

Foundation Batch



MATHS

Quadratic Equation

(द्विघात समीकरण)

LIVE

13-12-2024 07:00PM



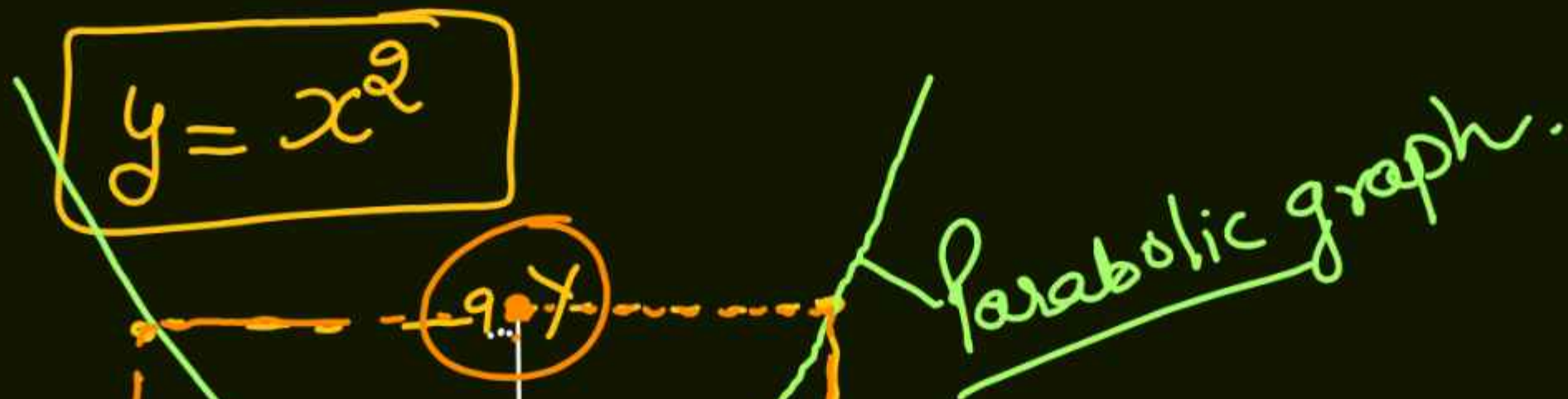
$$y = ax^2 + bx + c$$

max power = 2

→ Quadratic Expression
द्विघात अभिव्यक्ति

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

↓
Quadratic Equation
द्विघात समीकरण



$y = x^2$

Put $y = 9$

$x^2 = 9$

$x = +3, -3$

Roots (मूल)

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

Roots $\rightarrow \alpha, \beta$

Factor Method

श्रीधर आचार्य नियम

Shridhar Acharya Rule.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

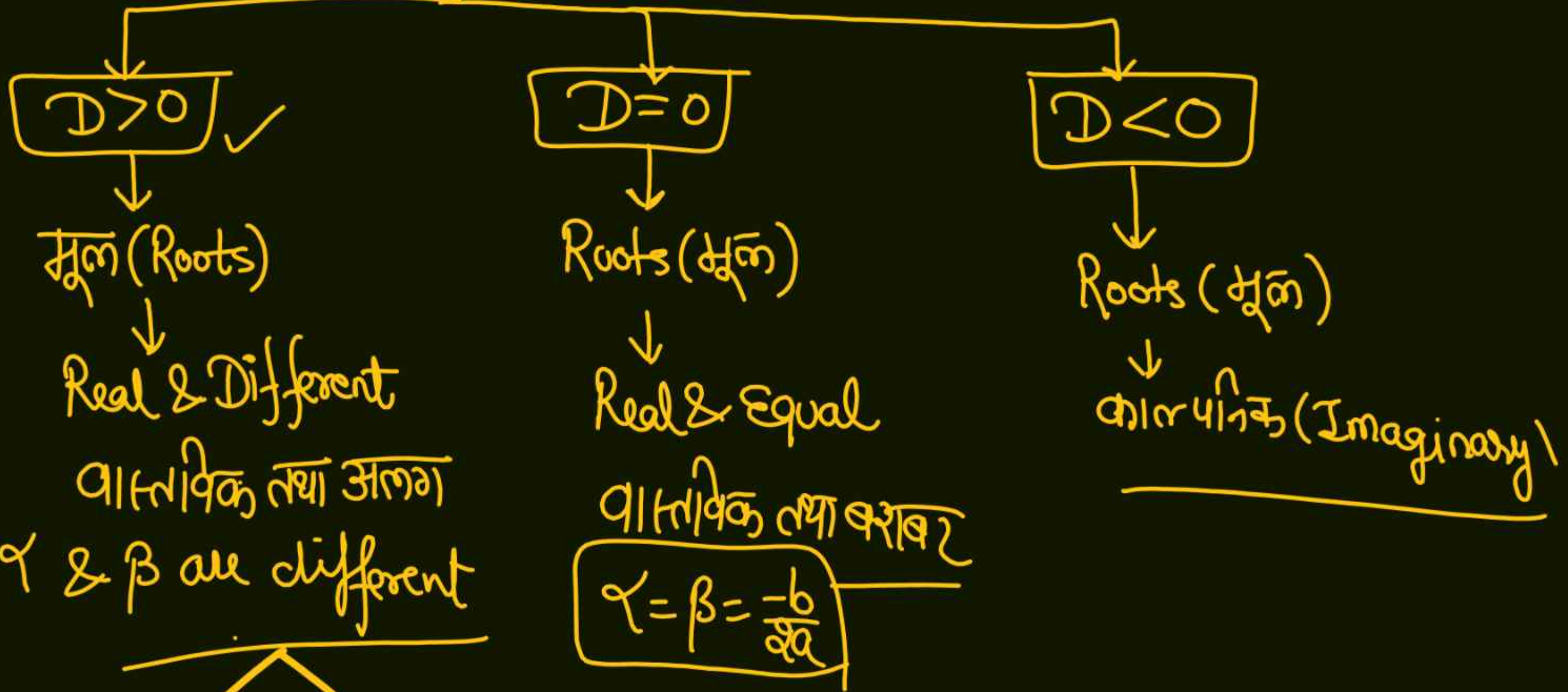
$$\frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

