

Foundation Batch



MATHS

Quadratic Equation

(द्विघात समीकरण)

Part -3

LIVE

15-12-2024

12:00PM





Foundation Batch

MATHS



TYPE-III

25. If α and β are the roots of the quadratic equation $2x^2 + 6x + k = 0$ where $k < 0$, then what is the maximum value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$?

यदि α और β द्विघात समीकरण $2x^2 + 6x + k = 0$, के मूल हैं, जहाँ $k < 0$ है, तो $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ का अधिकतम मान क्या है?

(a) 2

~~(b) -2~~

(c) 9

(d) -9

$$2x^2 + 6x + k = 0$$

$$\alpha + \beta = -\frac{6}{2} = -3$$

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

$$\alpha \cdot \beta = \frac{k}{2}$$

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

$$\frac{(-3)^2}{\frac{k}{2}} - 2$$

$$\left[\frac{18}{k} - 2 \right]$$

$$k < 0$$

$$\frac{18}{k} < 0$$

$$\frac{18}{k} - 2 < -2$$

max
val

26. If α and β are the roots of the equation $ax^2 + bx + c = 0$, then the value of $\frac{1}{a\alpha+b} + \frac{1}{a\beta+b}$ is?

यदि α और β समीकरण $a^2x + bx + c = 0$ के मूल हैं, तो

$\frac{1}{a\alpha+b} + \frac{1}{a\beta+b}$ का मान क्या है? $\alpha + \beta = -\frac{b}{a}$

(a) $\frac{a}{bc}$

(b) $\frac{b}{ac}$

(c) $\frac{c}{ab}$

(d) $\frac{1}{abc}$

(UPSC CDS 18/11/2018)

$a\beta + b + a\alpha + b$

$(a\alpha + b)(a\beta + b)$

$a(\alpha + \beta) + 2b$

$a^2\alpha\beta + ab\alpha + ab\beta + b^2$

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

$$\frac{a(\alpha + \beta) + 2b}{a^2\alpha\beta + ab(\alpha + \beta) + b^2}$$

$$\frac{a \times \left(-\frac{b}{a}\right) + 2b}{a^2 \left(\frac{c}{a}\right) + ab \left(-\frac{b}{a}\right) + b^2} = \frac{b}{ac - b^2 + b^2}$$

$\frac{b}{ac}$

27. If α and β are the roots of the quadratic equation $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + (8 + 2\sqrt{5}) = 0$, then the value of $2\alpha\beta/(\alpha + \beta)$ is.

यदि α तथा β द्विघात समीकरण $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + (8 + 2\sqrt{5}) = 0$ के मूल हैं, तो $2\alpha\beta/(\alpha + \beta)$ का मान ज्ञात कीजिए।

(a) 7

(b) 4

(c) 2

(d) 8

$$\alpha + \beta = \frac{4 + \sqrt{5}}{5 + \sqrt{2}}$$

$$\alpha \cdot \beta = \frac{8 + 2\sqrt{5}}{5 + \sqrt{2}}$$

$$\frac{2 \times 2 \cancel{(4 + \sqrt{5})}}{\cancel{(5 + \sqrt{2})}} \times \frac{\cancel{4 + \sqrt{5}}}{\cancel{5 + \sqrt{2}}}$$

$$= 2 \times 2 = 4$$



Foundation Batch

MATHS



TYPE-IV

one Root $\rightarrow a + \sqrt{b}$

other Root $\rightarrow a - \sqrt{b}$

one Root $\rightarrow 2 + \sqrt{3}$

Quadratic eqⁿ = ?

$$\alpha = 2 + \sqrt{3}$$

$$\beta = 2 - \sqrt{3}$$

$$\alpha + \beta = 4$$

$$\alpha \cdot \beta = (2 + \sqrt{3})(2 - \sqrt{3}) = 4 - 3 = 1$$

$$x^2 - (\alpha + \beta)x + \alpha \cdot \beta = 0$$

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

28. Quadratic equation corresponding to the roots $2 + \sqrt{5}$ and $2 - \sqrt{5}$ is

$2 + \sqrt{5}$ और $2 - \sqrt{5}$ मूलों के अनुरूप द्विघात समीकरण है।

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

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

C. $x^2 - 4x + 1 = 0$

D. $x^2 + 4x + 1 = 0$

$$\alpha + \beta = 4$$

$$\alpha \cdot \beta = (2 + \sqrt{5})(2 - \sqrt{5})$$

$$4 - 5 = -1$$

$$x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

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

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



29. One root of the equation $5x^2 + 2x + Q = 2$ is reciprocal of another. What is the value of Q^2 ?

समीकरण $5x^2 + 2x + Q = 2$ का एक मूल दूसरे का व्युत्क्रम है।
 Q^2 का मान क्या है?

