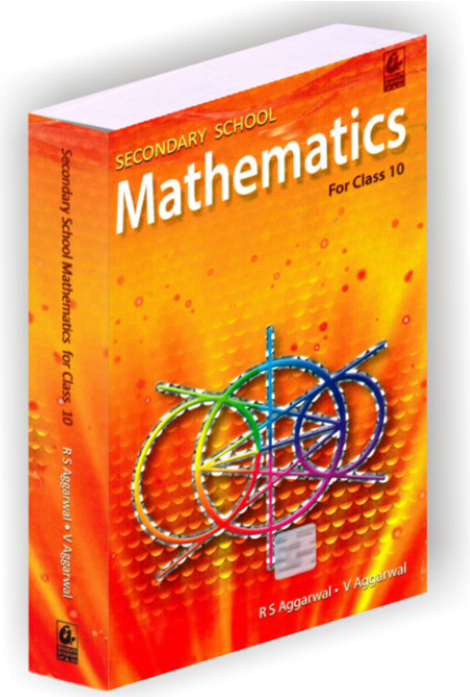
# RS Aggarwal Solutions for Class 10 Maths Chapter 4–Quadratic Equations

## Class 10 - Chapter 4 Quadratic Equations

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# RS Aggarwal Solutions for Class 10 Maths Chapter 4–Quadratic Equations

Class 10: Maths Chapter 4 solutions. Complete Class 10 Maths Chapter 4 Notes.

## RS Aggarwal Solutions for Class 10 Maths Chapter 4–Quadratic Equations

RS Aggarwal 10th Maths Chapter 4, Class 10 Maths Chapter 4 solutions

**Exercise 10A**

# Definition

- In mathematics, a **quadratic equation** is a polynomial equation of the second degree. The general form is

$$ax^2 + bx + c = 0$$

- where $x$ represents a variable or an unknown, and $a$, $b$, and $c$ are constants with $a \neq 0$. (If $a = 0$, the equation is a linear equation.)
- The constants $a$, $b$, and $c$ are called respectively, the quadratic coefficient, the linear coefficient and the constant term or free term.

| Equation | Is it Quadratic? | Explanation |
|---|---|---|
| $3x^3 - 4x + 5$ | No | The first term is raised to the 3rd power. It must be raised to the 2nd power in order to be quadratic. |
| $5x^2 - 4x + 2$ | Yes | This equation is in the correct form: $ax^2 + bx + c$ |
| $7x^2 = 49$ | Yes | This equation can be rewritten as: $7x^2 - 49$. In this equation, *b* is 0. *B* or *c* can be 0; however, *a* cannot be 0. |
| $2x^2 = 8x - 3$ | Yes | This equation can be rewritten as $2x^2 - 8x + 3$ which would then be in the correct form of: $ax^2 + bx + c$. |

**Question 1:**

(i) $x^2-x+3=0$ is a quadratic polynomial.

$\therefore$ $x^2-x+3=0$ is a quadratic equation.

(ii) $2x^2+ 52x-\sqrt{3}=0$

$\Rightarrow 4x^2+5x-2\sqrt{3}=0$

Clearly is $4x^2+5x-2\sqrt{3}=0$ a quadratic polynomial.

$\therefore$ $2x^2+ 52x-\sqrt{3}=0$ is a quadratic equation.

(iii) $\sqrt{2}x^2+7x+5\sqrt{2}=0$ is a quadratic polynomial.

$\therefore$ $\sqrt{2}x^2+7x+5\sqrt{2}=0$ is a quadratic equation.

(iv)$13x^2+15x-2=0$

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$\Rightarrow 5x^2+3x-2=0$

Clearly, $5x^2+3x-2=0$ is a quadratic equation.

$13x^2+15$ is a quadratic equation.

(v) $x^2-3x-\sqrt{x}+4=0$ is not a quadratic polynomial since it contains $\sqrt{x}$, in which power 1/2 of x is not an integer.

$\therefore$ $x^2-3x-\sqrt{x}+4=0$ is not a quadratic equation.

(vi) $x-6x=3$

$\Rightarrow x^2-3x-6=0$

And $(x^2-3x-6)$Being a polynomial of degree 2, it is a quadratic polynomial.

Hence, $x-6x=3$ is a quadratic equation.

(vii) $x+2x= x^2$

$\Rightarrow x^3-x^2-2=0$

And $(x^3-x^2-2=0)$ being a polynomial of degree 3, it is not a quadratic polynomial.

Hence, $x+2x= x^2$ is not a quadratic equation.

(viii) $x2-1x2=5 \Rightarrow x^4-1=5x^2$

$\Rightarrow x^4-5x^2-1=0$

And $(x^4-5x^2-1=0)$ being a polynomial of degree 4.

Hence $x2-1x2=5$ is not a quadratic equation.

