Chapter-4 Quadratic equation

WORKSHEET-4

1. The roots of the quadratic equation $x^2 + x - 1 = 0$ are
   a) Irrational & distinct   b) not real   c) rational & distinct   d) real & equal

2. If the root of the equation $ax^2 + bx + c = 0, a \neq 0$ are real and equal, then which of the following relation is true?
   a) $a = \dfrac{b^2}{c}$ b) $b^2 = ac$ c) $ac = \dfrac{b^2}{4}$ d) $c = \dfrac{b^2}{a}$

3. What is the roots of quadratic equation $x^2 - 3x - (m+2)(m+5) = 0$ where m and n are constant.

4. Solve the quadratic equation: a) $25x^2 - 15(a-b)x + 2(a-b)^2 - ab = 0$
   b) $\dfrac{1}{2a+b+x} = \dfrac{1}{2a} + \dfrac{1}{b} + \dfrac{1}{x}$, where 2a+b≠0

5. Show that the quadratic equation $4x^2 - 4a^3x + (a^6 - b^6) = 0$ have real roots. If real roots exist find them.

6. If the roots of the quadratic equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ are equal, prove that $2a = b + c$. Also, find the roots of the above quadratic equation.

7. What is the discriminant of quadratic equation $(2x-7)^2 = 2x + 3$.

8. Find the value of k for which the quadratic equation $(k+1)x^2 - 6(k+1)x + 3(k+9) = 0$, has equal roots. Also find the quadratic equation whose roots are double to the roots of above equation.

9. If -4 is the root of quadratic equation $3x^2 + px - 8 = 0$ and the quadratic equation $px^2 + 3px - k = 0$ has equal roots, then find the value of k.

10. If the roots of the equation $3kx(x-2) + 2 = 0$ are real & equal then find the value of k.

11. If $x = -2$ is root of the equation $3x^2 + 7x + p = 0$, then find k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal.

12. For what value of k, quadratic equation $k(x^2 + 5x) - 5 = 0$ have two real and equal roots.

13. Find the roots of quadratic equation $36x^2 - 12mx + (m^2 - n^2) = 0$ by using factorization method.

14. If the roots of quadratic equation $(a^2 + b^2)x^2 - 2(ac + bd)x + (c^2 + d^2) = 0$ are equal , prove that $ad = cb$.

Word problems

15. A rectangular floor area can be completely tiled with 200 square tiles. If the side length of each tile is increased by 1 unit, it would take only 128 tiles to cover the floor.

    i) Assuming the original length of each side of a tile be x units, make a quadratic equation from the above information.

    ii) Write the corresponding quadratic equation in standard form.

    iii) Find the value of x, the length of side of a tile by factorization.

    iv) Solve the quadratic equation for x, using quadratic formula.

16. For the distance of $200m$, a train travels with uniform speed. If the speed of train is reduced by $10km/h$, it takes $1hr$ more to cover the same distance. Find the usual speed of the train.

17. Divide 15 into two parts such that sum of their squares is 197.

18. The length of a rectangle exceeds its breadth by $10cm$. If the area of rectangle is $39cm^2$, then find the dimensions of rectangle and also find its perimeter.

19. Some students planned for a picnic and total budget for picnic was Rs 1800. But four students failed to go, thus cost for each member increased by Rs 5. Find how many students attended the picnic and how much it will cost to each student?

20. A girl is twice as old as her sister. Four years hence, the product of their ages will be 160. Find their present ages.

21. A plane left $30min.$ late than its schedule time and in order to reach its destination $1500km$ away in time it has to increase its speed by $250km/h$ from the usual speed. Find its usual speed.

22. Two water taps together can fill a tank in $1\frac{7}{8}hrs$. The tap of larger diameter takes 2 hrs less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

23. Two water taps together can fill a tank in $3\frac{1}{5}hrs$. The tap of smaller diameter takes 12 hrs more than the larger diameter tap to fill the tank separately. Find the time taken by each tap to fill the tank separately.