a. 25

b. 1

☒ c. 49

d. 4

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

$$\alpha, \beta$$
$$\boxed{\beta = \frac{1}{\alpha}}$$

$$\alpha \cdot \beta = \frac{Q-2}{5}$$

$$\alpha \cdot \frac{1}{\alpha} = \frac{Q-2}{5}$$

$$\boxed{Q=7}$$

$$Q^2 = 7^2 = 49$$

Special
Pattern

30. If α and β are the roots of equation $x^2 - x + 1 = 0$ then which equation will have root α^3 and β^3 ?

यदि α तथा β समीकरण $x^2 - x + 1 = 0$ के मूल हैं, तो किस समीकरण के मूल α^3 तथा β^3 होंगे?

(a) $x^2 + 2x + 1 = 0$ $(x+1)(x^2 - x + 1) = 0 \Rightarrow x(x+1)$

(b) $x^2 - 2x - 1 = 0$

(c) $x^2 + 3x - 1 = 0$

(d) $x^2 - 3x + 1 = 0$

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

$$x^3 = -1$$

$$\alpha^3 = \beta^3 = -1$$

$$\begin{aligned} \alpha^3 + \beta^3 &= -1 - 1 \\ &= -2 \\ \alpha^3 \cdot \beta^3 &= (-1)(-1) \\ &= 1 \end{aligned}$$

(SSC CGL Mains 17/02/2018)

$$\alpha^3 + \beta^3 = (\alpha + \beta)(\alpha^2 + \beta^2 - \alpha\beta)$$

$$\alpha^3 - \beta^3 = (\alpha - \beta)(\alpha^2 + \beta^2 + \alpha\beta)$$

$$x^2 - (\alpha^3 + \beta^3)x + \alpha^3 \cdot \beta^3$$

$$x^2 - (-2)x + 1 \Rightarrow x^2 + 2x + 1 = 0$$

Special
Pattern

30. If α and β are the roots of equation $x^2 - x + 1 = 0$ then which equation will have root α^3 and β^3 ?

यदि α तथा β समीकरण $x^2 - x + 1 = 0$ के मूल हैं, तो किस समीकरण के मूल α^3 तथा β^3 होंगे?

(a) $x^2 + 2x + 1 = 0$ $(x+1)(x^2 - x + 1) = 0 \Rightarrow x(x+1)$

~~(b) $x^2 - 2x + 1 = 0$~~

(c) $x^2 + 3x - 1 = 0$

(d) $x^2 - 3x + 1 = 0$

$x^3 + 1^3 = 0$

$x^3 = -1$

$\alpha^3 = \beta^3 = -1$

$\alpha^{30} = (\alpha^3)^{10} = (-1)^{10} = 1$

$\beta^{30} = (\beta^3)^{10} = (-1)^{10} = 1$

(SSC CGL Mains 17/02/2018)

$x^2 - (1+1)x + 1 \times 1$

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

31. If α and β are the roots of the equation $x^2 + x - 1 = 0$, then what is the equation whose roots are α^5 and β^5 ?

यदि α तथा β समीकरण $x^2 + x - 1 = 0$ के मूल हैं, तो वह समीकरण क्या है, जिसके मूल α^5 तथा β^5 हैं?

(a) $x^2 + 7x - 1 = 0$

(b) $x^2 - 7x - 1 = 0$

(c) $x^2 - 11x - 1 = 0$

(d) $x^2 + 11x - 1 = 0$

(SSC CGL Mains 19/02/2018)

$$-\frac{1}{a} = K$$

$$\frac{1}{a^3} = K^3 + 3K$$

$$a - \frac{1}{a} = K$$

$$a^2 + \frac{1}{a^2} = K^2 + 2$$

$$a^5 - \frac{1}{a^5} = \left(a^3 - \frac{1}{a^3}\right)\left(a^2 + \frac{1}{a^2}\right) - \left(a - \frac{1}{a}\right)$$

$$\alpha + \beta = -1$$

$$\alpha \cdot \beta = -1$$

$$\beta = -\frac{1}{\alpha}$$

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

Sum of Root $\rightarrow \alpha^5 + \left[-\frac{1}{\alpha^5}\right]$

$$\left[(-1)^3 - 3(-1)\right] \left[(-1)^2 + 2\right] - (-1)$$

$$[-1 + 3] 3 + 1$$

$$2 \times 3 + 1$$

$$= 7$$

$$(x+2)^2 = 0 \Rightarrow x(x+2)$$

$$3 = 0$$

$$-8$$

$$3 = -8$$

and $\frac{\beta^3}{\alpha^2}$?