**Question 2:**

The given equation is $3x^2+2x-1=0$

(i) On substituting x = -1 in the equation, we get

$$LHS = 3x(-1)^2 + 2x(-1) - 1 = 3 - 2 - 1 = 0 = RHS$$

$$\therefore x = -1 \text{ is a solution of } 3x^2 + 2x - 1 = 0$$

(ii) On substituting x=13 in the equation, we get

$$LHS = 3x\left(\frac{1}{3}\right)^2 + 2x\left(\frac{1}{3}\right) - 1 = 0 = \left(\frac{1}{3} + \frac{2}{3} - 1\right) = 0 = RHS$$

$$\therefore x = \frac{1}{3} \text{ is a solution of } 3x^2 + 2x - 1 = 0$$

(iii) On substituting x=−12 in the equation , we get

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

$$= \frac{3}{4} - 1 + 1 \neq 0$$

$$\therefore RHS \neq LHS$$

$$\therefore x = \frac{-1}{2} \text{ is not a solution of } 3x^2 + 2x - 1 = 0$$

**Question 3:**

Since x = 1 is a solution of $x^2+kx+3=0$ it must satisfy the equation.

$$\therefore (1)^2 + k(1) + 3 = 0 \Rightarrow k = -4$$

Hence the required value of k = -4

**Question 4:**

Since x=34 is a root of $ax^2+bx-6=0$, we have



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$$a\times\left(\frac{3}{4}\right)^2+b\times\left(\frac{3}{4}\right)-6=0 \Rightarrow \frac{9a}{16}+\frac{3b}{4}-6=0$$
$$9a+12b=96 \Rightarrow 3a+4b=32 \quad ---(1)$$

Again x = -2 being a root of $ax^2+bx-6=0$, we have

$$a\times(-2)+b(-2)-6=0$$
$$4a-2b=6$$
$$2a-b=3 \quad ---(2)$$

Multiplying (2) by 4 adding the result from (1), we get

$11a = 44 \Rightarrow a = 4$

Putting a = 4 in (1), we get

$$3\times 4+4b=32 \Rightarrow 4b=32-12=b=\frac{20}{4}=5$$
$$\therefore a=4 \text{ and } b=5$$

**Question 5:**

$$(3x-5)(2x+3)=0, \Rightarrow 3x-5=0 \text{ or } 2x+3=0$$
$$\Rightarrow x=\frac{5}{3} \text{ or } x=\frac{-3}{2}$$

Hence, $\frac{5}{3},\frac{-3}{2}$ are the roots of the equation $(3x-5)(2x+3)=0$

**Question 6:**

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$5x^2 + 4x = 0 \Rightarrow x(5x + 4) = 0$

$\Rightarrow x = 0 \text{ or } (5x + 4) = 0$

$\Rightarrow x = 0 \text{ or } x = \frac{-4}{5}$

Hence, 0 and $\frac{-4}{5}$ are the roots of the equation $5x^2 + 4x = 0$

**Question 7:**

$3x^2 - 243 \Rightarrow 0 \Rightarrow 3(x^2 - 81) = 0$

$\Rightarrow x^2 = 81 \Rightarrow x = \pm\sqrt{81} = \pm 9$

$\Rightarrow x = 9, -9$

Hence, 9 and -9 are the roots of the equation $3x^2$-243=0.

**Question 8:**

$x^2 + 12x + 35 = 0 \Rightarrow x^2 + 7x + 5x + 35 = 0$

$\Rightarrow x(x + 7) + 5(x + 7) = 0$

$\Rightarrow (x + 5)(x + 7) = 0$

$\Rightarrow x + 5 = 0 \text{ or } x + 7 = 0$

$\Rightarrow x = -5, x = -7$

Hence, -5 and -7 are the roots of $x^2$+12x+35=0.

**Question 9:**

$$x^2 = 18x - 77 \Rightarrow x^2 - 18x + 77 = 0$$
$$\Rightarrow x^2 - 11x - 7x + 77x = 0$$
$$\Rightarrow x(x - 11) - 7(x - 11) = 0$$
$$(x - 11)(x - 7) = 0$$
$$x - 11 = 0 \text{ or } x - 7 = 0$$
$$x = 11 \text{ or } x = 7$$

Hence, 11 and 7 are the roots of equation $x^2$=18x-77

**Question 10:**

$$9x^2 + 6x + 1 = 0 \Rightarrow (3x + 1)^2 = 0$$
$$\Rightarrow 3x + 1 = 0 \Rightarrow x = \frac{-1}{3}$$

Hence, x=−13 is the repeated root of the equation $9x^2$+6x+1=0

**Question 11:**

$$4x^2 - 12x + 9 = 0 \Rightarrow (2x - 3)^2 = 0$$
$$\Rightarrow 2x - 3 = 0$$
$$\Rightarrow 2x = 3 \Rightarrow x = \frac{3}{2}$$

Hence,  is the repeated root of the equation

**Question 12:**

$$6x^2 + 11x + 3 = 0 \Rightarrow 6x^2 + 9x + 2x + 3 = 0$$
$$\Rightarrow 3x(2x+3) + 1(2x+3) = 0$$
$$\Rightarrow \quad (2x+3) \times (3x+1) = 0$$
$$\Rightarrow \qquad (2x+3) = 0 \text{ or } (3x+1) = 0$$
$$x = \frac{-3}{2} \text{ or } x = \frac{-1}{3}$$

Hence, x=−32, x=−12are the roots of $6x^2+11x+3=0$

**Question 13:**

$$6x^2 + x - 12 \Rightarrow 6x^2 + 9x - 8x - 12 = 0$$
$$\Rightarrow 3x(2x+3) - 4(2x+3) = 0$$
$$\Rightarrow \quad (3x-4)(2x+3) = 0$$
$$\Rightarrow \qquad 3x - 4 = 0 \text{ or } 2x + 3 = 0$$
$$x = \frac{4}{3} \text{ or } x = \frac{-3}{2}$$

