UDAAN

2026

Quadratic Equations

MATHS LECTURE-1

BY-RITIK SIR

Topics *to be covered*

A Meaning of quadratic equation

B Basics

C Solving quadratic equation by factorization method

RITIK SIR

JOIN MY OFFICIAL TELEGRAM CHANNEL

Quadratic Equation

If p(x) is a quadratic polynomial, then p(x) = 0 is called a quadratic equation.

The general form a quadratic equation is $ax^2 + bx + c = 0$, where a, b, c $\in$ R and $a \neq 0$.

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

$a \neq 0$

$a, b, c \in R$ belongs to

c → constant term (coefficient of x^0)

$3x^2+5x+2$

$a=3, b=5, c=2$

Q. $-3x^2 = 5x - 2x^0 = 0$

$a = -3$
$b = -5$
$c = -2$

not unique

Q. $5x^2 = 4x + 5$
$5x^2 - 4x - 5 = 0$

$a = 5$
$b = -4$
$c = -5$

Q. $-2x^2 + 2 = 0$
$-2x^2 + 0x + 2 = 0$

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

Q. $\boxed{-\frac{5}{2}x^2 - 3x = 0}$

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

$a = -5/2$
$b = -3$
$c = 0$

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

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

$-5x^2 - 6x = 0$

$-5x^2 - 6x + 0 = 0$

$a = -5$
$b = -6$
$c = 0$

Roots of Quadratic Equation

$ax^2+bx+c=0$

$a \neq 0$
$a, b, c \in R$

Roots ≠ zeroes

equation

poly.

$ax^2+bx+c=0$

Quadratic poly.

Roots → Variable ki value

↓

To equation ko satisfy karr.

↓

L.H.S = R.H.S

How many roots?

exactly 2 roots

Maximum(2)
almost(2)

#Q. The equation $ax^2 + bx + c = 0$ is a quadratic equation for

$a \neq 0$

A all values of a ✗

B all non-zero values of a

zero nahi'

a ki saaari values 0 ko chhodkar

C all non-zero values of b ✗

b ki saaari values 0 ko chodkar.

D all non-zero values of c ✗

#Q. Which of the following is a quadratic equation?

A $x^2 + 2x + 1 = (4 - x)^2 + 3$

$x^2+2x+1 = 16+x^2-8x+3$

$x^2+2x+1-x^2-16+8x-3=0$

$10x-18=0$ ✗

B $-2x^2 = (5 - x)\left(2x - \frac{2}{5}\right)$ ✗

$(a-b)^3 = a^3-b^3-3ab(a-b)$

C $(k + 1)x^2 + \frac{3}{2}x = 7$, where $k = -1$ ✗

D $x^3 - x^2 = (x - 1)^3$

$x^3-x^2 = x^3-1^3-3(x)(1)(x-1)$

$x^3-x^2 = x^3-1-3x^2+3x$

$-x^2+1+3x^2-3x=0$

$2x^2-3x+1=0$

#Q. Which of the following is not a quadratic equation?

A $2(x-1)^2 = 4x^2 - 2x + 1$

B $2x - x^2 = x^2 + 5$

C $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$

D $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$

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

$= 3x^2 - 5x$

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

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

$(x^2)^2 + (2x)^2 + 2(x^2)(2x) = x^4 + 3 + 4x^3$

$x^4 + 4x^2 + 4x^3 = x^4 + 3 + 4x^3$

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

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

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

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

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

#Q. A quadratic equation has

A at most two roots

B at least two roots

C exactly two roots

D at least one root

$ax^2+bx+C=0$ → α, β → roots.

Sum of roots $(\alpha+\beta) = -b/a$

Product of roots $(\alpha\beta) = c/a$

α, β → roots

Quadratic equation = ?

$k[x^2 - \text{Sum}(x) + \text{product}]$

Q. Q.E → 2 Roots → 2, -4

Q.E = ?

Sol: Sum = 2 + -4 = -2

Product = 2 × -4 = -8

$k[x^2 - Sx + P] = 0$

$k[x^2 - -2x + -8] = 0$

$k[x^2 + 2x - 8] = 0$

$x^2 + 2x - 8$ Ans.

nav. jeev.

#Q. A quadratic equation whose roots are $2 + \sqrt{3}$ and $2 - \sqrt{3}$ is:

A $x^2 - 4x + 1 = 0$

B $x^2 + 4x + 1 = 0$

C $4x^3 - 3 = 0$

D $x^2 - 1 = 0$

$$\text{Sum} = (2+\sqrt{3}) + (2-\sqrt{3})$$
$$= 4$$
$$\text{Product} = (2+\sqrt{3})(2-\sqrt{3})$$
$$= (2)^2 - (\sqrt{3})^2$$
$$= 4 - 3$$
$$= 1$$

$$k[x^2 - Sx + P] = 0$$

$$\boxed{x^2 - 4x + 1 = 0}$$

#Q. If the sum and product of the roots of the equation $kx^2 + 6x + 4k = 0$ are equal, then k =