यदि α तथा β समीकरण $x^2 - 2x + 4 = 0$ के मूल समीकरण क्या है जिसके मूल $\frac{\alpha^3}{\beta^2}$ तथा $\frac{\beta^3}{\alpha^2}$ हैं?

(a) $x^2 - 4x + 8 = 0$

(b) $x^2 - 32x + 4 = 0$

(c) $x^2 - 2x + 4 = 0$

(d) $x^2 - 16x + 4 = 0$

(SSC CGL Mains 20/02/)

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

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

$$\alpha + \beta = 2 \quad \alpha \cdot \beta =$$

$$\frac{\beta^3}{\beta^2} \quad \frac{\alpha^3}{\alpha^2}$$

β

α

Sum of roots = $\beta + \alpha = 2$

Product = $\beta \cdot \alpha =$

8 and $\alpha - \beta = 2\sqrt{5}$, then which of the following equations will have roots α^4 and β^4 ?

यदि α तथा β द्विघात समीकरण के मूल हैं। यदि $\alpha + \beta = 8$ तथा $\alpha - \beta = 2\sqrt{5}$ हैं, तो α^4 तथा β^4 निम्नलिखित में से किस समीकरण के मूल हैं?

~~(a) $x^2 - 1522x + 14641 = 0$~~

~~(b) $x^2 + 1921x + 14641 = 0$~~

~~(c) $x^2 - 1764x + 14641 = 0$~~

~~(d) $x^2 + 2520x + 14641 = 0$~~

(SSC CGL Mains 21/02/2018)

$$\alpha^4 + \beta^4 = (\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2$$

$$(42)^2 - 2 \times 11$$

$$1764 - 22$$

Sum of Roots = 1522

Product
 $\alpha^4 \cdot \beta^4 = 11^4$
 $= 14641$

$$\alpha + \beta = 8$$

$$\alpha - \beta = 2\sqrt{5}$$

$$(\alpha - \beta)^2 = 4\alpha\beta$$

$$(2\sqrt{5})^2 = 4\alpha\beta$$

$$= \alpha\beta$$

$$= 11$$

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

$$8^2 - 2 \times 11$$

$$64 - 22$$

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

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

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

$$// (a+b)^2 - (a-b)^2 = 4ab$$

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

$$\beta = 4$$

$$\beta = \frac{-(-B)}{A} = \frac{B}{A}$$

$$(\alpha - \beta)^2 = 4\alpha\beta$$

$$4^2 = 4 \times \frac{C}{A}$$

$$16 = \frac{4C}{A} \times A$$

$$16A^2 = 4AC$$

$$B^2 - 10A^2 - 6A^2 = 4AC$$

$$B^2 - 16A^2 = 4AC$$

34. If the difference between the roots of the equation $Ax^2 - Bx + C = 0$ is 4, then which of the following

True?

यदि समीकरण $Ax^2 - Bx + C = 0$ के मूलों का अंतर 4 है, निम्नलिखित में से कौन-सा सत्य है?

(a) ~~$B^2 - 16A^2 = 4AC + 4B^2$~~

(b) $B^2 - 10A^2 = 4AC + 6A^2$

(c) $B^2 - 8A^2 = 4AC + 10A^2$

(d) $B^2 - 16A^2 = 4AC + 8B^2$

(SSC CGL Mains 21/02/2018)

$$\alpha \cdot \beta = \frac{C}{A}$$

$$B^2 - 16A^2 = 4AC$$

35. α and β are the roots of the quadratic equation $x^2 - x - 1 = 0$. What is the value of $\alpha^8 + \beta^8$?

यदि α तथा β द्विघात समीकरण $x^2 - x - 1 = 0$ के मूल हैं।

$\alpha^8 + \beta^8$ का मान क्या है?