Hence, x=43 and x=−32 are the roots of equation $6x^2+x-12=0$

**Question 14:**

$$3x^2 - 2x - 1 = 0 \Rightarrow 3x^2 - 3x + 1x - 1 = 0$$
$$\Rightarrow 3x(x-1) + 1(x-1) = 0$$
$$\Rightarrow \quad (3x+1)(x-1) = 0$$
$$\Rightarrow \qquad 3x+1 = 0 \text{ or } x-1 = 0$$
$$x = \frac{-1}{3} \text{ or } x = 1$$

Hence, x=−13 and 1 are the roots of the equation $3x^2-2x-1=0$.

**Question 15:**

$$6x^2 - x - 2 = 0 \Rightarrow 6x^2 - 4x + 3x - 2 = 0$$
$$\Rightarrow 2x(3x-2) + 1(3x-2) = 0$$
$$\Rightarrow \quad (3x-2)(2x+1) = 0$$
$$\Rightarrow (3x-2) = 0 \text{ or } (2x+1) = 0$$
$$x = \frac{2}{3} \text{ or } x = \frac{-1}{2}$$

Hence, x=23 and x=−12are the roots of equation $6x^2$-x-2=0.

**Question 16:**

$$48x^2 - 13x - 1 = 0 \Rightarrow 48x^2 - 16x + 3x - 1 = 0$$
$$\Rightarrow 16x(3x-1) + 1(3x-1) = 0$$
$$\Rightarrow \quad 16x+1 = 0 \text{ or } (3x-1) = 0$$
$$x = \frac{-1}{16} \text{ or } x = \frac{1}{3}$$

Hence, x=−116 and x=23 are the roots of $48x^2$-13x-1=0.

**Question 17:**

$$3x^2 + 11x + 10 = 0 \Rightarrow 3x^2 + 6x + 5x + 10 = 0$$
$$\Rightarrow 3x(x+2) + 5(x+2) = 0$$
$$\Rightarrow \quad (3x+5)(x+2) = 0$$
$$\Rightarrow \qquad (3x+5) = 0 \text{ or } (x+2) = 0$$
$$x = \frac{-5}{3} \text{ or } x = -2$$

Hence, x=−53 and x=-2 are the roots of the equation $3x^2$+11x+10=0

**Question 18:**

$$4x^2 - 9x = 100 \Rightarrow 4x^2 - 9x - 100 = 0$$
$$\Rightarrow 4x^2 - 25x + 16x - 100 = 0$$
$$\Rightarrow x(4x - 25) + 4(4x - 25) = 0$$
$$\Rightarrow \quad (4x - 25)(x + 4) = 0$$
$$(4x - 25) = 0 \text{ or } (x + 4) = 0$$
$$x = \frac{25}{4} \text{ or } x = -4$$

Hence,x=254 and x=-4 are the roots of the equation $4x^2$-9x=100.

**Question 19:**

$$9x^2 - 22 + 8 = 0 \Rightarrow 9x^2 - 18x - 4x + 8 = 0$$
$$\Rightarrow 9x(x - 2) - 4(x - 2) = 0$$
$$\Rightarrow \quad (9x - 4)(x - 2) = 0$$
$$\Rightarrow \quad (9x - 4) = 0 \text{ or } (x - 2) = 0$$
$$x = \frac{4}{9} \text{ or } x = 2$$

Hence, x=49 and 2 are the roots of the equation $9x^2$-22+8=0

**Question 20:**

$$15x^2 - 28 = x \Rightarrow 15x^2 - x - 28 = 0$$
$$\Rightarrow 15x^2 - 21x + 20x - 28 = 0$$
$$\Rightarrow 3x(5x - 7) + 4(5x - 7) = 0$$
$$\Rightarrow \quad (5x - 7)(3x + 4) = 0$$
$$\Rightarrow \quad (5x - 7) = 0 \text{ or } (3x + 4) = 0$$
$$x = \frac{7}{5} \text{ or } x = \frac{-4}{3}$$

Hence, x=75 and x=−43 are the roots of the given equation $15x^2$-28=x.

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**Question 21:**

$$4-11x=3x^2 \Rightarrow 3x^2+11x-4=0$$
$$\Rightarrow 3x^2+12x-x-4=0$$
$$\Rightarrow \quad 3x(x+4)-1(x+4)=0$$
$$\Rightarrow \quad (3x-1)(x+4)=0$$
$$\Rightarrow \quad 3x-1=0 \text{ or } x+4=0$$
$$x=\frac{1}{3} \text{ or } x=-4$$

Hence, x=13 and -4 are the roots of given equation .

