



UDAAN



2026

Quadratic Equations

MATHS

LECTURE-3

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Topics *to be covered*

A

Questions on factorization method

Notes

Patience

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

#Warmup

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

$$x^2 + \underline{1} - 2x - \underline{5x} + \underline{5} - \underline{6} = 0$$

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

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

$$\boxed{x = 0}$$

$$x - 7 = 0$$

$$\boxed{x = 7}$$

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

#Warm up

$$\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0, x \neq 3; -\frac{3}{2}$$

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

$$2x^2 + 5x + 3 = 0$$

A

-1

$$2x(2x+3) + 1(x-3) + 3x+9 = 0$$

$\underbrace{(x-3)(2x+3)}$

B

0

$$4x^2 + 6x + x-3 + 3x+9 = 0$$

C

1

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

D

2

$$S=5, P=6$$

2,3

$$2x^2 + 2x + 3x + 3 = 0$$

$$2x(x+1) + 3(x+1) = 0$$

Ans

$$(x+1)(2x+3) = 0$$

$$x = -1, x = -3/2$$

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

A 5, 5/2

B 2, 5/2

C -5, 5/2

D 5, -5/2

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

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

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

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

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

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

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

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

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

$$-10, -5$$

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

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

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

$$x = 5, 5/2$$

~~Solve~~

#Q. $\frac{a}{x-a} + \frac{b}{x-b} = \frac{2c}{x-c}$

A

$$0, \frac{2ab - bc - ac}{a + b - 2c}$$

C

$$0, \frac{a + b - 2c}{2ab + 2bc + ac}$$

B

$$0, \frac{a + b - 2c}{2ab - 2bc - ac}$$

D

$$0, \frac{2ab + 2bc + ac}{a + b - 2c}$$

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

$$\frac{a(x-b) + b(x-a)}{(x-a)(x-b)} = \frac{2c}{x-c}$$

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

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

$$(x-c)(ax+bx-2ab) = 2c(x^2-bx-ax+ab)$$

$$ax^2+bx^2-2abx-\cancel{acx}-\cancel{bcx}+2abc = 2cx^2-2bx^2-2acx+\cancel{2abc}$$

$$ax^2+bx^2-2cx^2-2abx+\cancel{acx}+\cancel{bcx} = 0$$

$$x^2(a+b-2c) + x(-2ab+ac+bc) = 0$$

$$(x)[(a+b-2c)x - 2ab+ac+bc] = 0$$

$$x=0 \quad \checkmark$$

$$(a+b-2c)x - 2ab+ac+bc = 0$$

$$(a+b-2c)x = 2ab-ac-bc$$

$$x = \frac{2ab-ac-bc}{a+b-2c} \quad \checkmark$$



#Q. The roots of the equation $x^2 - 2x - (r^2 - 1) = 0$ are

#Factorisation

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

Sum = -2, Product = -(r² - 1)

$$-(\gamma+1), (\gamma-1)$$

$$-(r^2 - 1)$$

$$-(\gamma+1)(\gamma-1)$$

$$x^2 - (\gamma+1)x + (\gamma-1)x - (\gamma+1)(\gamma-1) = 0$$

$$x - \gamma - 1 = 0$$

$$x = \gamma + 1$$

$$x(x - \gamma - 1) + (\gamma - 1)(x - \gamma - 1) = 0$$

$$x + \gamma - 1 = 0$$

$$x = 1 - \gamma$$

- A $1 - r, -r - 1$
- B $1 - r, r + 1$
- C $1, r$
- D $1 - r, r$

Factorisation

#Q. The roots of the equation $x^2 + x - p(p+1) = 0$, where p is a constant, are

~~H(SIPV)~~

$$x^2 + x - p(p+1) = 0$$

Sum = 1, Product = -p(p+1)

$$-p, p+1$$

- A $p, p+2$
- B $-p, p-1$
- C $p, -(p+1)$
- D $-p, -(p+1)$

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

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

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

Sum = $-2a$, Product = $a^2 - b^2$
 $-(a-b)$, $-(a+b)$

$$x - a + b = 0$$

$$x = a - b$$

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

$$x - a - b = 0$$

$$x = a + b$$

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

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

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

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

$$\text{Sum} = -4a, \text{ Product} = 4(a^2 - b^2)$$

$$4(a^2 - b^2)$$

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

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

$$2 \times 2 \times (a+b)(a-b)$$

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

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

$$2x - a - b = 0, 2x - a + b = 0$$

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

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

$$2x = a + b$$

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

$$2x = a - b$$

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

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

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

Sum = $-4a^2$, product = $4(a^4 - b^4)$

$$-2(a^2 - b^2), -2(a^2 + b^2)$$

#GPM
#Ghat Pej
12080

#Q1

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

$$(ii) \quad 9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$$

Sum = $-9a - 9b$, Product = $9(2a^2 + 5ab + 2b^2)$

$$-3(a+2b), -3(2a+b)$$

$$2a^2 + 5ab + 2b^2$$

$$\underline{2a^2 + 4ab + ab + 2b^2}$$

$$2a(a+2b) + b(a+2b)$$

$$(a+2b)(2a+b)$$

$$3 \cdot 3 \cdot (a+2b)(2a+b)$$

$$9x^2 - 3(a+2b)x - 3(2a+b)x + (a+2b)(2a+b) = 0$$

$$3x[3x - (a+2b)] - (2a+b)[3x - (a+2b)] = 0$$

$$[3x - (a+2b)][3x - (2a+b)] = 0$$

$$3x - a - 2b = 0, \quad 3x - 2a - b = 0$$

$$3x = a + 2b, \quad 3x = 2a + b$$

$$x = \frac{a+2b}{3}$$

$$, \quad x = \frac{2a+b}{3}$$



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Ritik Mishra



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