UDAAN

2026

POLYNOMIALS

MATHS | LECTURE-3

BY-RITIK SIR

Topics *to be covered*

A Middle term splitting

B Finding Zeroes of Quadratic Polynomial

C Relation between Zeroes and Coefficients of Quadratic Polynomial

RITIK SIR

JOIN MY OFFICIAL TELEGRAM CHANNEL

① $x^2 = 9$

$x^2 - 9 = 0$

$x^2 = 9$

$x = \pm\sqrt{9}$

$\boxed{x = +3, -3}$

3	27
3	9
3	3
	1

② $x^2 = 27$

$x^2 = 27$

$x = \pm\sqrt{27}$

$x = \pm\sqrt{3 \times 3 \times 3}$

$\boxed{x = +3\sqrt{3}, -3\sqrt{3}}$

③ $x^2 = 4x$

$x^2 - 4x = 0$

Common.....

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

$\boxed{x = 0}$

$x - 4 = 0$

$\boxed{x = 4}$

$x^2 - 4x = 0$

$x^2 = 4x$

$x = \pm\sqrt{4x}$

$x = +2\sqrt{x}$
$-2\sqrt{x}$

④ $x^2 = 36x$

$x^2 - 36x = 0$

$(x)(x-36) = 0$

$\boxed{x = 0}$

$x - 36 = 0$

$\boxed{x = 36}$

Middle term splitting for finding zeros of quadratic polynomials

1. $x^2 + 4x - 21$

Sum = 4, product = −21

7, −3

3	21
7	7
1	1

$x^2 + 7x - 3x - 21 = 0$

$x(x+7) - 3(x+7) = 0$

$(x+7)(x-3) = 0$

$x + 7 = 0$ $\quad x - 3 = 0$

$x = -7$ $\quad x = 3$

2. $-2x^2 + 7x - 6$

Sum = 7, product = 12

4, 3

2	12
3	6
2	2
1	1

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

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

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

$x - 2 = 0$ $\quad -2x + 3 = 0$

$x = 2$ $\quad -2x = -3$

$x = 3/2$

3. $7x^2 - 19x - 6$

$S = -19,\ P = -42$

$-21, 2$

2	42
3	21
7	7
1	1

$7x^2 - 21x + 2x - 6$

$7x(x-3) + 2(x-3) = 0$

$(x-3)(7x+2) = 0$

$x-3=0$ $\quad$ $7x+2=0$

$x = 3$ $\quad$ $x = -\frac{2}{7}$

q $\quad$ p

4. $6x^2 + 19x + 6$

Sum $= 13$, Product $= 36$

$9, 4$

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

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

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

$2x+3=0$ $\quad$ $3x+2=0$

$x = -\frac{3}{2}$ $\quad$ $x = -\frac{2}{3}$

q $\quad$ p

#Q. The zeroes of the polynomial $x^2 + \frac{1}{6}x - 2$ are

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

$\frac{6x^2 + x - 12 = 0}{6}$

$6x^2 + x - 12 = 0$

Sum = 1, product = −72

9, −8

$6x^2 + 9x - 8x - 12 = 0$

$3x(2x+3) - 4(2x+3) = 0$

$(2x+3)(3x-4) = 0$

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

2	72
2	36
2	18
3	9
3	3
	1

A. $-3, 4$

B. $-\frac{3}{2}, \frac{4}{3}$

C. $-\frac{4}{3}, \frac{3}{2}$

D. $-\frac{4}{3}, -\frac{3}{2}$

$6x^2 = 2 \times 3 \times x \times x$

$9x = 3 \times 3 \times x$

$3x(2x+3)$

$-8x = -1 \times 2 \times 2 \times 2 \times x$

$-12 = -1 \times 2 \times 2 \times 3$

$-4(2x+3)$

α, β

Find the zeroes

#Q. [redacted] the polynomial:

$$f(x) = x^2 - \frac{11}{6}x - \frac{5}{3}$$

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

$6x^2 = 2 \times 3 \times x \times x$

$-15x = -1 \times 3 \times 5 \times x$

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

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

$2x = 5$ → $x = 5/2$ (α)

$3x + 2 = 0$ → $x = -2/3$ (β)