**Question 22:**

$$x^2-\left(1+\sqrt{2}\right)x+\sqrt{2}=0 \Rightarrow x^2-1.x-\sqrt{2}x+\sqrt{2}=0$$
$$\Rightarrow x(x-1)-\sqrt{2}(x-1)=0$$
$$\Rightarrow \quad (x-1)\left(x-\sqrt{2}\right)=0$$
$$(x-1)=0 \text{ or } x-\sqrt{2}=0$$
$$x=1 \text{ or } x=\sqrt{2}$$

Hence, 1 and √2 are the roots of the given equation

**Question 23:**

$\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$

here, $6\sqrt{3} \times \sqrt{3} = 6 \times 3 = 18$ and $9 \times 2 = 18$ & $9 + 2 = 11$

$\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0 \Rightarrow \sqrt{3}x^2 + 9x + 2x + 6\sqrt{3} = 0$

$\Rightarrow \sqrt{3}\left(x + 3\sqrt{3}\right) + 2\left(x + 3\sqrt{3}\right) = 0$

$\Rightarrow \left(\sqrt{3}x + 2\right)\left(x + 3\sqrt{3}\right) = 0$

$\Rightarrow \sqrt{3}x + 2 = 0$ or $x + 3\sqrt{3} = 0$

$x = \frac{-2}{\sqrt{3}}$ or $x = -3\sqrt{3}$

$x = \frac{-2 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$ or $x = -3\sqrt{3}$

Hence, $\frac{-2\sqrt{3}}{3}$ and $-3\sqrt{3}$ are the roots of the given equation

**Question 24:**

$4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0 \Rightarrow 4\sqrt{3}x^2 + 8x - 3x - 2\sqrt{3} = 0$

$\Rightarrow 4x\left(\sqrt{3}x + 2\right) - \sqrt{3}\left(\sqrt{3}x + 2\right) = 0$

$\Rightarrow \left(\sqrt{3}x + 2\right)\left(4x - \sqrt{3}\right) = 0$

$\Rightarrow \left(\sqrt{3}x + 2\right) = 0$ or $\left(4x - \sqrt{3}\right) = 0$

$x = -\frac{2}{\sqrt{3}} = \frac{-2 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}}$ or $x = \frac{\sqrt{3}}{4}$

$x = \frac{-2\sqrt{3}}{3}$ or $x = \frac{\sqrt{3}}{4}$

Hence, $\frac{-2\sqrt{3}}{3}$ and $\frac{\sqrt{3}}{4}$ are the roots of the given equation

**Question 25:**

$$3\sqrt{7}x^2 + 4x - \sqrt{7} = 0 \Rightarrow 3\sqrt{7}x^2 + 7x - 3x - \sqrt{7} = 0$$
$$\Rightarrow \sqrt{7}x\left(3x + \sqrt{7}\right) - 1\left(3x + \sqrt{7}\right) = 0$$
$$\Rightarrow \left(3x + \sqrt{7}\right)\left(\sqrt{7}x - 1\right) = 0$$
$$\Rightarrow \left(3x + \sqrt{7}\right) = 0 \text{ or } \left(\sqrt{7}x - 1\right) = 0$$
$$3x = -\sqrt{7} \text{ or } x = \frac{1}{\sqrt{7}}$$
$$x = \frac{-\sqrt{7}}{3} \text{ or } x = \frac{1 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} = \frac{\sqrt{7}}{7}$$

Hence, −7√3 and 7√7 are the roots of given equation.

**Question 26:**

$$\sqrt{7}y^2 - 6y - 13\sqrt{7} \Rightarrow \sqrt{7}y^2 - 13y + 7y - 13\sqrt{7} = 0$$
$$\Rightarrow y\left(\sqrt{7}y - 13\right) + \sqrt{7}\left(\sqrt{7}y - 13\right) = 0$$
$$\Rightarrow \left(y + \sqrt{7}\right)\left(\sqrt{7}y - 13\right) = 0$$
$$\Rightarrow \left(y + \sqrt{7}\right) = 0 \text{ or } \left(\sqrt{7}y - 13\right) = 0$$
$$y = -\sqrt{7} \text{ or } y = \frac{13}{\sqrt{7}} = \frac{13 \times \sqrt{7}}{\sqrt{7} \times \sqrt{7}} =$$
$$y = -\sqrt{7} \text{ or } y = \frac{13\sqrt{7}}{7}$$

Hence, -√7 and 137√7 are the roots of given equation.

**Question 27:**

$$4\sqrt{6}x^2 - 13x - 2\sqrt{6} = 0$$
$$\Rightarrow 4\sqrt{6}x^2 - 16x + 3x - 2\sqrt{6} = 0$$
$$\Rightarrow 4\sqrt{2}x\left(\sqrt{3}x - 2\sqrt{2}\right) + \sqrt{3}\left(\sqrt{3}x - 2\sqrt{2}\right) = 0$$
$$\Rightarrow \left(\sqrt{3}x - 2\sqrt{2}\right)\left(4\sqrt{2}x + \sqrt{3}\right) = 0$$
$$\Rightarrow x = \left(\frac{2\sqrt{2}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}\right) = \frac{2\sqrt{6}}{3} \text{ or } x = \left(\frac{-\sqrt{3}}{4\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}\right) = \frac{-\sqrt{6}}{8}$$

Hence, $26\sqrt{3}$ and $-6\sqrt{8}$are the roots of given equation.

