

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

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

$$(a+b)^2 = a^2 + 2ab + b^2$$

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

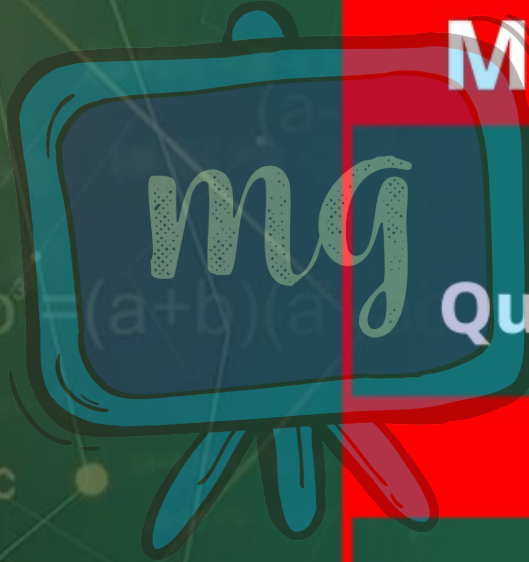
$$4a^2x^2 + 4abx + 4ac = 0$$

$$4a^2x^2 + 4abx = -4ac$$

$$4a^2x^2 + 4abx + b^2 = b^2 - 4ac$$

$$(2ax + b)^2 = b^2 - 4ac$$

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



CLASS - 10

MATHEMATICS

CH - 4

Quadratic Equations

CBSE Board

Most Important Questions - 2

Shubham Tiwari

5. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k .

Solu.

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

$$2(-5)^2 + p(-5) - 15 = 0$$

$$2 \times 25 - 5p - 15 = 0$$

$$50 - 15 - 5p = 0$$

$$35 - 5p = 0$$

$$35 = 5p$$

$$7 = p$$

$$p(x^2 + x) + k = 0$$

$$7(x^2 + x) + k = 0$$

$$7x^2 + 7x + k = 0$$

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

$$0 = b^2 - 4ac$$

$$(7)^2 - 4(7)k = 0$$

$$7[7 - 4k] = 0$$

$$7 - 4k = 0$$

$$7 = 4k$$

$$\boxed{\frac{7}{4} = k}$$

6. For what value of k,

$(4 - k)x^2 + (2k + 4)x + (8k + 1)$, is a perfect square.

$(x+1)^2 = x^2 + 2x + 1$
 $x = -1, -1$
 $b^2 = 4ac$
Solve. $D = b^2 - 4ac$
 $0 = b^2 - 4ac$
 $(2k+4)^2 = 4(4-k)(8k+1)$
 $4k^2 + 16 + 16k = 4(32k - 8k^2 + 4 - k)$
 $4(k^2 + 4k + 4) = 4(31k - 8k^2 + 4)$

$$k^2 + 4k + 4 = 31k - 8k^2 + 4$$

$$k^2 + 4k + 4 - 31k + 8k^2 - 4 = 0$$

$$9k^2 - 27k = 0$$

$$(9k)[k-3] = 0$$

$$9k = 0 \quad | \quad k - 3 = 0$$

$$k = 0 \quad | \quad k = 3$$

$$4x^2 + 4x + 1$$

$$x^2 + 10x + 25$$

7. If the roots of the equation

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

are equal, then prove that $2b = a + c$.

$$(a+b+c)^2$$

Solu.

$$D = 0 = b^2 - 4ac$$

$$(c - a)^2 - 4(b - c)(a - b) = 0$$

$$c^2 + a^2 - 2ac - 4[ab - ac - b^2 + bc] = 0$$

$$c^2 + a^2 + 2ac - 4ab + 4b^2 - 4bc = 0$$

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

$$[c + a - 2b]^2 = 0$$

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

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

$$c + a = 2b$$

8. If the equation

$$\underbrace{(1 + m^2)}_a x^2 + \underbrace{2mc}_b x + \underbrace{(c^2 - a^2)}_c = 0$$

has equal roots, prove that $c^2 = a^2 (1 + m^2)$.

Soln.

$$D = 0$$

$$b^2 - 4ac = 0$$

$$(2mc)^2 - 4(1+m^2)(c^2 - a^2) = 0$$

$$4m^2c^2 - 4[c^2 + m^2c^2 - a^2 - a^2m^2] = 0$$

$$[\cancel{m^2c^2} - c^2 - \cancel{m^2c^2} + a^2 + a^2m^2] = 0$$

$$-c^2 + \underbrace{a^2 + a^2 m^2}_{a^2(1+m^2)} = 0$$

$$-c^2 + a^2(1+m^2) = 0$$

$$a^2(1+m^2) = c^2$$

