\frac{3}{4}$ times the corresponding sides of the given triangle. Write the steps of construction.
25. The angle of elevation of the top of a chimney from the foot of a tower is 60° and the angle of depression of the foot of the chimney from the top of the tower is 30° . If the height of the tower is 40m, find the height of the chimney. According to pollution control norms, the minimum height of a smoke emitting chimney should be 100m. State if the height of the above mentioned chimney meets the pollution norms. What value is discussed in this question?
26. A well of diameter 4 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of height 40cm to form an embankment. Find the width of the embankment.
27. In figure, PSR, RTQ and PAQ are three semicircles of diameters 10cm, 3cm and 7cm respectively. Find the perimeter of the shaded region.



28. Cards marked with numbers 21 to 40 are placed in the box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is:
 - (a) an odd composite number.
 - (b) a number not divisible by 5.
 - (c) a number in the form $3q+1$.
29. The vertices of a triangle are A(-5, 7), B(3, 2) and C(4, 5). Show whether it is an isosceles, scalene or equilateral triangle. Also, find its area.
30. A farmer buys a used tractor for Rs12000. He pays Rs6000 cash and agrees to pay the balance in annual installments of Rs 500 plus 12% interest on the unpaid amount. How much will the tractor cost him?
31. A right triangle having sides 15cm and 20cm is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed. ($\pi = 3.14$).

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