UDAAN

2025

Quadratic Equation

Mathematics | Lecture - 02

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Topics *to be covered*

1. Important Questions on Factorization Method
2. Quadratic Formula (Shreedharacharya's Formula)
3. Nature of roots of a quadratic equation
4. Badhiya Questions


WORK HARD
DREAM BIG
NEVER GIVE UP !!

Topic : Roots of a Quadratic Equation

#Q. Which of the following equation has 2 as a root?

A $x^2 - 4x + 5 = 0$

B $x^2 + 3x - 12 = 0$

C $2x^2 - 7x + 6 = 0$

D $3x^2 - 6x - 2 = 0$

Topic : Roots of a Quadratic Equation

#Q. Find the roots of the quadratic equation $\sqrt{3}x^2 - 2x - \sqrt{3} = 0$.

[CBSE Term – II, 2015]

A) $\frac{-1}{\sqrt{3}}, -\sqrt{3}$

B) $\frac{-1}{\sqrt{3}}, \sqrt{3}$

C) $\frac{1}{\sqrt{3}}, \sqrt{3}$

D) NOTA

$x = \sqrt{3}, \frac{-1}{\sqrt{3}}$

$P = -3, S = -2$

$-3, 1$

$\sqrt{3}x^2 - 2x - \sqrt{3} = 0$

$\sqrt{3}x^2 - 3x + 1x - \sqrt{3} = 0$

$\sqrt{3}x(x - \sqrt{3}) + 1(x - \sqrt{3}) = 0$

$(x - \sqrt{3})(\sqrt{3}x + 1) = 0$

Topic : Roots of a Quadratic Equation

#Q. Solve the quadratic equation $(x-1)^2 - 5(x-1) - 6 = 0$

[CBSE Term – II, 2015]

$$x^2 + 1^2 - 2(x)(1) - 5x + 5 - 6 = 0$$

$$x^2 + 1 - 2x - 5x - 1 = 0$$

$$x^2 - 7x = 0$$

$$x(x-7) = 0$$

$$x = 0$$

$$x = 7$$

Topic : Factorisation Method

#Q. Solve the following quadratic equation by factorization method:

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

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

$P = a^2 - b^2$, $S = -2a$

$-(a-b), -(a+b)$

$(a+b)(a-b)$

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

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

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

$(x-a+b)(x-a-b) = 0$

$x - a + b = 0$

$x = a - b$

$x - a - b = 0$

$x = a + b$

Topic : Factorisation

#Q. Solve the following quadratic equation by factorization method:

(ii) $4x^2 - 4ax + (a^2 - b^2) = 0$ **[CBSE 2012]**

A $\frac{a+b}{2}, \frac{a-b}{2}$

B $\frac{-a+b}{2}, \frac{-a+b}{2}$

C $\frac{a+b}{4}, \frac{a-b}{4}$

D None of these

$2x - a - b = 0$

$x = \frac{a+b}{2}$

$2x - a + b = 0$

$x = \frac{a-b}{2}$

$4x^2 - 4ax + a^2 - b^2 = 0$

$P = 4(a^2 - b^2), \; S = -4a$

$-2(a+b), \; -2(a-b)$

$(a+b)(a-b)$

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

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

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

Topic : Factorisation Method

#Q. Solve the following quadratic equation by factorization method:

(i) $\frac{x}{x+1}+\frac{x+1}{x}=\frac{34}{15}, x \neq 0, x \neq -1$

10, -6

$4x^2+4x-15=0$

$4x^2+10x-6x-15=0$

$2x(2x+5)-3(2x+5)=0$

$(2x+5)(2x-3)=0$

$x=-\frac{5}{2}, x=\frac{3}{2}$

$\frac{2x^2+2x+1}{x^2+x}=\frac{34}{15}$

$15(2x^2+2x+1)=34(x^2+x)$

$30x^2+30x+15=34x^2+34x$

$-4x^2-4x+15=0$

$4x^2+4x-15=0$

$P=-60, S=4$

$\frac{x}{x+1}+\frac{x+1}{x}=\frac{34}{15}$

$\frac{x^2+(x+1)^2}{(x+1)(x)}=\frac{34}{15}$

$\frac{x^2+x^2+1+2x}{x^2+x}=\frac{34}{15}$

Topic : Factorisation Method

#Q. Solve the following quadratic equation by factorization method:

(ii) $\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}$

A. –3, 4/3,

B. 4, 4/3

C. ~~+~~3, 4/3,

D. –4, 4/3

$x(3x-5)=6(x^2-3x+2)$

$3x^2-5x=6x^2-18x+12$

$-3x^2+13x-12=0$

$3x^2-13x+12=0$

$P=36,\ S=-13$

$-9,-4$

$\frac{1}{x-2}+\frac{2}{x-1}=\frac{6}{x}$

$\frac{1(x-1)+2(x-2)}{(x-2)(x-1)}=\frac{6}{x}$

$\frac{x-1+2x-4}{x^2-x-2x+2}=\frac{6}{x}$

$\frac{3x-5}{x^2-3x+2}=\frac{6}{x}$

$$3x^2 - 13x + 12 = 0$$

$$3x^2 - 9x - 4x + 12 = 0$$

$$3x(x-3) - 4(x-3) = 0$$

$$(x-3)(3x-4) = 0$$

$$x = 3, \quad x = \frac{4}{3}$$

Topic : Factorisation Method

#Q. Solve for x : $\frac{x-1}{x-2}+\frac{x-3}{x-4}=3\frac{1}{3}, x \neq 2,4$ **[CBSE 2005]**