**Question 28:**

$$5x - \frac{35}{x} = 18$$
$$\Rightarrow 5x^2 - 35 = 18x$$
$$\Rightarrow 5x^2 - 18x - 35 = 0$$
$$\Rightarrow 5x^2 - 25x + 7x - 35 = 0$$
$$\Rightarrow 5x(x-5) + 7(x-5) = 0$$
$$\Rightarrow (x-5)(5x+7) = 0$$
$$\Rightarrow (x-5) = 0 \quad \text{or} \quad (5x+7) = 0$$
$$\Rightarrow \quad x = 5 \text{ or } x = \frac{-7}{5}$$

Hence, 5 and $-75$are the roots of given equation

**Question 29:**

$$10x - \frac{1}{x} = 3 \Rightarrow 10x^2 - 1 = 3x$$
$$\Rightarrow 10x^2 - 3x - 1 = 0$$
$$\Rightarrow 10x^2 - 5x + 2x - 1 = 0$$
$$\Rightarrow 5x(2x-1) + 1(2x-1) = 0$$
$$\Rightarrow (5x+1)(2x-1) = 0$$
$$\Rightarrow 5x + 1 = 0 \text{ or } 2x - 1 = 0$$
$$x = \frac{-1}{5} \text{ or } x = \frac{1}{2}$$

Hence, $-15$ and 12are the roots of given equation.

**Question 30:**

$\frac{2}{x^2}-\frac{5}{x}+2=0$

Multiplying by $x^2$

$2-5x+2x^2=0$ or $2x^2-5x+2=0$

$\Rightarrow 2x^2-4x-x+2=0$

or $2x(x-2)-1(x-2)=0$

$(x-2)(2x-1)=0$

$\therefore (x-2)=0$ or $2x-1=0$

$\Rightarrow x=2, x=\frac{1}{2}$

Hence, 2 and 12 are the roots of given equation.

**Question 31:**

$$abx^2+(b^2-ac)x-bc=0$$

$$\Rightarrow abx^2+b^2x-acx-bc=0$$

$$\Rightarrow bx(ax+b)-c(ax+b)=0$$

$$\Rightarrow (ax+b)(bx-c)=0$$

$$(ax+b)=0 \text{ or } (bx-c)=0$$

$$x=\frac{-b}{a} \text{ or } x=\frac{c}{b}$$

Hence, −ba and cb are the roots of given equation.

**Question 32:**

$$a^2b^2x^2+b^2x-a^2x-1=0$$

$$\Rightarrow b^2x(a^2x+1)-1(a^2x+1)=0$$

$$\Rightarrow (a^2x+1)(b^2x-1)=0$$

$$\Rightarrow (a^2x+1)=0 \text{ or } (b^2x-1)=0$$

$$x=\frac{-1}{a^2} \text{ or } x=\frac{1}{b^2}$$

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Hence, −1a2 and 1b2are the roots of given equation.

**Question 33:**

$$12abx^2 - \left(9a^2 - 8b^2\right)x - 6ab = 0$$

$$\Rightarrow 12abx^2 - 9a^2x + 8b^2x - 6ab = 0$$

$$\Rightarrow 3ax\left(4bx - 3a\right) + 2b\left(4bx - 3a\right) = 0$$

$$\Rightarrow \left(4bx - 3a\right)\left(3ax + 2b\right) = 0$$

$$\Rightarrow \left(4bx - 3a\right) = 0 \text{ or } \left(3ax + 2b\right) = 0$$

$$4bx = 3a \text{ or } 3ax = -2b$$

$$x = \frac{3a}{4b}, x = \frac{-2b}{3a}$$

Hence, 3a4b and −2b3a are the roots of given equation.

**Question 34:**

$$4x^2 - 2\left(a^2 + b^2\right)x + a^2b^2 = 0 \Rightarrow 4x^2 - 2a^2x - 2b^2x + a^2b^2 = 0$$

$$\Rightarrow 2x\left(2x - a^2\right) - b^2\left(2x - a^2\right) = 0$$

$$\Rightarrow \left(2x - a^2\right)\left(2x - b^2\right) = 0$$

$$\Rightarrow \left(2x - a^2\right) = 0 \text{ or } \left(2x - b^2\right) = 0$$

$$x = \frac{a^2}{2} \text{ or } x = \frac{b^2}{2}$$

Hence, a22 and b22are the roots of given equation.

**Question 35:**

$$\frac{1}{x+4}-\frac{1}{(x-7)}=\frac{11}{30}\Rightarrow\frac{(x-7)-(x+4)}{(x+4)(x-7)}=\frac{11}{30}$$

$$\Rightarrow\frac{x-7-x-4}{x^2-3x-28}=\frac{11}{30}\Rightarrow\frac{-11}{x^2-3x-28}=\frac{11}{30}$$