α, β

$(\alpha + \beta)$ Sum = product $(\alpha\beta)$

$$-\frac{b}{a} = \frac{c}{a}$$

$$\frac{-6}{k} = \frac{4k}{k}$$

$$\frac{-6}{k} = 4$$

$$\frac{-6}{4} = k$$

$$\frac{-3}{2} = k$$

A $-3/2$

B $3/2$

C $2/3$

D $-2/3$

#Q. If $x = 0.2$ is a root of the equation $x^2 - 0.4k = 0$, then $k =$

A 1

B 10

C 0.1

D 100

$x^2 - 0.4k = 0$

$(0.2)^2 - 0.4k = 0$

$\left(\frac{2}{10}\right)^2 - \frac{4}{10}k = 0$

$\left(\frac{1}{5}\right)^2 - \frac{2}{5}k = 0$

$\frac{1}{25} - \frac{2}{5}k = 0$

$\frac{1}{25} = \frac{2}{5}k$

$\frac{1}{25} \times \frac{5}{2} = k$

$\frac{1}{10} = k$

$0.1 = k$

#Q. If $-\frac{1}{2}$ is a root of the equation $x^2 - kx - \frac{5}{4} = 0$, then the value of k is:

A. -2

B. 2

C. 1/4

D. 1/2

$x^2 - kx - \frac{5}{4} = 0$

$\left(-\frac{1}{2}\right)^2 - k\left(-\frac{1}{2}\right) - \frac{5}{4} = 0$

$\frac{1}{4} + \frac{k}{2} - \frac{5}{4} = 0$

$\frac{1-5}{4} + \frac{k}{2} = 0$

$-\frac{4}{4} + \frac{k}{2} = 0$

$-1 + \frac{k}{2} = 0$

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

$k = 2$

#Q. If $x = 2$ and $x = 3$ are roots of the equation $3x^2 - 2kx + 2m = 0$, find the value of k and m.

$3x^2 - 2kx + 2m = 0$

$x = 2$

$3(2)^2 - 2k(2) + 2m = 0$

$12 - 4k + 2m = 0$

$12 = 4k - 2m$ ... (1)

$x = 3$

$3(3)^2 - 2k(3) + 2m = 0$

$27 - 6k + 2m = 0$

$27 = 6k - 2m$ ... (2)

$4k - 2m = 12$

$6k - 2m = 27$

(−) (−) (+) (−)

$-2k = -15$

$k = \frac{-15}{-2}$

$k = 15/2$

$12 = 2k - 2m$

$12 = 2\left(\frac{15}{2}\right) - 2m$

$12 - 30 = -2m$

$-18 = -2m$

$m = 9$

#Q. If one root of the equation $3x^2 = 8x + (2k + 1)$ is seven times the other, then the value of k is

#GPH

A 7/3

B 5/3

C −5/3

D −7/3

#Q. A quadratic equation whose one root is 2 and the sum of whose roots is zero, is

#Gpy

A $x^2 + 4 = 0$

B $x^2 - 4 = 0$

C $4x^2 - 1 = 0$

D $x^2 - 2 = 0$

#Q. If the sum of the roots of the equation $x^2 - x = \lambda(2x - 1)$ is zero, then λ =

#GP4

A -2

B 2

C $-1/2$

D $1/2$

#Q. If one root of the equation $4x^2 - 2x + (\lambda - 4) = 0$ be the reciprocal of the other, then λ =

