



DSSSB TGT

PART (A+B)



MATHS

QUADRATIC EQUATION

(द्विघात समीकरण)

Part-03



10/04/2024 04:00PM



Symmetric Expression of the roots:

(i) $\alpha^2 + \beta^2 \Rightarrow (\alpha + \beta)^2 - 2\alpha\beta$

(ii) $\frac{1}{\alpha} + \frac{1}{\beta} \Rightarrow \frac{\alpha + \beta}{\alpha\beta}$

$\frac{(\alpha + \beta)}{\alpha\beta}$

(iii) $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} \Rightarrow \frac{\alpha^2 + \beta^2}{\alpha\beta} \Rightarrow \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta}$

(iv) $\alpha^2 + \alpha\beta + \beta^2 \Rightarrow (\alpha + \beta)^2 - \alpha\beta$

(v) $\alpha^2\beta + \beta^2\alpha \Rightarrow \alpha\beta(\alpha + \beta)$

(vi) $\alpha^3 + \beta^3 \Rightarrow (\alpha + \beta)[(\alpha + \beta)^2 - 3\alpha\beta]$

(vii) $\left(\frac{\alpha}{\beta}\right)^2 + \left(\frac{\beta}{\alpha}\right)^2 \Rightarrow \frac{\alpha^4 + \beta^4}{\alpha^2\beta^2}$

(viii) $\alpha^4 + \beta^4 \Rightarrow (\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2$
 $\Rightarrow [(\alpha + \beta)^2 - 2\alpha\beta]^2 - 2(\alpha\beta)^2$

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

(vi)

$$\begin{aligned} \hookrightarrow \alpha^3 + \beta^3 &= (\alpha + \beta)(\alpha^2 + \beta^2 - \alpha\beta) \\ &= (\alpha + \beta)(\alpha^2 + \beta^2 - 2\alpha\beta - \alpha\beta) \\ &= (\alpha + \beta)(\alpha^2 + \beta^2 - 2\alpha\beta - \alpha\beta) \\ &= (\alpha + \beta)(\alpha^2 + \beta^2 - 3\alpha\beta) \end{aligned}$$

* $4x^2 - 16x + 28 = 0$ के दो Root α, β हैं
 $\alpha + \beta = -\frac{(-16)}{4} = 4$, $\alpha\beta = \frac{c}{a} = \frac{28}{4} = 7$

1 # $\alpha^2 + \beta^2 \Rightarrow (\alpha + \beta)^2 - 2\alpha\beta \Rightarrow 4^2 - 2 \times 7 \Rightarrow 16 - 14 \Rightarrow 2$

2 # $\frac{1}{\alpha} + \frac{1}{\beta} \Rightarrow \frac{\alpha + \beta}{\alpha\beta} \Rightarrow \frac{4}{7}$

3 # $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} \Rightarrow \frac{\alpha^2 + \beta^2}{\alpha\beta} \Rightarrow \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta} \Rightarrow \frac{4^2 - 2 \times 7}{7} = \frac{2}{7}$

$$x^2 - 5x - 3x + 15 = 0$$

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

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

$$x = 3, 5$$

$$x^2 - 8x + 15 = 0$$

$$\alpha + \beta = -\frac{b}{a} \Rightarrow -\frac{(-8)}{1} \Rightarrow 8$$

$$\alpha\beta \Rightarrow \frac{c}{a} \Rightarrow \frac{15}{1} \Rightarrow 15$$

के दो Root α व β हैं?

$$\alpha^2 + \beta^2 = ? \quad 3^2 + 5^2 \Rightarrow 9 + 25$$

$$(\alpha + \beta)^2 - 2\alpha\beta$$

$$8^2 - 2 \times 15$$

$$64 - 30 = 34$$

34

यदि समीकरण $a(b-c)x^2 + b(c-a)x + c(a-b) = 0$ का एक मूल 1 है, तो दूसरा मूल क्या है?