$$\Rightarrow 11\left(x^2-3x-28\right)=(30)(-11)$$

$$\Rightarrow x^2-3x-28=-30$$

$$\Rightarrow x^2-3x-28+30=0$$

$$\Rightarrow x^2-3x+2=0$$

$$\Rightarrow x^2-2x-x+2=0$$

$$\Rightarrow x(x-2)-1(x-2)=0$$

$$\Rightarrow (x-2)(x-1)=0$$

$$(x-2)=0 \text{ or } x-1=0$$

$$x=2 \text{ or } x=1$$

Hence, 2 and 1 are the roots of the given equation

**Question 36:**

$$\frac{1}{(x-3)}-\frac{1}{(x+5)}=\frac{1}{6}$$

$$\Rightarrow\frac{(x+5)-(x-3)}{(x-3)(x+5)}=\frac{1}{6}$$

$$\Rightarrow\frac{x+5-x+3}{(x-3)(x+5)}=\frac{1}{6}$$

$$\Rightarrow\frac{8}{x^2+2x-15}=\frac{1}{6}$$

$$\Rightarrow x^2+2x-15=48$$

$$\Rightarrow x^2+2x-15-48=0$$

$$\Rightarrow x^2+2x-63=0$$

$$\Rightarrow x^2+9x-7x-63=0$$

$$\Rightarrow x(x+9)-7(x+9)=0$$

$$\Rightarrow (x+9)(x-7)=0$$

$$\Rightarrow x+9=0 \text{ or } x-7=0$$

$$x=-9 \text{ or } x=7$$

Hence, -9 and 7 are the roots of the given equation

**Question 37:**

$$\frac{(x-3)}{(x+3)}-\frac{(x+3)}{(x-3)}=6\frac{6}{7}$$

$$\Rightarrow \frac{(x-3)^2-(x+3)^2}{(x+3)(x-3)}=\frac{48}{7}$$

$$\Rightarrow \frac{(x^2+9-6x)-(x^2+9+6x)}{(x+3)(x-3)}=\frac{48}{7}$$

$$\Rightarrow \frac{-12x}{x^2-9}=\frac{48}{7}$$

$$\Rightarrow -84x=48x^2-432$$

$$\Rightarrow 48x^2+84x-432=0$$

$$\Rightarrow 4x^2+7x-36=0$$

$$\Rightarrow 4x^2+16x-9x-36=0$$

$$\Rightarrow 4x(x+4)-9(x+4)=0$$

$$\Rightarrow (4x-9)(x+4)=0$$

$$4x-9=0 \text{ or } x+4=0$$

$$x=\frac{9}{4} \text{ or } x=-4$$

Hence, -4 and 94 are the roots of the given equation

**Question 38:**

$$\frac{2x}{(x-4)}+\frac{(2x-5)}{(x-3)}=\frac{25}{3}$$

$$\Rightarrow \frac{2x(x-3)+(2x-5)(x-4)}{(x-4)(x-3)}=\frac{25}{3}$$

$$\Rightarrow \frac{2x^2-6x+2x^2-8x-5x+20}{x^2-4x-3x+12}=\frac{25}{3}$$

$$\Rightarrow \frac{4x^2-19x+20}{x^2-7x+12}=\frac{25}{3}$$

$$\Rightarrow 3\left(4x^2-19x+20\right)=25\left(x^2-7x+12\right)$$

$$\Rightarrow 12x^2-57x+60=25x^2-175x+300$$

$$\Rightarrow 12x^2-25x^2-57x+175x+60-300=0$$

$$\Rightarrow -13x^2+118x-240=0$$

$$\Rightarrow 13x^2-78x-40x+240=0$$

$$\Rightarrow 13x(x-6)-40(x-6)=0$$

$$\Rightarrow (13x-40)(x-6)=0$$

$$13x-40=0 \quad \text{or} \quad x-6=0$$

$$x=\frac{40}{13} \quad \text{or} \quad x=6$$

Hence  4013 and 6 are the roots of the given equation

**Question 39:**

$$\frac{(x+3)}{(x-2)} - \frac{(1-x)}{x} = \frac{17}{4}$$

$$\Rightarrow \frac{x(x+3)-(1-x)(x-2)}{x(x-2)} = \frac{17}{4}$$

$$\Rightarrow \frac{x^2+3x-\left(x-2-x^2+2x\right)}{x^2-2x} = \frac{17}{4}$$

$$\Rightarrow \frac{x^2+3x-x+2+x^2-2x}{x^2-2x} = \frac{17}{4}$$

$$\Rightarrow \frac{2x^2+2}{x^2-2x} = \frac{17}{4}$$

$$\Rightarrow 8x^2+8 = 17x^2-34x$$

$$\Rightarrow 9x^2-34x-8 = 0$$

$$\Rightarrow 9x^2-36x+2x-8 = 0$$

$$\Rightarrow 9x(x-4)+2(x-4) = 0$$

$$\Rightarrow (x-4)(9x+2) = 0$$

$$\Rightarrow x-4 = 0 \quad \text{or} \quad 9x+2 = 0$$

$$x = 4 \quad \text{or} \quad x = \frac{-2}{9}$$

Hence, 4 and −29 are the roots of the given equation

**Question 40:**

$$\frac{1}{(x-2)}+\frac{2}{(x-1)}=\frac{6}{x}$$
$$\Rightarrow \frac{x-1+2x-4}{(x-2)(x-1)}=\frac{6}{x}$$
$$\Rightarrow \frac{3x-5}{x^2-3x+2}=\frac{6}{x}$$
$$\Rightarrow 3x^2-5x=6x^2-18x+12$$
$$\Rightarrow 3x^2-6x^2-5x+18x-12=0$$
$$\Rightarrow -3x^2+13x-12=0$$
$$\Rightarrow 3x^2-13x+12=0$$
$$\Rightarrow 3x^2-9x-4x+12=0$$
$$\Rightarrow 3x(x-3)-4(x-3)=0$$
$$\Rightarrow (x-3)(3x-4)=0$$
$$\Rightarrow (x-3)=0 \text{ or } 3x-4=0$$
$$x=3 \text{ or } x=\frac{4}{3}$$

Hence, 3 and 43 are the roots of the given equation.

