

यदि, $x^2 + \frac{1}{x^2} = k$

तो,

$$x + \frac{1}{x} = \pm \sqrt{k+2} \quad \checkmark$$

$$x - \frac{1}{x} = \pm \sqrt{k-2} \quad \checkmark$$

$$x^2 + \frac{1}{x^2} = k$$

$$\Rightarrow x^2 + \frac{1}{x^2} + 2 = k + 2$$

$$\Rightarrow \left(x + \frac{1}{x}\right)^2 = k + 2$$

$$\Rightarrow x + \frac{1}{x} = \pm \sqrt{k+2}$$

$$\left(x + \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} + 2$$



$$\text{If, } x^2 + \frac{1}{x^2} = k$$

$$x^2 + \frac{1}{x^2} - 2 = k - 2$$

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

$$\text{तो } x + \frac{1}{x} = \pm\sqrt{k+2}$$

$$\text{तो } x - \frac{1}{x} = \pm\sqrt{k-2}$$



If, $x^2 \oplus \frac{1}{x^2} = 142$

तो $x + \frac{1}{x} = \pm \sqrt{142+2} = 12$

$x - \frac{1}{x} = \pm \sqrt{142-2} = \pm 2\sqrt{35}$

$\sqrt{35 \times 9}$

$\frac{w^6}{25} + \frac{25}{w^6} = 167$

तो $\frac{w^3}{5} \oplus \frac{5}{w^3} = \pm \sqrt{169} = \pm 13$

51. If $x^2 + \frac{1}{x^2} = 79$, then a possible value of $(x + \frac{1}{x})$ is:

यदि $x^2 + \frac{1}{x^2} = 79$ है, तो $(x + \frac{1}{x})$ का संभावित मान ज्ञात कीजिए।

[A] 6

[B] 7

[C] 9 ✓

[D] 8

$\sqrt{79+2}$
 $= 9$

52. If $\frac{x^2}{y^2} + \frac{y^2}{x^2} = 223$, then find $\frac{x}{y} + \frac{y}{x}$?

यदि $\frac{x^2}{y^2} + \frac{y^2}{x^2} = 223$ है, तो $\frac{x}{y} + \frac{y}{x}$ ज्ञात करें?

[A] ± 15

[B] 15

[C] -15

[D] $\sqrt{221}$

$$\begin{aligned} & \downarrow \\ & \pm \sqrt{225} \\ & = \pm 15 \end{aligned}$$

53. If $4x^2 + \frac{1}{4x^2} = 14$, what is the positive value of $x + \frac{1}{4x}$?

यदि $4x^2 + \frac{1}{4x^2} = 14$ है, तो $x + \frac{1}{4x}$ का धनात्मक मान ज्ञात कीजिए।

[RRB ALP CBT-1 2025]

[A] 4

[B] 8

[C] 2

[D] 1

$$\frac{4x^2 + \frac{1}{4x^2}}{2} = \frac{14}{2}$$

$$x + \frac{1}{4x} = 2$$

54. If $\frac{3(x^2 + 1) - 7x}{3x} = 6, x \neq 0$, then the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$ is:

यदि $\frac{3(x^2+1)-7x}{3x} = 6, x \neq 0$ है, तो $\sqrt{x} + \frac{1}{\sqrt{x}}$ का मान क्या होगा?

(RRB JE 2025)

[A] $\sqrt{\frac{25}{3}}$

~~[B] $\sqrt{\frac{31}{3}}$~~

[C] $\sqrt{\frac{11}{3}}$

[D] $\sqrt{\frac{35}{3}}$

$$3(x^2 + 1) - 7x = 18x$$

$$x + \frac{1}{x} = \frac{25}{3} \Rightarrow \sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{\frac{25}{3} + 2} = \sqrt{\frac{31}{3}}$$

55. If $x^2 + \frac{1}{x^2} = 123$, then a possible value of $\left(x - \frac{1}{x}\right)$ is:

यदि $x^2 \oplus \frac{1}{x^2} = 123$ है, तो $\left(x - \frac{1}{x}\right)$ का संभावित मान ज्ञात कीजिए।

[RRB Group - D 2025]