(a) 47

(b) 54

(c) 59

(d) 68

$$\alpha^8 + \left(-\frac{1}{\alpha}\right)^8$$

$$\alpha^8 + \frac{1}{\alpha^8}$$

$$\begin{aligned} \alpha - \frac{1}{\alpha} &= 1 \\ \alpha^2 + \frac{1}{\alpha^2} &= 1^2 + 2 = 3 \\ \alpha^4 + \frac{1}{\alpha^4} &= 3^2 - 2 = 7 \end{aligned}$$

$$\begin{aligned} \alpha + \beta &= 1 \\ \alpha \cdot \beta &= -1 \\ \beta &= -\frac{1}{\alpha} \\ \alpha - \frac{1}{\alpha} &= 1 \end{aligned}$$

$$\begin{aligned} \alpha^8 + \frac{1}{\alpha^8} &= 7^2 - 2 \\ &= 47 \end{aligned}$$

$$\begin{aligned} a - \frac{1}{a} &= K \\ a^2 + \frac{1}{a^2} &= K^2 + 2 \\ a^4 + \frac{1}{a^4} &= (K^2 + 2)^2 - 2 \\ a^8 + \frac{1}{a^8} &= \end{aligned}$$

36. If α and β are the roots of the equation $x^2 - x + 3 = 0$, then find the value of $\alpha^4 + \beta^4 = ?$

यदि α तथा β समीकरण $x^2 - x + 3 = 0$ के मूल हैं, तो $\alpha^4 + \beta^4$ का मान क्या होगा?

(a) 7

(b) 9

(c) 11

(d) 13

$$\alpha^4 + \beta^4 = (\alpha^2 + \beta^2)^2 - 2\alpha^2\beta^2$$

$$\alpha + \beta = 1$$

$$\alpha \cdot \beta = 3$$

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

(SSC CPO 01/07/2017)

$$\alpha^2 + \beta^2 = 1^2 - 2 \times 3 = -5$$

$$\alpha^4 + \beta^4 = (-5)^2 - 2 \times 3^2$$

$$25 - 18$$

7

37. If α and β are the roots of the quadratic equation $x^2 - 6x + 2 = 0$, then what will be the value of $\alpha^4\beta^3 + \alpha^3\beta^4$ is?

यदि α एवं β द्विघातीय समीकरण $x^2 - 6x + 2 = 0$ के मूल हों, तो $\alpha^4\beta^3 + \alpha^3\beta^4$ का मान क्या होगा?

(a) 24

(b) 48

(c) 96

(d) 120

$$\alpha^3 \cdot \beta^3 (\alpha + \beta)$$

$$2^3 (6)$$

$$8 \times 6 = 48$$

$$\alpha + \beta = 6$$

$$\alpha \cdot \beta = 2$$

38. If α and β are the roots of the quadratic equation $x^2 - 5x + 4 = 0$, then what will be the value of $\left(\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta\right)$ is.

यदि α एवं β द्विघातीय समीकरण $x^2 - 5x + 4 = 0$ के मूल हो, तो $\left(\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta\right)$ का मान होगा।

(a) 0

(b) $\frac{27}{4}$

(c) $\frac{-27}{4}$

(d) $\frac{37}{4}$

$$\frac{\alpha + \beta}{\alpha\beta} - 2\alpha\beta$$

$$\frac{5}{4} - 2 \times 4$$

$$\frac{5}{4} - 8 = \frac{-27}{4}$$

$$\alpha + \beta = 5$$

$$\alpha \cdot \beta = 4$$

39. If one of the roots of the quadratic equation: $4x^2 - 2x + (k - 4) = 0$ is the reciprocal of the other root, then k is equal to:

यदि द्विघात समीकरण: $4x^2 - 2x + (k - 4) = 0$ का एक मूल दूसरे मूल का व्युत्क्रम है, तो k बराबर है।

a. 8

b. -8

c. 4

d. -4

$$\alpha \quad \beta$$
$$\boxed{\beta = \frac{1}{\alpha}}$$

$$\alpha \cdot \beta = \frac{k-4}{4}$$
$$\alpha \cdot \frac{1}{\alpha} = \frac{k-4}{4}$$

$$k = 8$$

$$\left. \begin{aligned} &= -\frac{b}{a} \\ &= \frac{c}{a} \end{aligned} \right\} \begin{aligned} &m^2 + n^2 \\ &= (m+n)^2 - 2mn \end{aligned}$$

$$\frac{n^2+1}{n}$$

$$\frac{n+mn^2+m}{mn}$$

$$\frac{(1+n)+(m+n)}{mn}$$

$$\frac{n)(mn+1)}{mn}$$

$c = 0$, then find the equation whose roots $(m^2 + 1)/m$ and $(n^2 + 1)/n$ is.