**Question 41:**

$$\frac{1}{x-2}+\frac{1}{x}=\frac{8}{2x+5}\Rightarrow\frac{x+x-2}{x(x-2)}=\frac{8}{2x+5}$$
$$\text{or } \frac{2(x-1)}{x(x-2)}=\frac{8}{2x+5}\Rightarrow(x-1)(2x+5)=4x(x-2)$$
$$\Rightarrow 2x^2-2x+5x-5=4x^2-8x$$
$$\Rightarrow 2x^2+3x-5=4x^2-8x$$
$$\Rightarrow 2x^2-11x+5=0 \text{ or } 2x^2-10x-x+5=0$$
$$\Rightarrow 2x(x-5)-1(x-5)=0 \text{ or } (x-5)(2x-1)=0$$
$$\Rightarrow x=5,\frac{1}{2}$$

Hence, 5 and 12 are the roots of the given equation.

https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-4-quadratic-equations/

**Question 42:**

Putting

$$\left(\frac{x}{x+1}\right) = y,$$

the given equation become

$$\Rightarrow y^2 - 5y + 6 = 0$$
$$\Rightarrow y^2 - 3y - 2y + 6 = 0$$
$$\Rightarrow y(y-3) - 2(y-3) = 0$$
$$(y-3)(y-2) = 0$$
$$y - 3 = 0 \text{ or } y - 2 = 0$$
$$y = 3 \text{ or } y = 2$$

Case I:

$$y = 3 \Rightarrow \frac{x}{x+1} = 3$$
$$\Rightarrow 3x + 3 = x \Rightarrow 3x - x = -3$$
$$2x = -3$$
$$x = \frac{-3}{2}$$

Case II:

$$y = 2 \Rightarrow \frac{x}{x+1} = 2$$
$$2x + 2 = x \Rightarrow 2x - x = -2$$
$$x = -2$$

Hence, −32 and -2 are the roots of the given equation

https://www.indcareer.com/schools/rs-aggarwal-solutions-for-class-10-maths-chapter-4-quadratic-equations/

**Question 43:**

$$2\left(\frac{x-1}{x+3}\right)-7\left(\frac{x+3}{x-1}\right)=5$$

Putting

$$\left(\frac{x-1}{x+3}\right)=y$$

the given equation become

$$2y-7\left(\frac{1}{y}\right)=5$$

$$2y^2-7=5y$$

$$\Rightarrow \quad 2y^2-5y-7=0$$

$$\Rightarrow 2y^2-7y+2y-7=0$$

$$\Rightarrow y(2y-7)+1(2y-7)=0$$

$$\Rightarrow (2y-7)(y+1)=0$$

$$2y-7=0 \quad \text{or} \quad y+1=0$$

Case I:

$$y=\frac{7}{2}\Rightarrow\frac{x-1}{x+3}=\frac{7}{2}$$

$$\Rightarrow 2x-2=7x+21$$

$$5x=-23\Rightarrow x=\frac{-23}{5}$$

Case II:

$$\frac{x-1}{x+3} = -1$$
$$\Rightarrow x - 1 = -x - 3$$
$$\Rightarrow 2x = -2$$
$$x = -1$$

Hence, -1 and −235 are the roots of the given equation

**Question 44:**

On putting

the given equation become

$$2y - \frac{3}{y} = 5 \Rightarrow 2y^2 - 3 = 5y$$
$$\Rightarrow 2y^2 - 5y - 3 = 0$$
$$\Rightarrow 2y^2 - 6y + y - 3 = 0$$
$$\Rightarrow 2(y-3) + 1(y-3) = 0$$
$$\Rightarrow (y-3)(2y+1) = 0$$
$$y = 3 \text{ or } y = \frac{-1}{2}$$

Case I:

$$y = 3 \Rightarrow \frac{2x-1}{x+3} = 3$$
$$\Rightarrow 2x - 1 = 3x + 9$$
$$\Rightarrow x = -10$$

Case II:

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

Hence, -10 and −15 are the roots of the given equation.

**Question 45:**

Putting

$$\left(\frac{4x-3}{2x+1}\right) = y,$$

the given equation become

$$y - \frac{10}{y} = 3 \Rightarrow y^2 - 10 = 3y$$
$$\Rightarrow y^2 - 3y - 10 = 0$$
$$\Rightarrow y^2 - 5y + 2y - 10 = 0$$
$$\Rightarrow y(y-5) + 2(y-5) = 0$$
$$\Rightarrow (y-5)(y+2) = 0$$
$$y - 5 = 0 \text{ or } y + 2 = 0$$
$$y = 5 \text{ or } y = -2$$

Case I:

$$y = 5 \Rightarrow \frac{4x-3}{2x+1} = 5 \Rightarrow 4x - 3 = 10x + 5$$
$$-6x = 8 \Rightarrow x = \frac{-4}{3}$$