$x^2 - \frac{11}{6}x - \frac{5}{3} = 0$

$\frac{6x^2 - 11x - 10}{6} = 0$

$6x^2 - 11x - 10 = 0$

$P = -60,\ S = -11$

$-15, 4$

Verify:

$a = 1$, $b = -11/6$, $c = -5/3$

$\alpha = 5/2$, $\beta = -2/3$

$\alpha + \beta = -\frac{b}{a}$

$\frac{5}{2} + \frac{-2}{3} = -\frac{-11/6}{1}$

$\frac{15-4}{6} = +11/6$

$11/6 = 11/6$

$\alpha\beta = c/a$

$\frac{5}{2} \times \frac{-2}{3} = -5/3 \times 1$

$-5/3 = -5/3$

Relationship between the zeroes and coefficients of a Quadratic Polynomial

Q: $-3x^2-3x+2$

$a=-3, b=-3, c=2$

Q: $5x^2-2x^0+0x$

$a=5, b=0, c=-2$

ax^2+bx+c

$a \neq 0$

$a, b, c \in R$

Coefficient = a, b, c

α (a) = alpha

β = Beta

Zeroes

$$\alpha + \beta = -b/a$$

(Sum of zeroes)

$$\alpha \beta = c/a$$

(Product of zeroes)

#Q Find the zeros of the following quadratic polynomial and verify the relationship between the zeros and their coefficients:

CBSE 2019

$q(y) = 7y^2 - \frac{11}{3}y - \frac{2}{3}$

$7y^2 - \frac{11}{3}y - \frac{2}{3} = 0$

$\frac{21y^2 - 11y - 2}{3} = 0$

$21y^2 - 11y - 2 = 0$

$P = -42, S = -11$

$-14, 3$

$21y^2 - 14y + 3y - 2 = 0$

$7y(3y-2) + 1(3y-2) = 0$

$(3y-2)(7y+1) = 0$

$3y = 2$ | $7y + 1 = 0$

$y = 2/3$ | $y = -1/7$

$\alpha = 2/3$, $\beta = -1/7$ | $a = 7, b = -11/3, c = -2/3$

Verify:

$\alpha + \beta = -b/a$

$\frac{2}{3} + -\frac{1}{7} = -\frac{-11/3}{7}$

$\frac{14-3}{21} = \frac{11}{21}$

$\frac{11}{21} = \frac{11}{21}$

$\alpha\beta = c/a$

$\frac{2}{3} \times -\frac{1}{7} = \frac{-2/3}{7}$

$\frac{-2}{21} = \frac{-2}{21}$

#Q. Find the zeros of the quadratic polynomial $f(x) = 6x^2 - 3$, and verify the relationship between the zeros and its coefficients:

$6x^2 - 3 = 0$

$6x^2 = 3$

$x^2 = \frac{3}{6}$

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

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

$x = \frac{1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}$

α β

$a = 6$

$b = 0$

$c = -3$

$\alpha + \beta = -b/a$

$\frac{1}{\sqrt{2}} + \frac{-1}{\sqrt{2}} = -\frac{0}{6}$

$0 = 0$

$\alpha\beta = c/a$

$\frac{1}{\sqrt{2}} \times \frac{-1}{\sqrt{2}} = \frac{-3}{6}$

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

Hence verified

#Q. Find the zeros of the polynomial $f(u) = 4u^2 + 8u$ and verify the relationship between the zeros and its coefficients.

#Gph

$4u^2 + 8u = 0$

$[4u][u+2] = 0$

$4u = 0 \quad u+2 = 0$

$u = 0/4 \quad u = -2$

$u = 0$

$\alpha = 0$

$\beta = -2$

$a = 4$

$b = 8$

$c = 0$

#Q. Find the zeroes of each of the following quadratic polynomial and verify the relationship between the zeroes and their coefficients:

(i) $g(s) = 4s^2 - 4s + 1$

(ii) $g(x) = 6x^2 - 3 - 7x$

#Gpt

#Q. Find the zeroes of following quadratic polynomial.