#GPU

A 8

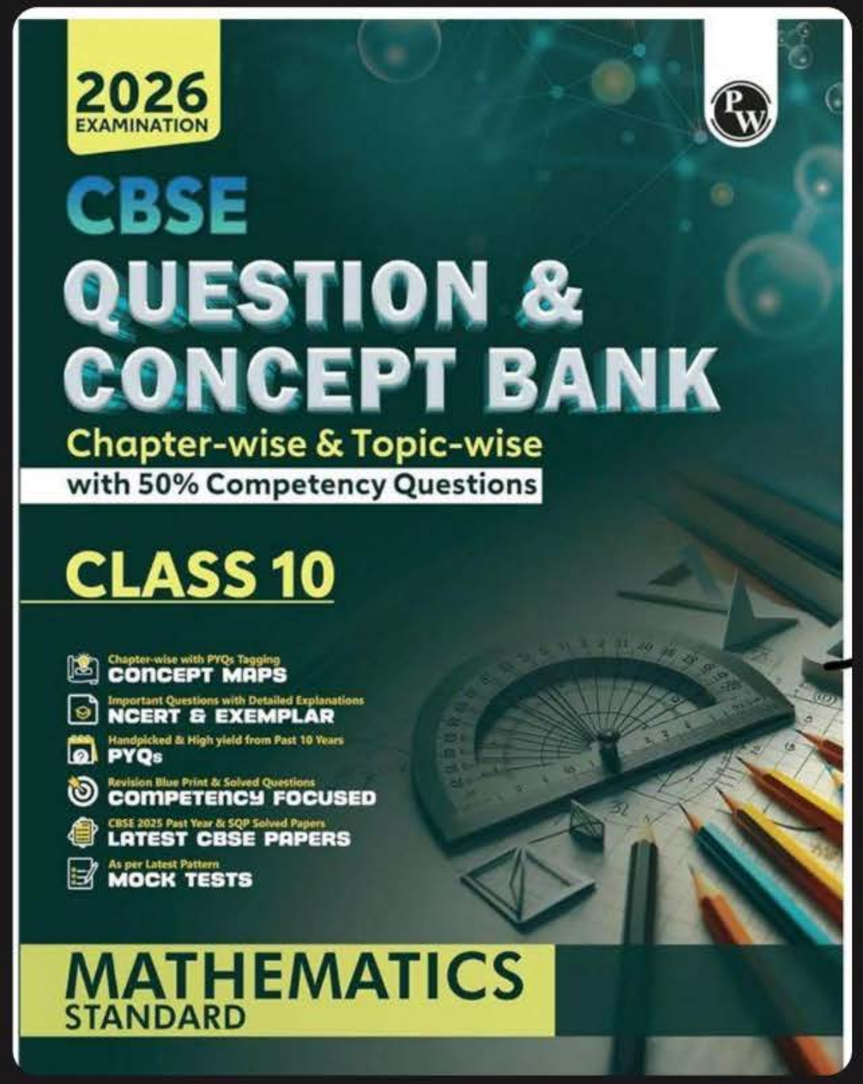
B −8

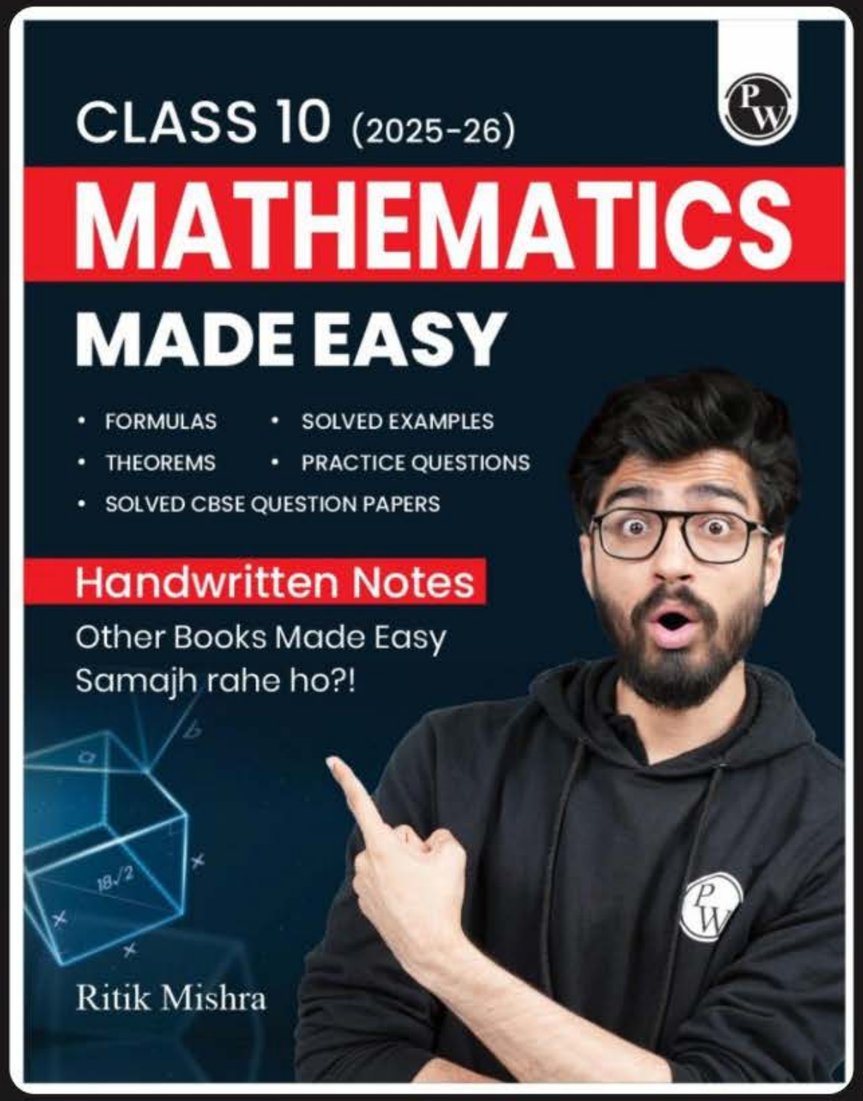
C 4

D −4

#kaam 1 = Polynomial ka zeros. 5

#kaam 2 = word problems (chapter 3)






WORK HARD
DREAM BIG
NEVER GIVE UP

Thank You