यदि समीकरण $ax^2 + bx + c = 0$ के मूल m और n हैं, त समीकरण ज्ञात कीजिए, जिसके मूल $(m^2 + 1)/m$ और $(n^2 + 1)/n$ हैं।

~~(a)~~ $acx^2 + (ab + bc)x + b^2 + (a - c)^2 = 0$

~~(b)~~ $acx^2 + (ab - bc)x + b^2 + (a - c)^2 = 0$

~~(c)~~ $acx^2 + (ab - bc)x + b^2 - (a - c)^2 = 0$

~~(d)~~ $acx^2 + (ab + bc)x + b^2 \ominus (a - c)^2 = 0$

$$\frac{-\frac{b}{a} \left[\frac{c}{a} + 1 \right]}{\frac{c}{a}} \Rightarrow \frac{-\frac{b}{c} \left[\frac{c+a}{a} \right]}{\frac{c}{a}} = \frac{-[ab+bc]}{ac}$$

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

Product of Roots

$$\frac{m^2+1}{m} \times \frac{n^2+1}{n}$$

$$\frac{m^2 n^2 + m^2 + n^2 + 1}{mn}$$

$$m^2 + n^2 = \left(-\frac{b}{a}\right)^2 - 2 \times \frac{c}{a}$$

$$\frac{a^2 \left[\frac{c^2}{a^2} + \frac{b^2}{a^2} - \frac{2c}{a} + 1 \right]}{a^2 \times \frac{c}{a}} = \frac{c^2 + b^2 - 2ac + a^2}{\left[\frac{(c-a)^2 + b^2}{ac} \right]}$$



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Miscellaneous

41. If $3x^2 - ax + 6 = ax^2 + 2x + 2$ has only one (repeated) solution, then the positive integral solution of a is:

यदि $3x^2 - ax + 6 = ax^2 + 2x + 2$ का केवल एक (दोहराया गया) हल है, तो a का धनात्मक समाकलन हल है:

a. 3 $3x^2 - ax^2 - ax - 2x + 6 - 2 = 0$

b. 2 $(3-a)x^2 - (a+2)x + 4 = 0$

c. 4

d. 5

$D = 0$ (for one repeated Solⁿ)

$b^2 - 4ac = 0$

$(a+2)^2 = 4 \times (3-a) \times 4$

$a^2 + 4 + 4a = 48 - 16a$

$a^2 + 20a - 44 = 0$

$-22 + 2$ ✓



42. What is the value of $\alpha (\alpha \neq 0)$ for which $x^2 - 5x + \alpha$ and $x^2 - 7x + 2\alpha$ have a common factor?

$\alpha (\alpha \neq 0)$ का वह मान क्या है, जिसके लिए $x^2 - 5x + \alpha$ और $x^2 - 7x + 2\alpha$ का एक सार्व गुणनखंड होता है?

(a) 6

(b) 4

(c) 3

(d) 2

α, γ

$$\alpha + \gamma = 7 \quad (1)$$

$$\alpha \cdot \gamma = 2\alpha \quad (2)$$

$$\frac{(2)}{(1)} = \frac{\alpha \cdot \gamma}{\alpha \cdot \beta} = \frac{2\alpha}{\alpha}$$

$$\gamma = 2\beta$$

$$\alpha + 2\beta = 7$$

$$\alpha + \beta = 5$$

$$\beta = 7 - 5 = 2$$

α, β

$$\alpha + \beta = 5 \quad (3)$$

$$\alpha \cdot \beta = \alpha \quad (4)$$

$$\alpha = 5 - 2 = 3$$

$$\alpha \cdot \beta = \alpha$$

$$3 \times 2 = \alpha = 6$$

(UPSC CDS 19/11/2017)

43. If α and β are roots of the equation $x^2 + bx + c = 0$, then which equation will have roots $(\alpha\beta + \alpha + \beta)$ and $(\alpha\beta - \alpha - \beta)$?

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

यदि α तथा β समीकरण $ax^2 + bx + c = 0$ के मूल हैं, तो किस समीकरण के मूल $(\alpha\beta + \alpha + \beta)$ तथा $(\alpha\beta - \alpha - \beta)$ होंगे?