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

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

(a) $-\frac{b(c-a)}{a(b-c)}$

(b) $\frac{b(c-a)}{a(b-c)}$

(c) $\frac{c(a-b)}{a(b-c)}$

(d) $-\frac{c(a-b)}{a(b-c)}$

$$\alpha\beta = \frac{c}{a} = \frac{c(a-b)}{a(b-c)}$$

$$\beta = \frac{c(a-b)}{a(b-c)}$$

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

$$\beta = \frac{bc-ab}{ab-ac} - 1 = \frac{bc-ab-ab+ac}{a(b-c)}$$

$$\Rightarrow \frac{bc-bc}{a(b-c)} = 0$$

$$\alpha + \beta = \frac{5}{2}$$

$$\alpha \beta = -6$$

What are the roots of the equation
समीकरण की जड़ें क्या हैं

$$2(y + 2)^2 - 5(y + 2) = 12?$$

(a) $-7/2, 2$

(b) $-3/2, 4$

(c) $-5/3, 3$

(d) $3/2, 4$

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

$$x-4=0$$

$$x=4$$

$$2x+3=0$$

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

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

$$2(y+2)^2 - 5(y+2) - 12 = 0$$

$$\text{Let } y+2 = x$$

$$2x^2 - 5x - 12 = 0$$

$$2x^2 - 8x + 3x - 12 = 0$$

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

$$\begin{array}{r} -24(x) \quad -8 \\ -5(x) \quad +3 \end{array}$$

original $\Rightarrow x^2 + 13x + 9 = 0$
 $x^2 + 13x + 30 = 0$
 $x^2 + 10x + 3x + 30 = 0$
 $x(x+10) + 3(x+10) = 0$
 Roots $\Rightarrow -3, -10$
 $x^2 + 17x + 9 = 0$
 $-2x - 15 = 9 \Rightarrow 9 = -30$

The coefficient of x in the equation $x^2 + px + q = 0$ was taken as 17 in place of 13, its roots were found to be -2 and -15. The roots of the original equation are.

समीकरण $x^2 + px + q = 0$ में x का गुणांक 13 के स्थान पर 17 लिया गया, इसके मूल -2 तथा -15 पाये गये। मूल समीकरण की जड़ें हैं।

(a) 3, 10

(b) -5, -8

(c) -3, -10

(d) None of these

$$a = p - q, b = 5(p + q)$$

$$(p - q)x^2 + 5(p + q)x - 2(p - q) = r$$

$$c = -2(p - q)$$

$$\alpha + \beta =$$

$$\alpha\beta =$$

If p, q and r are real and $p \neq q$, then the roots of the equation $(p - q)x^2 + 5(p + q)x - 2(p - q) = r$ are

यदि p, q और r वास्तविक हैं और $p \neq q$, तो समीकरण $(p - q)x^2 + 5(p + q)x - 2(p - q) = r$ की जड़ें हैं

- (a) real and equal
- (b) unequal and rational
- (c) unequal and irrational
- (d) nothing can be said

If the roots of the equation $(p^2 + q^2)x^2 - 2q(p + r)x + (q^2 + r^2) = 0$ be real and equal, then p, q and r will be in.

यदि समीकरण की जड़ें $(p^2 + q^2)x^2 - 2q(p + r)x + (q^2 + r^2) = 0$ वास्तविक और बराबर हो, तो p, q और r होंगे।

(a) AP

(b) HP

(c) GP

(d) None of these

$$\boxed{4, -2}$$

$$y =$$

$$y = \sqrt{8 + 2y}$$

$$y^2 = 8 + 2y$$

$$y^2 - 2y - 8 = 0$$

-4 + 2

$$y^2 - 4y + 2y - 8 = 0$$

$$y(y - 4) + 2(y - 4) = 0$$

What is the value of

$$\sqrt{8 + 2\sqrt{8 + 2\sqrt{8 + 2\sqrt{8 + \dots \dots \infty}}}}$$

$$\sqrt{8 + 2\sqrt{8 + 2\sqrt{8 + 2\sqrt{8 + \dots \dots \infty}}}}$$

का

मान क्या है?

$$y$$

(a) 10

(b) 8

(c) 6

(d) 4

$$\begin{array}{ccc} a & b & c \\ \uparrow & \uparrow & \uparrow \\ 1x^2 - 5x + (k-15) = 0 \end{array}$$

$$\alpha\beta = \frac{c}{a}$$

$$-3 = \frac{k-15}{1}$$

$$-3 = k - 15$$

$$-3 + 15 = k$$

$$k = 12$$

If the product of the roots of the equation $x^2 - 5x + k = 15$ is -3 , then what is the value of k ?

यदि समीकरण $x^2 - 5x + k = 15$ के मूलों का गुणनफल -3 है, तो k का मान क्या है?

(a) 12

(b) 15

(c) 16

(d) 18