A) 5, 5/2

B) 2, 5/2

C) –5, 5/2

D) 5, –5/2

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

$$\frac{(x-1)(x-4)+(x-3)(x-2)}{(x-2)(x-4)}=\frac{10}{3}$$

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

$$\frac{2x^2-10x+10}{x^2-6x+8}=\frac{10}{3}$$

$$3(2x^2-10x+10)=10(x^2-6x+8)$$

$$6x^2-30x+30=10x^2-60x+80$$

$$-4x^2+30x-50=0$$

$$-2[2x^2-15x+25)=0$$

$$2x^2-15x+25=0$$

$2x^2 - 15x + 25 = 0$

$P = 50, \quad S = -15$

$-10, -5$

$2x^2 - 10x - 5x + 25 = 0$

$2x(x-5) - 5(x-5) = 0$

$(x-5)(2x-5) = 0$

$x = 5, \frac{5}{2}$

Topic : Factorisation

[NCERT]

#Q. $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq 4, 7$

H.w

(A) 1, 2

(B) −1, −2

(C) −1, 2

(D) 1, −2

Topic : Factorisation Method

#Q. Solve : $\frac{1}{x-1} - \frac{1}{x+5} = \frac{6}{7}, x \neq 1, -5$

H.W

(A) 2, 6

(B) –2, 6

(C) –2, –6

(D) 2, –6

Topic : Factorisation

#Q. Solve the following quadratic equations by factorization method :

$a^2b^2x^2 + b^2x - a^2x - 1 = 0$ [CBSE 2005]

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

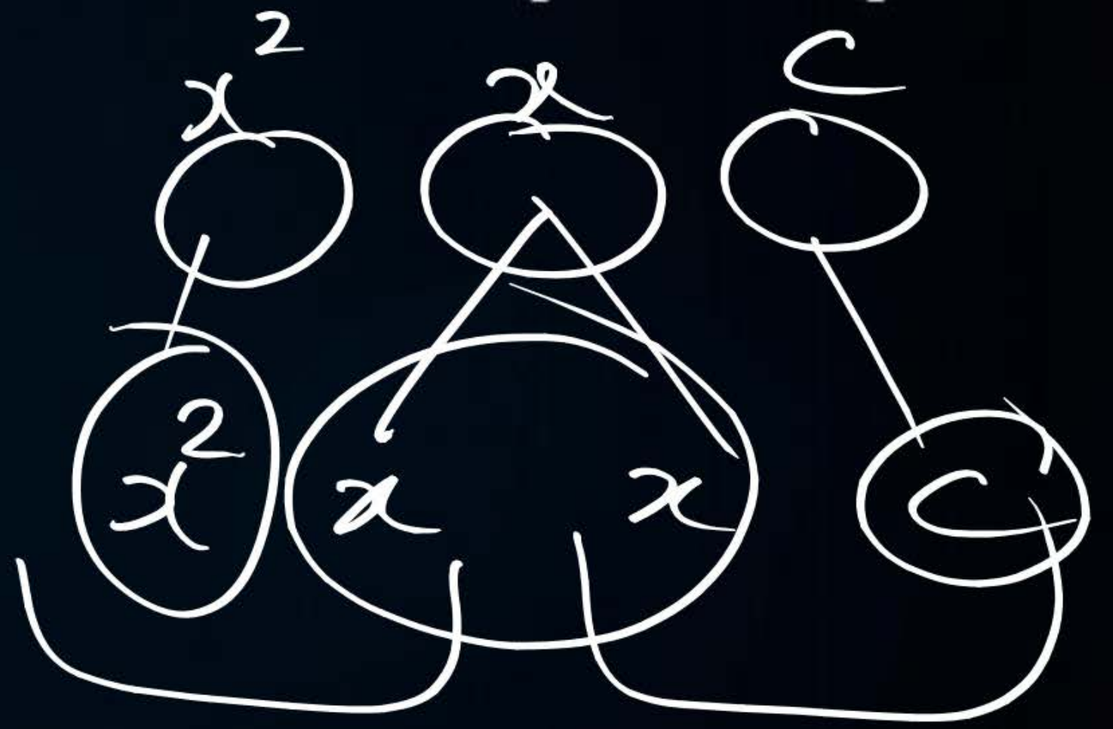
$b^2x(a^2x+1) - 1(a^2x+1) = 0$

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

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

$a^2x=-1$ $\quad$ $b^2x=1$

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



Topic : Factorisation

#Q. Solve the following quadratic equations by factorization method:

$$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, \quad a+b \neq 0$$

[CBSE 2005]

$$\frac{1}{a+b+x} - \frac{1}{x} = \frac{1}{a} + \frac{1}{b}$$

$$\frac{x(1) - 1(a+b+x)}{(a+b+x)(x)} = \frac{b+a}{ab}$$

$$\frac{x - a - b - x}{ax+bx+x^2} = \frac{b+a}{ab}$$

$$\frac{-a-b}{ax+bx+x^2} = \frac{a+b}{ab}$$

$$\frac{-(a+b)}{ax+bx+x^2} = \frac{(a+b)}{ab}$$

$$\frac{-1}{ax+bx+x^2} = \frac{1}{ab}$$

$$-ab = ax+bx+x^2$$

$$0 = x^2+ax+bx+ab$$

$$x^2+ax+bx+ab=0$$

$$x(x+a)+b(x+a)=0$$

$$(x+a)(x+b)=0$$

$$x=-a,-b$$

Topic : Factorisation

#Q. Find the positive roots of $\sqrt{3x^2 + 6} = 9$.

[CBSE Term – II, 2015, 2017]

$$\left(\sqrt{3x^2+6}\right)^2 = (9)^2$$

$$3x^2 + 6 = 81$$

$$3x^2 = 75$$

$$3x^2 = 75$$

$$x^2 = 25$$

$$x = \pm 5$$

Ans: positive root = 5

Homework

DPP - toy → nahi bane → next class wait.

THANK YOU