[A] 12

[C] 13

[B] 10

[D] 11

$$\sqrt{123-2}$$

$$= 11$$


$$\text{if, } x^4 + \frac{1}{x^4} = 1154$$

$$x^2 + \frac{1}{x^2} = \sqrt{1154 + 2} = 34$$

$$\text{Now, } x + \frac{1}{x} = \sqrt{34 + 2} = 6$$

$$x - \frac{1}{x} = \sqrt{34 - 2} = 4\sqrt{2}$$


56. If $x^4 + \frac{1}{x^4} = 3842$, then the positive value of $x + \frac{1}{x}$ will be :

यदि $x^4 + \frac{1}{x^4} = 3842$ है, तो $x + \frac{1}{x}$ का धनात्मक मान ज्ञात करें।

[A] 12

[B] 8

[C] 10

[D] 6

$$x^4 + \frac{1}{x^4} = \sqrt{3844} = 62$$

$$x + \frac{1}{x} = \sqrt{64} = 8$$

57. If $x^2y^2 + \frac{1}{x^2y^2} = 83$ then what is the value of $xy - \frac{1}{xy}$?

यदि $x^2y^2 + \frac{1}{x^2y^2} = 83$ हो तो $xy - \frac{1}{xy}$ का मान क्या है?

[RRB NTPC - 2021]

[A] 10

[C] 85

[B] 81

[D] 9

$\sqrt{83-2}$

58. If $x^4 + \frac{1}{x^4} = 6887$, then the positive value of $x - \frac{1}{x}$ is:

यदि $x^4 + \frac{1}{x^4} = 6887$ है, तो $x - \frac{1}{x}$ का धनात्मक मान ज्ञात करें।

[A] 12

[C] 15

[B] 9

[D] 8

$$\rightarrow \sqrt{83-2} = 9$$

$$x^4 + \frac{1}{x^4} = \sqrt{6889} = 83$$

59. If $x^8 - 1442x^4 + 1 = 0$, then a possible value of $x - \frac{1}{x}$ is:

यदि $x^8 - 1442x^4 + 1 = 0$ है, तो $x - \frac{1}{x}$ का एक संभावित मान है:

[A] 5

[B] 8

[C] 6

[D] 4

$$\sqrt{38-2} = 6$$

$$x^4 + \frac{1}{x^4} = 1442$$

$$x^2 + \frac{1}{x^2} = \sqrt{1444} = 38$$

60. If $x^8 - 2599x^4 + 1 = 0$, then the positive value of $x - \frac{1}{x}$ will be:

यदि $x^8 - 2599x^4 + 1 = 0$ है, तो $x - \frac{1}{x}$ का धनात्मक मान होगा:

[A] 7 ✓

[B] 12

[C] 6

[D] 8



61. If $\left(x^2 + \frac{1}{49x^2}\right) = 15\frac{5}{7}$, then what is the value of $\left(x + \frac{1}{7x}\right)$?

यदि $\left(x^2 + \frac{1}{49x^2}\right) = 15\frac{5}{7}$, है, तो $\left(x + \frac{1}{7x}\right)$ का मान क्या होगा?

[A] 7

[B] ± 7

[C] ± 4

[D] 4

$\rightarrow \pm 4$

$$\left(x\right)^2 + \left(\frac{1}{7x}\right)^2 = \frac{110}{7} + \frac{2}{7}$$

$$\left(x + \frac{1}{7x}\right)^2 = \frac{112}{7} = 16$$

$$a^2 = 16 \\ \Rightarrow a = \pm 4$$

62. If $x^8 - 433x^4 + 16 = 0, x > 0$, then what is the value of $\left(x + \frac{2}{x}\right)$?

यदि $x^8 - 433x^4 + 16 = 0, x > 0$ है, तो $\left(x + \frac{2}{x}\right)$ का मान क्या होगा?

