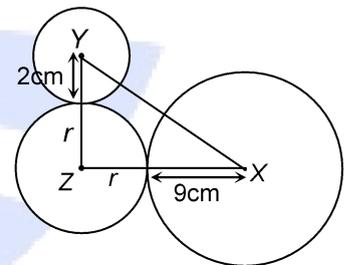


1. Check whether the following equations are quadratic or not.
  - (i)  $(x-2)^2 + 1 = 2x - 3$
  - (ii)  $x(x+1) + 8 = (x+2)(x-2)$
  - (iii)  $7x - 2x^2$
  - (iv)  $x + \frac{1}{x} = 2$
2. If  $x = 2$  and  $x = 3$  are roots of  $3x^2 - 2px + 2q = 0$ , find the values of  $p$  and  $q$ .
3. Using factorization, solve following equations.
  - (i)  $(x-2)^2 - 36 = 0$
  - (ii)  $x^2 + 2\sqrt{2}x + 3 = 0$
4. Solve:  $4x^2 - 4ax + (a^2 - b^2) = 0$ ,  $a, b$  are real numbers
5. Solve by completing the square :  $y^2 + \frac{1}{2}y - 1 = 0$ .
6. By using the method of completing the square, show that the equation  $2x^2 + x + 5 = 0$  has no real roots.
7. Solve the equation  $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$  by the method of completing the square.
8. Find the discriminant of the quadratic equation  $2x^2 - 4x + 3 = 0$ , and hence find the nature of its roots.
9. Find the discriminant of the equation  $3x^2 - 2x + \frac{1}{3} = 0$  and hence find the nature of its roots. Find them, if they are real.
10. Find the values of  $k$  for which the following equation has equal roots:
 
$$(k-12)x^2 + 2(k-12)x + 2 = 0$$
11. Find the values of  $k$  for which the given equation has real roots:
  - (i)  $kx^2 - 6x - 2 = 0$
  - (ii)  $9x^2 + 3kx + 4 = 0$
  - (iii)  $5x^2 - kx + 1 = 0$
12. If  $-4$  is a root of equation  $x^2 + px - 4 = 0$  and the equation  $x^2 + px + q = 0$  has equal roots, find the values of  $p$  and  $q$ .

13. If  $-5$  is a root of the quadratic equation  $2x^2 + px - 15 = 0$  and the quadratic equation  $p(x^2 + x) + k = 0$  has equal roots, find the value of  $k$ .
14. If  $\alpha$  and  $\beta$  are the roots of the equation  $ax^2 + bx + c = 0$  find the equation. Whose roots are  $\frac{1}{\alpha + \beta}$ ,  $\frac{1}{\alpha} + \frac{1}{\beta}$ ?
15. Find the minimum value of expression  $x^2 + 3x + 25$ ?
16. The sum of two numbers is 15. If the sum of their reciprocals is  $\frac{3}{10}$ , find the numbers.
17. A two-digit number is such that the product of its digits is 14. When 45 is added to this number, the digits interchange their places. Find the number.
18. A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the differences of its distances from two diametrically opposite fixed gates Q and R on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?
19. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was Rs.90, find the number of articles produced and the cost of each article.
20. X and Y are centres of two circles of radii 9 cm and 2 cm respectively and  $XY = 17$ cm. Z is the centre of a circle of radius  $r$  cm. which touches the above circles externally. Given that  $\angle XZY = 90^\circ$ , write an equation in  $r$  and solve it for  $r$ .



21. A piece of cloth cost Rs.200. If the piece was 5m longer and each metre of cloth costs Rs.2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre?
22. The sum of squares of two positive integers is 208. If the square of the larger number is 18 times the smaller number. Find the numbers.
23. The denominator of a fraction is one more than twice the numerator. If the sum of the fraction and its reciprocal is  $2\frac{9}{10}$ , find the fraction.

24. Out of a group of swans,  $\frac{7}{2}$  times the square root of the number are playing on the shore of a tank. The two remaining ones are playing, with amorous fight, in the water. What is the total number of swans?
25. A plane left 30 minutes later than the schedule time and in order to reach its destination 1500 km away in time it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.
26. Two trains leave a railway station at the same time. The first train travels due west and the second train due north. The first train travels 5 km/hr faster than the second train. If after two hours, they are 50 km apart, find the average speed of each train.
27. The hypotenuse of a right triangle is  $3\sqrt{5}$  cm. If the smaller side is tripled and the larger side is doubled, the new hypotenuse will be 15cm. Find the length of each side.
28. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work.

29. A swimming pool is filled with three pipes with uniform flow. The first two pipes operating simultaneously fill the pool in the same time during which the pool is filled by the third pipe alone. The second pipe fills the pool five hours faster than the first pipe and four hours slower than the third pipe. Find the time required by each pipe to fill the pool separately.
30. There is a square field whose side is 44 m. A square flower bed is prepared in its centre leaving a gravel path all round the flower bed. The total cost of laying the flower bed and gravelling the path at Rs.2.75 and Rs.1.50 per square metre, respectively, is Rs.4904. Find the width of the gravel path.

