



# PRACTICE WORKSHEET

**Subject:** Mathematics

**Class:** ICSE 10<sup>th</sup>

**Chapter:** Quadratic Equations

**Worksheet:** M-5

## TYPE/TOPIC OF QUESTIONS: FINDING ROOTS OF QUADRATIC EQUATIONS

1. With the help of quadratic formula or factorising, solve each of the following equations:

(i)  $x^2 - 10x + 21 = 0$

(ii)  $\frac{4}{x} - 3 = \frac{5}{2x+3} + 3$

(iii)  $(4x - 3)^2 - 2(x + 3) = 0$

(iv)  $(2x + 7)(3x - 8) + 52 = 0$

(v)  $\frac{2x+3}{3x+8} = \frac{x+4}{x+2}$

(vi)  $(3x + 4)^2 - 3(x + 2) = 0$

(vii)  $\sqrt{6x^2 - 4x} - 2\sqrt{6} = 0$

(viii)  $(4x - 2)^2 + 6x - 25 = 0$

(ix)  $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$

(x)  $\frac{2x}{x-4} + \frac{2x-5}{x-3} = 8\frac{1}{3}$

## TYPE/TOPIC OF QUESTIONS: NATURE OF ROOTS

2. Without solving, comment upon the nature of roots of each of the following equations:

(a)  $7x^2 - 9x + 2 = 0$

(b)  $6x^2 - 13x + 4 = 0$

(c)  $25x^2 - 10x + 1 = 0$

(d)  $x^2 + 2\sqrt{3}x - 9 = 0$

(e)  $x^2 - ax + b^2 = 0$

(f)  $2x^2 + 8x + 9 = 0$

3. Find the value of 'p', if the following quadratic equation has equal roots:  $4x^2 - (p - 2)x + 1 = 0$

4. Prove that each of the following equation has only one solution. Find the solution.

(a)  $4y^2 - 28y + 49 = 0$

(b)  $\frac{1}{4}x^2 + \frac{1}{3}x + \frac{1}{9} = 0$

(c)  $8x(2x - 5) + 25 = 0$

5. Find the value of  $\lambda$  for which the equation  $\lambda x^2 + 2x + 1 = 0$  has real and distinct roots.

6. For what value of k will each of the following equations give equal roots? Also, find the solution for that value of k.

(a)  $3x^2 + kx + 2 = 0$

(b)  $kx^2 - 4x + 1 = 0$

(c)  $5x^2 + 20x + k = 0$

(d)  $(k - 12)x^2 + 2(k - 12)x + 2 = 0$

7. The equation  $3x^2 - 12x + z - 5 = 0$  has equal roots. Find the value of z.

8. Find k for which the equation  $4x^2 + kx + 9 = 0$  will be satisfied by only one real value of x. Also find the solution.

9. Find the value of 'z', if the following equation has equal roots:

$$(z - 2)x^2 - (5 + z)x + 16 = 0$$

10. Find the nature of roots of the following equation. If they are real, find them.

(a)  $3x^2 - 2x + \frac{1}{3} = 0$

(b)  $3x^2 - 6x + 2 = 0$

**TYPE/TOPIC OF QUESTIONS: WORD PROBLEMS**

11. The difference of two positive integers is 3 and the sum of their squares is 117; find the numbers.

12. The product of two consecutive positive odd integers is 2499. Find the bigger integer.

13. The product of two positive consecutive even integer is 168. Assuming the smaller integer to be x, frame an equation for the statement and find the numbers.

14. For every litre of petrol, one car travels x km and another car travels 5 km more than the first. If the first car uses 4 litres more than the second car in converting 400 km, frame an equation for the statement to find x. What is the value of x?

15. The product of two consecutive integers is 3906. Find the integers.

16. Divide 51 into two parts whose product is 608.

17. At a party, each member gives a gift to the rest. There were 132 gifts given at the party. Find the number of members.

18. A two-digit number is made of two consecutive digits such that the sum of their squares is 4 less than the number. Find the two-digit number.

19. 780 students stand in rows and columns. Each row has equal number of students and each column has equal number of students. If the number of students in each row is 4 more than the number of rows, find the number of students in each row.

20. Find the percent age of a man if his age 40 years hence will become equal to the square of what his age was 32 years ago.

21. Two pipes together can fill a cistern in  $11 \frac{1}{9}$  minutes. If operated separately, time taken by the first pipe to fill the cistern is 5 minutes more than that by the second. Find the time required individually for each of the pipes to fill the cistern.

22. Mrs Tendon has two sons, one being exactly one year older than the other. At percentage, her age is equal to the sum of the squares of the ages of her sons. If 4 years hence her age becomes five times the age of the elder son then find the percent ages of her sons.

23. In a triangle the measure of the greatest angle is square of the measure of the smallest angle, and the other angle is double of the smallest angle. Find the greatest angle of the triangle.

24. Area and perimeter of a rectangular field are 2000 sq.m. and 180 m respectively. Find its length and breadth.

25. The base of a triangle exceeds twice its altitude by 18m. If the area of the triangle be 360 sq. m., what is its altitude?

26. Five times of a positive integer is less than twice its square by 3. Find the integer.

27. Smith and Johnson together can do a piece of work in 4 days. If they had to work separately, the time taken by Johnson to do the work would be more than that of Smith by 6 days. In how many days can Smith alone do the work?

28. A shopkeeper buys a certain number of books for \$720. If the cost per book was \$5 less, the number of books that could be bought for \$ 720 would be 2 more. Taking the original cost of each book to be \$x, write an equation in x and solve it.