[A] 5

[B] 7

[C] 4

[D] 9

~~$$x^4 + \frac{16}{x^4} + 8 = 433 + 8$$

$$\left(x^2 + \frac{4}{x^2}\right)^2 = 441 \Rightarrow x^2 + \frac{4}{x^2} + 4 = 21 + 4$$

$$\left(x + \frac{2}{x}\right)^2 = 25 \Rightarrow x + \frac{2}{x} = 5$$~~



63. If $x^4 + x^{-4} = 119, (x > 0)$, then the value of $(2x - 3)^2$ is:

यदि $x^4 + x^{-4} = 119$ है, $(x > 0)$ तो $(2x - 3)^2$ का मान है:

[A] 12

[B] 13

[C] 15

[D] 14

$$= 4x^2 - 12x + 9$$

$$x^4 + \frac{1}{x^4} = 119$$

$$= 4x(x-3) + 9$$

$$= 4 \times 1 + 9$$

$$= 13$$

$$x^2 + \frac{1}{x^2} = \sqrt{119} = 11$$

$$\Rightarrow x - \frac{1}{x} = 3 \Rightarrow x - 3 = \frac{1}{x}$$

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

$$\text{If, } x + \frac{1}{x} = k$$

$$\text{तो, } x - \frac{1}{x} = \pm \sqrt{k^2 - 4} \checkmark$$



$$\text{If, } x - \frac{1}{x} = k$$

$$\text{तो, } x + \frac{1}{x} = \pm \sqrt{k^2 + 4}$$



If, $x + \frac{1}{x} = k$

तो $x - \frac{1}{x} = \pm \sqrt{k^2 - 4}$

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

$$\left(x - \frac{1}{x}\right)^2 = \left(x + \frac{1}{x}\right)^2 - 4 \times \cancel{x} \times \cancel{\frac{1}{x}}$$

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

$$\Rightarrow x - \frac{1}{x} = \pm \sqrt{k^2 - 4}$$



$$\text{If, } y \oplus \frac{1}{y} = 11$$

$$\text{तो } y - \frac{1}{y} = \pm \sqrt{11^2 - 4} = \pm \sqrt{117} \\ = \pm 3\sqrt{13}$$

$$\text{If, } x - \frac{1}{x} = 6$$

$$\text{तो } x \oplus \frac{1}{x} = \pm \sqrt{6^2 + 4} = \pm 2\sqrt{10}$$

$$\text{If, } 5x + \frac{7}{4x} = 12$$

$$\begin{aligned} \text{तो } 5x - \frac{7}{4x} &= \pm \sqrt{12^2 - 4 \times 5 \times \frac{7}{4}} \\ &= \pm \sqrt{109} \end{aligned}$$

$$\text{If, } x + \frac{1}{x} = k$$

$$\text{तो } x - \frac{1}{x} = \pm \sqrt{k^2 - 4}$$

64. If $\frac{m^{117}}{n^{109}} - \frac{n^{109}}{m^{117}} = 9$, then find $\frac{m^{117}}{n^{109}} + \frac{n^{109}}{m^{117}}$?

यदि $\frac{m^{117}}{n^{109}} - \frac{n^{109}}{m^{117}} = 9$ है, तो $\frac{m^{117}}{n^{109}} + \frac{n^{109}}{m^{117}}$ ज्ञात कीजिये?

[A] $\sqrt{90}$

[C] $\sqrt{10}$

[B] $\sqrt{85}$

[D] $\sqrt{82}$

$$x - \frac{1}{x} = 9$$

$$x + \frac{1}{x} = \sqrt{9^2 + 4}$$

65. If $a = \frac{1}{a-5}$ ($a > 0$) then the value of $a + \frac{1}{a}$ is

यदि $a = \frac{1}{a-5}$ ($a > 0$) है, तो $a + \frac{1}{a}$ का मान क्या होगा?

[A] $\sqrt{29}$

[C] $-\sqrt{29}$

[B] $2\sqrt{29}$

[D] $\sqrt{21}$

$\sqrt{5+4}$

$$a - 5 = \frac{1}{a}$$

$$a - \frac{1}{a} = 5$$

66. If $\frac{a-1}{\sqrt{a}} = 5$, then find $\frac{a+1}{\sqrt{a}}$?

यदि $\frac{a-1}{\sqrt{a}} = 5$ है, तो $\frac{a+1}{\sqrt{a}}$ ज्ञात कीजिए?

