



Quadratic Equations

SPM Practice (Quadratic Equation)

1. Solve the following quadratic equations by factorisation.

a. $x^2 - 5x - 10 = -4$

b. $3 - x - 2x^2 = 0$

c. $11a = 2a^2 + 12$

d. $\frac{2x+7}{3x-2} = x$

[Ans : (a) -1,6 (b) $-\frac{3}{2}$, -1 (c) $\frac{3}{4}$, 4 (d) $\frac{7}{3}$, -1]

2. Solve the following quadratic equations by completing the square.

a. $5x^2 + 10x - 3 = 0$

b. $2x^2 - 5x - 6 = 0$

[Ans : (a) -2.265, 0.265 (b) -0.866, 3.386]

3. Solve the following quadratic equations by using quadratic formula. Give your answer in four significant figures.

a. $(x+1)(x-5) = 15$

b. $\frac{x^2 + 3x - 2}{x^2 - x - 1} = 3$

[Ans : (a) 6.899, -2.899 (b) 3.158, -0.158]

4. If the roots of $2x^2 + 4x - 1 = 0$ are α and β , find the equations whose roots are

a. α^2, β^2

b. $\alpha - \beta, \beta - \alpha$

[Ans : (a) $4x^2 - 20x + 1 = 0$ (b) $x^2 - 6 = 0$]

5. Write down and simplify the equation whose roots are double the roots of $3x^2 - 5x - 1 = 0$, without solving the given equation.

[Ans : $3x^2 - 10x - 4 = 0$]

6. Write down and simplify the equation whose roots are the reciprocals of the roots of $3x^2 + 2x - 1 = 0$, without solving the given equation.

[Ans : $x^2 - 2x - 3 = 0$]

7. Find the value of p if one root of $x^2 + px + 8 = 0$ is the square of the other.

[Ans : $p = -6$]

8. If one root of $2x^2 + px + 9 = 0$ is twice the other, find the values of p .

[Ans : $p = -9, 9$]

9. The roots of the equation $6x^2 + hx + 1 = 0$ are α and β , where as 3α and 3β are the roots of the equation $2x^2 - x + k = 0$. Find the value of h and k .

[Ans : $h = \frac{1}{3}$, $k = 9$]

10. Find the range of values of p for which the equation $2x^2 + 5x + 3 - p = 0$ has two real distinct roots.

[Ans : $p > -\frac{1}{4}$]



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11. The quadratic equation $x^2 - 4x - 1 = 2p(x - 5)$, where p is a constant, has two equal roots. Calculate the possible values of p .

[Ans : $p=1,5$]

12. Find the range of values of k for which the equation $x^2 - 2kx + k^2 + 5k - 6 = 0$ has no real roots.

[Ans: $k > \frac{6}{5}$]

13. Find the range of values of p for which the equation $5x^2 + 7x - 3p = 6$ has no real roots.

[Ans : $p < -2\frac{49}{60}$]

14. Show that $6x - 6 - 2kx^2 = x^2$ has no real roots if

$$k > \frac{1}{4}.$$

15. The quadratic equation $x^2 + px + q = 0$ has roots -2 and 6 . Find
- the value of p and of q ,
 - the range of values of r for which the equation $x^2 + px + q = r$ has no real roots.

[Ans: a. $p=-4, q=-12$, b. $r < -16$]