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

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

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

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

(SSC CGL Mains, 09/03/2018)

योग

$$= \alpha \cdot \beta + \cancel{\alpha} + \cancel{\beta} + \alpha \cdot \beta - \cancel{\alpha} - \cancel{\beta}$$

$$= 2\alpha\beta$$

$$= 2 \times \frac{c}{a}$$

Sum = $\pm \left(\pm \frac{2 \times \frac{c}{a}}{a^2} \right)$

$$= \frac{2c}{a}$$

44. If the sum of the roots of a quadratic equation is -7 and product of roots is 12, then find the quadratic equation.

यदि एक द्विघात समीकरण के मूलों का योग -7 है और मूलों का गुणनफल 12 है, तो उस द्विघात समीकरण को ज्ञात करें।

~~(a) $x^2 + 7x + 12 = 0$~~

~~(b) $x^2 - 7x + 12 = 0$~~

~~(c) $x^2 - 7x - 12 = 0$~~

~~(d) $x^2 + 7x - 12 = 0$~~

(SSC CHSL 31/01/2017)

$$x^2 - (-7)x + 12$$

$$x^2 + 7x + 12 = 0$$

$+bx+c=0$
 $+bx-(c)$
45. What will be the value of k so that the sum and product of the roots of the equation $3x^2 + (2k + 1)x - k - 5 = 0$ are equal?

k का मान क्या होगा जिससे की समीकरण $3x^2 + (2k + 1)x - k - 5 = 0$ के मूलों के योगफल एवं गुणनफल समान हो?

(a) 0

(b) 2

(c) 3

☒ (d) 4

$$\left. \begin{aligned} \alpha + \beta &= -\frac{(2k+1)}{3} \\ \alpha \cdot \beta &= \frac{(k+5)}{3} \end{aligned} \right\} \begin{aligned} +\frac{(2k+1)}{3} &= +\frac{(k+5)}{3} \\ 2k-k &= 5-1 \end{aligned}$$

$$k=4$$

$$3x^2 + (2k+1)x - (k+5) = 0$$



46. If α, β are the roots of the quadratic equation $x^2 - q(1+x) - r = 0$, then the value of $(1+\alpha)(1+\beta)$ is?

यदि α, β द्विघात समीकरण $x^2 - q(1+x) - r = 0$ के मूल हों, तो $(1+\alpha)(1+\beta)$ का मान क्या होगा?

(a) $1 - r$

(b) $1 + r$

(c) $q - r$

(d) $q + r$

$$1 + \beta + \alpha + \alpha\beta$$

$$(1 + \alpha + \beta + \alpha\beta)$$

$$1 + \cancel{q} - \cancel{q} - r$$

$$= 1 - r$$

$$x^2 - q - qx - r = 0$$

$$x^2 - qx - (r+q) = 0$$

$$\alpha + \beta = q$$

$$\alpha \cdot \beta = -(q+r)$$

47. If a root of the equation $x^2 + px + 12$ is 4, while the roots of the equation $x^2 + px + q = 0$ are equal, then the value of q will be.

यदि समीकरण $x^2 + px + 12 = 0$ का एक मूल 4 हो, जबकि समीकरण $x^2 + px + q = 0$ के मूल समान हो, तो q का मान होगा।

(a) 4

(b) 4/49

(c) 49/7

(d) None of these

$$\beta = 4$$

$$D = 0$$

$$x^2 + px + 12 = 0$$

$$\alpha + \beta = -p$$

$$\alpha = -p - 4$$

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

$$b^2 = 4ac$$

$$p^2 = 4 \times 1 \times 9$$

$$p^2 = 49$$

$$(-7)^2 = 49$$

$$q = 49$$

$$\alpha \cdot \beta = 12$$

$$x \cdot (p+4) = 12$$

$$p+4 = -3$$

$$p = -3 - 4 = -7$$

48. If α and β are the roots of the equation $(x - a)(x - b) = c, c \neq 0$; then the roots of the equation $(x - \alpha)(x - \beta) + c = 0$ are

यदि α और β समीकरण $(x-a)(x-b)=c, c \neq 0$ के मूल हैं; तो समीकरण $(x-\alpha)(x-\beta)+c=0$ के मूल हैं

A. a and c

B. b and c

C. a and b

D. $(a + c)$ and $(b + c)$

$$(x-a)(x-b)-c=0$$

$$(x-a)(x-b)-c = (x-\alpha)(x-\beta)$$

$$(x-\alpha)(x-\beta)+c = (x-a)(x-b)$$

$$x=a \quad x=b$$