~~[A]~~ $\sqrt{29}$

[B] 21

[C] $\sqrt{21}$

[D] $\sqrt{27}$

$$\sqrt{a} - \frac{1}{\sqrt{a}} = 5$$

$$\sqrt{a} + \frac{1}{\sqrt{a}} = \sqrt{5^2 + 4}$$

67. If $\frac{A+B}{\sqrt{A} \sqrt{B}} = 10\sqrt{2}$, then $\frac{A-B}{\sqrt{A} \sqrt{B}} = ?$

[A] 12

☒ [B] 14

[C] 13

[D] $9\sqrt{2}$

$$\sqrt{\frac{A}{B}} + \sqrt{\frac{B}{A}} = 10\sqrt{2}$$

$$\sqrt{\frac{A}{B}} - \sqrt{\frac{B}{A}} = \sqrt{(10\sqrt{2})^2 - 4} = \sqrt{196} = 14$$

68. **If $x + \frac{1}{x+7} = 0$, then $x - \frac{1}{x+7} = ?$**

यदि $x + \frac{1}{x+7} = 0$, हो तो, $x - \frac{1}{x+7} = ?$ $3\sqrt{5}-7$

[A] $3\sqrt{5}-5$

[B] $3\sqrt{5}-7$

[C] $3\sqrt{7}-5$

[D] $3\sqrt{7}-7$

$$(x+7) + \frac{1}{x+7} = 7$$

$$\cancel{(x+7)} - \frac{1}{\cancel{(x+7)}} = 3\sqrt{5}$$

69. If $x > 1$ and $x^2 + \frac{1}{x^2} = 2\sqrt{5}$ what is the value of $x^4 - \frac{1}{x^4}$?

यदि $x > 1$ और $x^2 + \frac{1}{x^2} = 2\sqrt{5}$, $x^4 - \frac{1}{x^4}$ का मान क्या है?

(SSC SELECTION POST XI 2023)

[A] $4\sqrt{5}$

[B] $4\sqrt{30}$

[C] $8\sqrt{5}$

[D] $8\sqrt{6}$

$$x > \frac{1}{x}$$

$$\begin{aligned} & \left(x^2\right)^2 - \left(\frac{1}{x^2}\right)^2 \\ &= \left(x^2 + \frac{1}{x^2}\right) \cdot \left(x^2 - \frac{1}{x^2}\right) \\ & \quad \downarrow \qquad \qquad \downarrow \\ &= 2\sqrt{5} \quad \times \quad \sqrt{20-4} \\ &= 8\sqrt{5} \end{aligned}$$



70. If $x^2 - 16x + 59 = 0$, then find the value of $(x - 6)^2 + \frac{1}{(x-6)^2}$?

यदि $x^2 - 16x + 59 = 0$ है, तो $(x - 6)^2 + \frac{1}{(x-6)^2}$ का मान ज्ञात कीजिए

[A] 14

[C] 16

माना, $x - 6 = y$

$\Rightarrow x = y + 6$

[B] 18

[D] 20

$$y^2 + \frac{1}{y^2} = 4^2 + \frac{1}{4} = 18$$

~~$$(y+6)^2 - 16(y+6) + 59 = 0$$~~

$$y^2 + 12y + 36 - 16y - 96 + 59 = 0$$

$$\frac{y^2 - 4y - 1}{y} = 0 \Rightarrow y - \frac{1}{y} = 4$$

71. If $x^2 + 2x - 7 = 0$ then $(x + 4)^4 + \frac{1}{(x+4)^4} = ?$

यदि $x^2 + 2x - 7 = 0$ तो $(x + 4)^4 + \frac{1}{(x+4)^4} = ?$

[A] 527

[C] 1154

माना $x + 4 = y$

$\Rightarrow x = y - 4$

[B] 2207

[D] 1286

$$y^2 - 8y + 16 + 2y - 8 - 7 = 0$$

$$\Rightarrow y^2 - 6y + 1 = 0$$

$$\Rightarrow y + \frac{1}{y} = 6$$

$$y^2 + \frac{1}{y^2} = 6^2 - 2$$

$$y^4 + \frac{1}{y^4} = 34^2 - 2 = 1154$$