

## UDAAN 2025

## Maths

## Quadratic Equation

DHA: 02

- ✓Q1 Using quadratic formula, solve for  $x$  :

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

- ✓Q2 Factorise :  $\frac{m}{n}x^2 + \frac{n}{m} = 1 - 2x$

- ✓Q3 Find the roots of the equation  $x^2 - 3x - m(m + 3) = 0$ , where  $m$  is a constant.

- (A)  $x = m + 3$  or  $-m$   
 (B)  $x = m - 3$  or  $-m$   
 (C)  $x = m + 3$  or  $m$   
 (D)  $x = m - 2$  or  $m$

- ✓Q4 Solve for  $x$  :  $36x^2 - 12ax + (a^2 - b^2) = 0$

(A)  $\frac{a+b}{9}$  or  $\frac{a-b}{9}$

(B)  $\frac{a-b}{5}$  or  $\frac{a+b}{5}$

(C)  $\frac{a-b}{3}$  or  $\frac{a+b}{3}$

✓(D)  $\frac{a-b}{6}$  or  $\frac{a+b}{6}$

- ✓Q5 Solve the following quadratic equation for  $x$  :

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

(A)  $\frac{a^2-b^2}{10}$  or  $\frac{a^2+b^2}{10}$

✓(B)  $\frac{a^2-b^2}{2}$  or  $\frac{a^2+b^2}{2}$

(C)  $\frac{a^2-b^2}{4}$  or  $\frac{a^2+b^2}{4}$

(D)  $\frac{a^2-b^2}{3}$  or  $\frac{a^2+b^2}{3}$



## Answer Key

**Q1 (Refer Video Solution)**

**Q2 (Refer Video Solution)**

**Q3 (A)**

**Q4 (D)**

**Q5 (B)**



[Android App](#)

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# Hints & Solutions

## Q1 Text Solution:

Given equation is  $p^2x^2 + (p^2 - q^2)x$

$$-q^2 = 0$$

Comparing with  $ax^2 + bx + c = 0$ , we get

$$a = p^2, b = p^2 - q^2, c = -q^2$$

$$D = b^2 - 4ac$$

$$= (p^2 - q^2)^2 - 4p^2(-q^2)$$

$$= (p^2 - q^2)^2 + 4p^2q^2$$

$$= (p^2 + q^2)^2$$

$$\sqrt{D} = \sqrt{(p^2 + q^2)^2} = (p^2 + q^2)$$

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

$$x = \frac{-(p^2 - q^2) \pm (p^2 + q^2)}{2p^2}$$

$$x = \frac{-p^2 + q^2 + p^2 + q^2}{2p^2}, \frac{-p^2 + q^2 - p^2 - q^2}{2p^2}$$

$$x = \frac{q^2}{p^2}, -1$$

## Video Solution:



## Q2 Text Solution:

Given equation is  $\frac{m}{n}x^2 + \frac{n}{m} = 1 - 2x$

$$\Rightarrow \frac{m^2x^2 + n^2}{mn} = 1 - 2x$$

$$\Rightarrow m^2x^2 + n^2 = mn - 2mnx$$

$$\Rightarrow m^2x^2 + 2mnx + n^2 - mn = 0$$

On comparing with  $ax^2 + bx + c = 0$ , we get  $a = m^2$ ,  $b = 2mn$ ,  $c = n^2 - mn$

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

$$x = \frac{-2mn \pm \sqrt{(2mn)^2 - 4 \times m^2 \times (n^2 - mn)}}{2m^2}$$

$$x = \frac{-2mn \pm 2m\sqrt{mn}}{2m^2}$$

$$x = \frac{-n \pm \sqrt{mn}}{m}$$

$$x = \frac{-n + \sqrt{mn}}{m}, \frac{-n - \sqrt{mn}}{m}$$

## Video Solution:



**Q3 Text Solution:**

Given equation is  $x^2 - 3x - m(m+3) = 0$

Let's calculate Discriminant  $D = b^2 - 4ac$

On comparison, we get  $a = 1, b = -3, c = -m(m+3)$

$$D = (-3)^2 - 4 \times 1 \times [-m(m+3)] = 9 + 4m(m+3)$$

$$\Rightarrow 4m^2 + 12m + 9 = (2m+3)^2$$

Roots of the equation are

$$x = \frac{-b \pm \sqrt{D}}{2a}$$

$$x = \frac{-(-3) \pm \sqrt{(2m+3)^2}}{2}$$

$$x = \frac{3 \pm (2m+3)}{2}$$

$$x = \frac{3+2m+3}{2}, \frac{3-2m-3}{2}$$

$$x = m+3, -m$$

**Video Solution:****Q4 Text Solution:**

Given equation is  $36x^2 - 12ax$

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

$$\Rightarrow 6^2x^2 - 12ax + a^2 - b^2 = 0$$

$$\Rightarrow [(6x)^2 - 2 \times 6x \times a + a^2] - b^2 = 0$$

$$\Rightarrow (6x - a)^2 - b^2 = 0$$

$$\Rightarrow (6x - a + b)(6x - a - b) = 0$$

$$x = \frac{a-b}{6}, \frac{a+b}{6}$$

**Video Solution:****Q5 Text Solution:**

Given equation is  $4x^2 - 4a^2x$

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

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

$$\Rightarrow (2x - a^2)^2 - (b^2)^2 = 0$$

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

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

$$\Rightarrow x = \frac{a^2 + b^2}{2}, \frac{a^2 - b^2}{2}$$

**Video Solution:**