(i) $\sqrt{3}x^2 + 10x + 7\sqrt{3}$

(ii) $x^2 + 2\sqrt{2}x - 6$

Sum = 10, Product = $7\sqrt{3} \times \sqrt{3}$

$= 7 \times 3$

$= 21$

$7, 3$

$\sqrt{3}x^2 + 7x + 3x + 7\sqrt{3} = 0$

$x(\sqrt{3}x + 7) + 1(3x + 7\sqrt{3}) = 0$

$x(\sqrt{3}x + 7) + \sqrt{3}(\sqrt{3}x + 7) = 0$

$(\sqrt{3}x + 7)(x + \sqrt{3}) = 0$

$\sqrt{3}x + 7 = 0$

$x = -7/\sqrt{3}$

$x + \sqrt{3} = 0$

$x = -\sqrt{3}$

α

β

#Q. Find the zeroes of following quadratic polynomial.

(i) $\sqrt{3}x^2 + 10x + 7\sqrt{3}$

(ii) $x^2 + 2\sqrt{2}x - 6$

$S = -2\sqrt{2}, P = -6$

#Sp4

#Q. If one zero of the quadratic polynomial $kx^2 + 3x + k$ is 2, then the value of k is

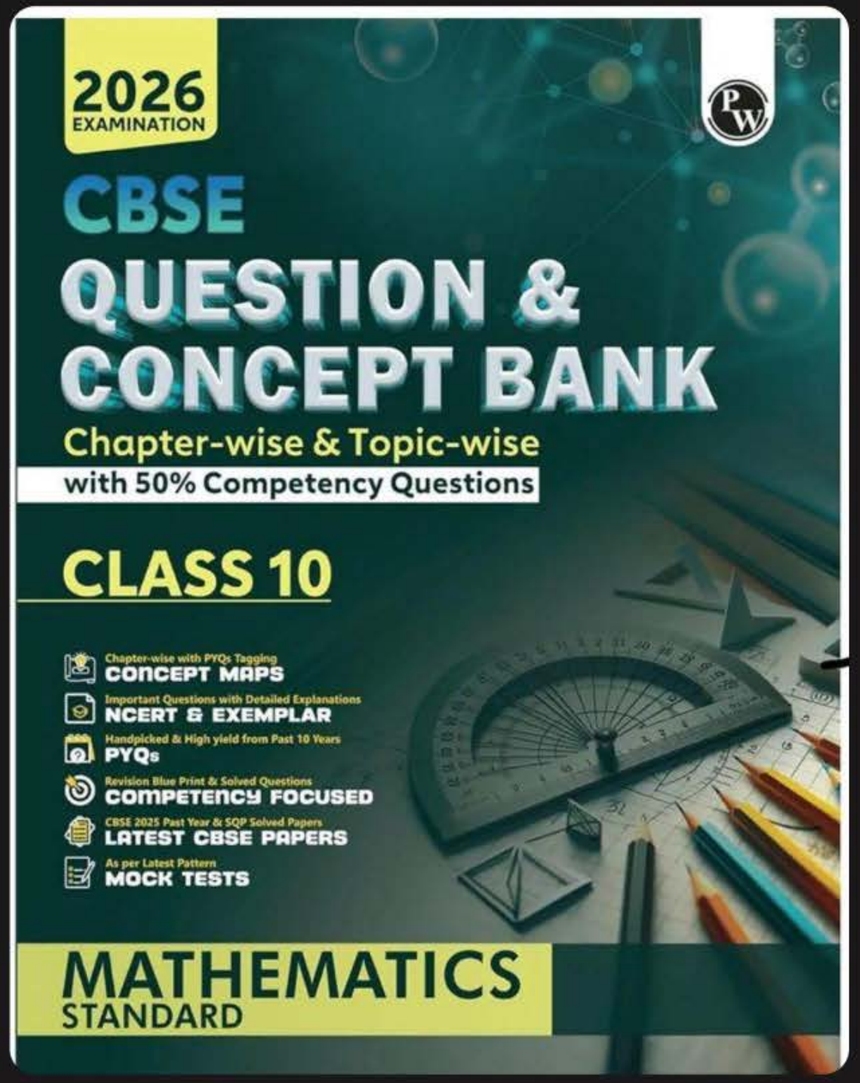
#Gph

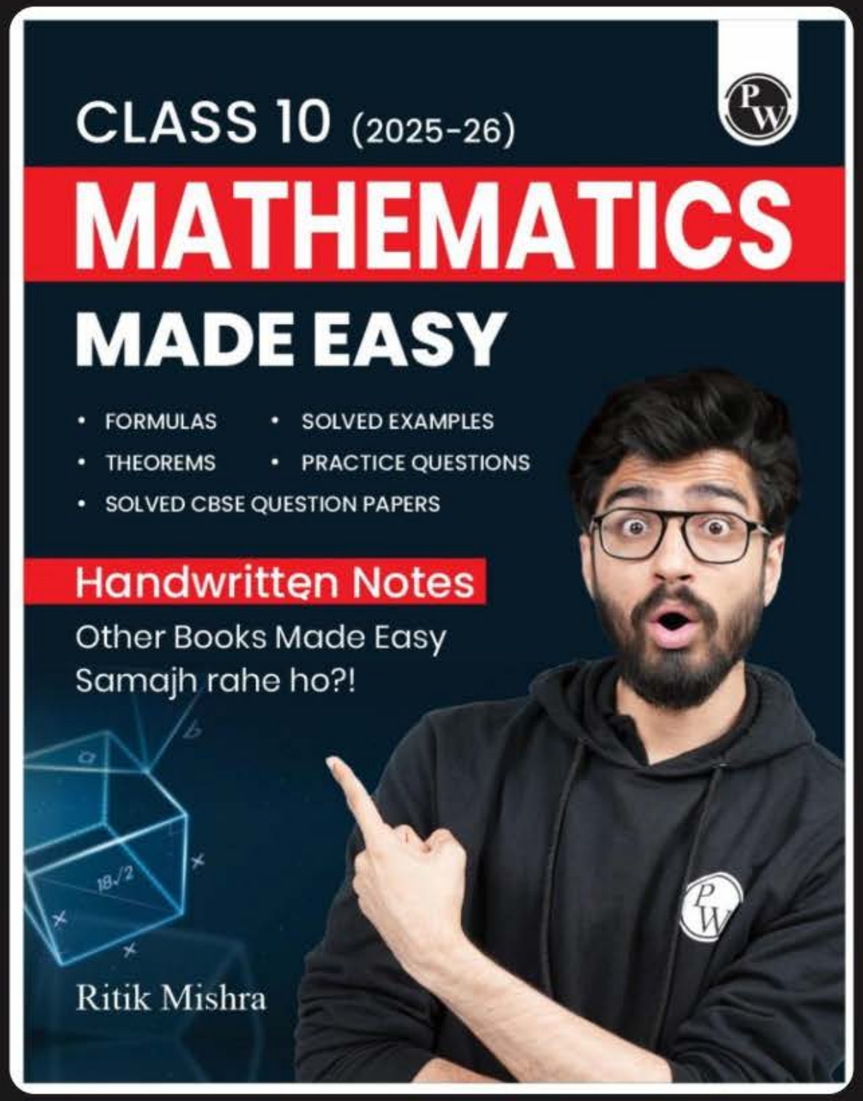
A $\frac{5}{6}$

B $-\frac{5}{6}$

C $\frac{6}{5}$

D $-\frac{6}{5}$


2026
EXAMINATION
CBSE
QUESTION &
CONCEPT BANK
Chapter-wise & Topic-wise
with 50% Competency Questions
CLASS 10
Chapter-wise with PYQs Tagging
CONCEPT MAPS
Important Questions with Detailed Explanations
NCERT & EXEMPLAR
Handpicked & High yield from Past 10 Years
PYQs
Revision Blue Print & Solved Questions
COMPETENCY FOCUSED
CBSE 2025 Past Year & SQP Solved Papers
LATEST CBSE PAPERS
As per Latest Pattern
MOCK TESTS
MATHEMATICS
STANDARD


CLASS 10 (2025-26)
MATHEMATICS
MADE EASY
• FORMULAS
• SOLVED EXAMPLES
• THEOREMS
• PRACTICE QUESTIONS
• SOLVED CBSE QUESTION PAPERS
Handwritten Notes
Other Books Made Easy
Samajh rahe ho?!
Ritik Mishra


WORK HARD
DREAM BIG
NEVER GIVE UP

Thank You