α

$$\frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

β

29



Case-1

 $b^2 - 4ac =$ पूर्ण वर्ग

Case-2

 $b^2 - 4ac =$ पूर्ण वर्ग नहीं है

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

Roots $\rightarrow \alpha, \beta$

Sum of Roots (मूलों का योग) =

$$\alpha + \beta = -\frac{b}{a} = -\left[\frac{\text{Coefficient of } x}{\text{Coefficient of } x^2}\right]$$

Product of Roots (मूलों का गुणनफल)

$$\alpha \cdot \beta = \frac{c}{a} = \left[\frac{\text{Constant term}}{\text{Coefficient of } x^2}\right]$$

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

divide both side by 'a'

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$x^2 - [\overset{\alpha+\beta}{\text{Sum of Roots}}]x + \overset{\alpha \cdot \beta}{\text{Product of Roots}} = 0$$

ex $\alpha + \beta = 6$

$$\alpha \times \beta = 8$$

eqⁿ $x^2 - 6x + 8 = 0$ ✓

$$\alpha + \beta = -10$$

$$\alpha \cdot \beta = 16$$

$$x^2 - (-10)x + 16 = 0$$

$$\underline{x^2 + 10x + 16 = 0}$$

$$x^2 - 16x + 48 = 0$$

$$x = \frac{-(-16) \pm \sqrt{(-16)^2 - 4 \times 1 \times 48}}{2 \times 1}$$

$$\frac{16 \pm \sqrt{256 - 192}}{2}$$

$$\frac{16 \pm \sqrt{64}}{2} = \frac{16 \pm 8}{2}$$

$$\frac{16+8}{2} \quad \frac{16-8}{2}$$

$$\frac{24}{2} \textcircled{12}$$

$$\frac{8}{2} \textcircled{4}$$

$$x^2 - \overbrace{16x}^{\alpha+\beta} + \underbrace{48}_{\alpha \cdot \beta} = 0$$

$\swarrow \quad \searrow$
 $12 \quad 4$

$$x^2 - 12x - 4x + 48 = 0$$

$$x(x-12) - 4(x-12) = 0$$

$$(x-12)(x-4) = 0$$

$$x-12=0 \quad x-4=0$$

$x=12$

$x=4$

$$1x^2 - 16x + 48 = 0$$

1x48

$$\begin{array}{cc} +12 & +4 \\ \hline & \hline \end{array}$$

$$+12, +4$$

$$\begin{array}{cc} & + \\ \alpha & \beta \\ \hline + & + \\ \hline \end{array} \quad \begin{array}{c} - \\ - \end{array}$$

$$2x^2 - 11x + 14 = 0$$

$$\begin{array}{r} 28 \\ +7 \quad +4 \\ \hline 29 \quad 29 \end{array}$$

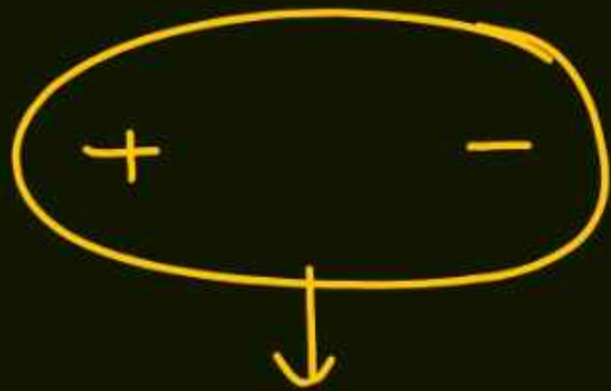
$$\left(\frac{7}{2}, 2 \right)$$

$$\begin{array}{c} + \\ \alpha \beta \\ - - \quad + + \\ \hline \end{array}$$

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

$$\begin{array}{cc} & \swarrow \searrow \\ -9 & +7 \\ \hline \end{array}$$

$$\begin{array}{cc} -9 & +7 \\ \hline \end{array}$$



$$\begin{array}{cc} - & + \end{array}$$

$$2x^2 + 7x - 9 = 0$$

$$\begin{array}{c} 18 \\ \wedge \\ -\frac{9}{2} \quad +\frac{2}{2} \end{array}$$

$$-\frac{9}{2}, +1$$

$$\begin{array}{cc} + & - \\ - & + \end{array}$$

$$7 - 5x^2 + 2x = 0$$

$$5x^2 - 2x - 7 = 0$$



$$\begin{array}{r}
 3s \\
 \swarrow \quad \searrow \\
 \frac{+7}{s} \quad \frac{-5}{s} \\
 \\
 \frac{+7}{s} \quad -1 \\
 \hline
 \end{array}$$

$$(x-3)(x+5) = -16$$

$$x^2 + 5x - 3x - 15 = -16$$

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

+
 Root
 - -



$$-2x^2 - 8x + 6$$

HW