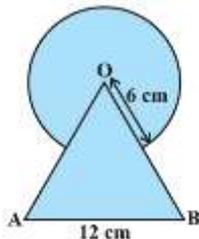


## MATHS ASSIGNMENT FOR PRE BOARD EXAMINATIONS

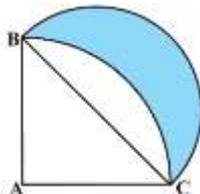
1. Find the value of 'k' such that the quadratic equation  $2x^2 - kx + 3 = 0$  has two equal roots.
2. If  $x = 2$  is one root of  $kx^2 - 4x + 12 = 0$  find 'k' and other root.
3. Find the discriminant of  $3x^2 - 4x + 3 = 0$ .
4. Write the number of real roots exist for the quadratic equation  $x^2 - 8x + 24 = 0$ .
5. Find the roots of the quadratic equation  $6x^2 - 8\sqrt{2}x - 3 = 0$ .
6. Sum of the squares of two consecutive natural numbers is 313. Find the numbers.
7. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.
8. The sum of the reciprocals of Reshma's ages (in years) 3 yr ago and 5 yr from now is  $\frac{1}{3}$ . Find her present age.
9. An express train takes 1 h less than a passenger train to travel 132 km between Warangal and Hyderabad (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 kmph more than that of the passenger train, find the average speed of two trains.
10. Two taps together can fill a tank in  $9\frac{3}{8}$  hours. The tap of larger diameter takes 10h less than the smaller one to fill the tank separately. Find the time in which each tap separately fill the tank.
11. A piece of cloth costs ₹200. If the piece was 5m longer and each metre of cloth costs ₹ 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is the original rate per metre?
12. Find the 20<sup>th</sup> term of the AP 3, 8, 13, ..., 253.
13. Ramkali saves ₹ 5 in the first week of a year and then increased her weekly savings by ₹1.75. If in the n<sup>th</sup> week, her weekly savings becomes ₹20.75. Find n.
14. If the sum of 13 terms of an AP is 169 and that of 21 terms is 441, Find the sum of n terms.
15. If the 15<sup>th</sup> term of an AP is 32 and 32<sup>nd</sup> term of the same AP is 15; Find the 47<sup>th</sup> term.
16. Find the Sum of 3 digit numbers which are divisible by 7.
17. The ratio of the sum to 'n' terms of two AP's is  $(7n+1):(4n+27)$ . Find the ratio of their n<sup>th</sup> terms.
18. A sum of ₹700 is to be used to give eight cash prizes to students of a school for their overall academic performance. If each prize is ₹20 less than its preceding prize, find the value of each of the prizes
19. A quadrilateral ABCD is drawn to circumscribe a circle, prove that  $AB + CD = AD + BC$ .
20. Two tangents PQ, PR are drawn to a circle with centre 'O'. Prove that the quadrilateral OQPR is a cyclic quadrilateral.
21. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.
22. Prove that the sums of opposite sides of a quadrilateral that circumscribe a circle are equal
23. Prove that the lengths of tangents drawn from an external point to a circle are equal.
24. If a circle of radius 'r' is inscribed in a triangle of prove that the area of the triangle is equal to half the product of perimeter of triangle and radius.
25. A circle is drawn in a triangle ABC such that it touches the sides of triangle AB, BC and AC at P, Q and R respectively. If  $AP = x + 1$ ,  $BQ = x + 2$ ,  $CQ = 2x + 1$  and  $AC = 23$ ; Find the length of AB.
26. If PA, PB are two tangents to a circle of centre O such that  $\angle APB = 120^\circ$ , prove that  $2AP = OP$ .

27. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other angle of at an angle of  $60^\circ$ .
28. Draw a triangle ABC in which  $AB = 5$  cm,  $BC = 6$  cm and  $\angle ABC = 60^\circ$ . Construct a triangle similar to ABC with scale factor  $\frac{5}{7}$ . Justify the construction.
29. Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then construct another triangle whose sides are  $1\frac{1}{2}$  times the corresponding sides of the isosceles triangle.
30. Draw a circle of radius 4 cm. Construct two tangents to this circle from a point which is 7 cm away from the centre
31. The string of a kite is 150 m long and it makes an angle of  $60^\circ$  with the horizontal. Find the height of the kite from the ground.
32. The angle of elevation of the top of the hill from the foot of a tower is  $60^\circ$  and the angle of elevation of the top of the tower from the foot of the tower is  $30^\circ$ . If the tower is 50 m high find the height of the hill.
33. The angles of the depression of the top and bottom of a tower as seen from the top of a  $60\sqrt{3}$  m high lift are  $45^\circ$  and  $60^\circ$  respectively. Find the height of the tower.
34. A person standing on the bank of a river observes that the angle subtended by a tree on the opposite bank is  $60^\circ$ , when he retires 10 m from the bank, he finds the angle to be  $30^\circ$ . Find the height of the tree and width of the river.
35. 18 defective pens are accidentally mixed with 170 good ones. It is not possible to just look at the pen and tell whether or not it is a defective. One pen is taken at random from this lot, determine the probability the pen taken out is a good one.
36. A box contains 'p' green balls, 'q' red balls and 'r' blue balls. All the balls are identical in size and 21 in number. The probability of selecting a blue ball is double of that of selecting a green ball and four times to the probability of selecting a red ball. Find the probability of selecting (i) a green ball, (ii) a red ball (iii) a blue ball.
37. Satvika and Mahija are friends. What is the probability that both will have (i) different birthmonth? (ii) the same birthmonth?
38. From a well shuffled pack of playing cards, a spade king, diamond queen, two red kings are taken out. What is the probability of drawing a (i) face card (ii) a king from remaining cards.
39. If  $Q(0, 1)$  is equidistant from  $P(5, -3)$  and  $R(x, 6)$  find the values of x. Also Find the distance QR and PR.
40. Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points  $A(2, -2)$  and  $B(3, 7)$ .
41. Find the area of triangle whose vertices are  $(2, 3)$ ,  $(-1, 0)$  and  $(2, -4)$ .
42. Find the ratio that the line segment joining the points  $A(-1, -7)$  and  $B(4, 2)$  is divided by X – Axis.
43.  $A(2, 3)$ ,  $B(4, -3)$  and  $C(0, 5)$  are the vertices of a triangle ABC, Find the length of median AD.
44. Find the ratio in which the point  $(-3, p)$  divides the line segment joining the points  $(-5, -4)$  and  $(-2, 3)$  and find the value of 'p'.
45. Prove that  $(4, -1)$ ,  $(6, 0)$ ,  $(7, 2)$  and  $(5, 1)$  are the vertices of a rhombus.
46. Find the ratio that the line segment joining the points  $A(-1, -7)$  and  $B(4, 2)$  is divided by X – Axis also find the coordinates
47. In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find (i) the length of the arc. (ii) the area of the sector formed by the arc, (iii) area of the segment formed by the corresponding chord.
48. A round table cover has six equal designs as shown in figure. If the radius of the cover is 28 cm, find the cost of making the design at the rate of ₹0.35 per  $m^2$ .
49. In figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If  $OD = 2$  cm, find (i) the area of quadrant OACB (ii) Shaded portion.

50. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of 5 m long rope. Find the area of the part of the field in which the horse can graze. (ii) The increase in the grazing area if the rope were 10 m long instead of 5 m. (take  $\pi = 3.14$ ).
51. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of ₹500 per  $m^2$ .
52. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. it is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.
53. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of the water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.
54. A container opened from the top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends are 8 cm and 20 cm, respectively. Find the cost of milk which can completely fill the container at the rates of 20 per L. Also, find the cost of metal sheet used to make the container. If it costs ₹8 per 100  $cm^2$ .
55. An oil funnel made of tin sheet consists of a 10 cm long cylindrical portion attached to a frustum of a cone. If the total height is 22 cm, diameter of the cylindrical portion is 8 cm and the diameter of the top of the funnel is 18 cm, find the area of the tin sheet required to make the funnel.
56. Selvi's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (an underground tank) which is in the shape of a cuboid. The sump has dimensions 1.57 m  $\times$  1.44 m  $\times$  95 cm. The overhead tank has its radius 60 cm and height 95 cm. Find the height of the water left in the sump after the overhead tank has been completely filled with water from the sump which had been full. Compare the capacity of the tank with that of the sump. (Use  $\pi = 3.14$ )
57. Find the area of the shaded region in Fig. shown below, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



58. In the Fig given below, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.



59. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest  $cm^2$ .
60. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1  $cm^3$  of iron has approximately 8g mass. (Use  $\pi = 3.14$ )