Case II:

$$y = -2 \Rightarrow \frac{4x-3}{2x+1} = -2 \Rightarrow 4x - 3 = -4x - 2$$

$$8x = 1 \Rightarrow x = \frac{1}{8}$$

Hence, -1 and 18 are the roots of the given equation

**Question 46:**

The given equation

$$\left(\frac{a}{x-b} - 1\right) + \left(\frac{b}{x-a} - 1\right) = 0$$

$$\Rightarrow \frac{(a-x+b)}{(x-b)} + \frac{(b-x+a)}{(x-a)} = 0$$

$$\Rightarrow (a-x+b)\left[\frac{1}{(x-b)} + \frac{1}{(x-a)}\right] = 0$$

$$\Rightarrow (a-x+b)\left[\frac{2x-(a+b)}{(x-a)(x-b)}\right] = 0$$

$$\Rightarrow (a-x+b)[2x-(a+b)] = 0$$

$$\Rightarrow x = (a+b) \text{ or } x = \frac{(a+b)}{2}$$

Hence, (a+b) and (a+b)2 is the roots of the given equation

**Question 47:**

$$\frac{a}{(ax-1)}+\frac{b}{(bx-1)}=(a+b), \qquad \left(x\neq\frac{1}{a},\frac{1}{b}\right)$$

$$\Rightarrow\left[\frac{a}{(ax-1)}-b\right]+\left[\frac{b}{(bx-1)}-a\right]=0$$

$$\Rightarrow\frac{(a-abx+b)}{(ax-1)}+\frac{(a-abx+b)}{(bx-1)}=0$$

$$\Rightarrow(a-abx+b)\left[\frac{1}{ax-1}+\frac{1}{bx-1}\right]=0$$

$$\Rightarrow(a-abx+b)[x(b+a)-2]=0$$

$$\Rightarrow\ (a-abx+b)=0 \quad \text{or} \quad x(b+a)-2=0$$

$$x=\frac{a+b}{ab} \quad \text{or} \quad x=\frac{2}{(b+a)}$$

Hence, a+bab and 2a+b are the roots of the given equation

**Question 48:**

$$3^{x+2}+3^{-x}=10$$

$$3^{x}.3^{2}+3^{-x}=10$$

$$\Rightarrow 9y+\frac{1}{y}=10 \text{ where } 3^{x}=y$$

$$\Rightarrow 9y^{2}-10y+1=0$$

$$\Rightarrow 9y^{2}-9y-y+1=0$$

$$\Rightarrow 9y(y-1)-1(y-1)=0$$

$$\Rightarrow(9y-1)(y-1)=0$$

$$\Rightarrow 9y-1=0 \quad \text{or} \quad y-1=0$$

$$\Rightarrow\ y=\frac{1}{9} \quad \text{or} \quad y=1$$

$$\text{If } \ 3^{x}=\frac{1}{9}\Rightarrow 3^{x}=(3)^{-2}\Rightarrow x=-2$$

$$\text{If } \ 3^{x}=1=3^{0}\Rightarrow x=0$$

Hence, -2,0 are the roots of the given equation

**Question 49:**

$$4^{(x+1)} + 4^{(1-x)} = 10$$

$$4^x.4^1 + 4^1.4^{-x} = 10$$

$$4y + \frac{4}{y} = 10 \text{ where } 4^x = y$$

$$4y^2 - 10y + 4 = 0$$

$$\Rightarrow 4y^2 - 8y - 2y + 4 = 0$$

$$\Rightarrow 4y(y-2) - 2(y-2) = 0$$

$$\Rightarrow (y-2)(4y-2) = 0$$

$$y - 2 = 0 \text{ or } 4y - 2 = 0$$

$$y = 2 \text{ and } y = \frac{2}{4} = \frac{1}{2}$$

$$y = 2 \text{ or } y = \frac{1}{2}$$

In caseI $4^x = 2 \Rightarrow (2)^{2x} = (2)^1 \Rightarrow 2x = 1$

$$x = \frac{1}{2}$$

In case II $4^x = \frac{1}{2} \Rightarrow (2)^{2x} = \left(\frac{1}{2}\right)^1 = (2)^{2x} = (2)^{-1}$

$$\therefore \quad x = -\frac{1}{2}$$

Hence, 12 and 12 are the roots of the given equation

**Question 50:**

$2^{2x} - 3.2^{(x+2)} + 32 = 0$

$2^{2x} - 3.2^{x}.2^{2} + 32 = 0$

$y^2 - 12y + 32 = 0$ where $2^x = y$

$y^2 - 8y - 4y + 32 = 0$

$y(y-8) - 4(y-8) = 0$

$(y-8)(y-4) = 0$

$y - 8 = 0$ or $y - 4 = 0$

$y = 8$ or $y = 4$

$2^x = 8 \Rightarrow 2^x = (2)^3 \Rightarrow x = 3$

$2^x = 4 \Rightarrow 2^x = (2)^2 \Rightarrow x = 2$

Hence, 3 and 2 are the roots of the given equation.

# RS Aggarwal Class 10 Solutions

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He was born on January 2, 1946 in a village of Delhi. He graduated from Kirori Mal College, University of Delhi. After completing his M.Sc. in Mathematics in 1969, he joined N.A.S. College, Meerut, as a lecturer. In 1976, he was awarded a fellowship for 3 years and joined the University of Delhi for his Ph.D. Thereafter, he was promoted as a reader in N.A.S. College, Meerut. In 1999, he joined M.M.H. College, Ghaziabad, as a reader and took voluntary retirement in 2003. He has authored more than 75 titles ranging from Nursery to M. Sc. He has also written books for competitive examinations right from the clerical grade to the I.A.S. level.

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