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$$\frac{a+b}{a-b} \oplus \frac{a-b}{a+b} = \frac{2(a^2 + b^2)}{(a^2 - b^2)}$$

$$\frac{a+b}{a-b} \ominus \frac{a-b}{a+b} = \frac{4ab}{a^2 - b^2}$$

$$\begin{aligned} x-y &= 5 \\ y-x &= -5 \end{aligned}$$

$$\frac{\sqrt{11}+\sqrt{7}}{\sqrt{11}-\sqrt{7}} \oplus \frac{\sqrt{11}-\sqrt{7}}{\sqrt{11}+\sqrt{7}} = \frac{2 \cdot (11+7)}{(11-7)} = \frac{36}{4} = 9$$

$$\begin{aligned} \frac{\sqrt{7}-\sqrt{3}}{\sqrt{7}+\sqrt{3}} \ominus \frac{\sqrt{7}+\sqrt{3}}{\sqrt{7}-\sqrt{3}} &= -\frac{\cancel{4} \times \sqrt{7} \times \sqrt{3}}{(\cancel{7}-3)} \\ &= -\sqrt{21} \end{aligned}$$


$$\frac{a+b}{a-b} + \frac{a-b}{a+b} = \frac{(a+b)^2 + (a-b)^2}{(a-b) \cdot (a+b)} = \frac{2(a^2 + b^2)}{(a^2 - b^2)}$$


27. If $x^{150} = \frac{6-\sqrt{21}}{6+\sqrt{21}}$, then $x^{150} + \frac{1}{x^{150}} = ?$

यदि $x^{150} = \frac{6-\sqrt{21}}{6+\sqrt{21}}$ हो तो, $x^{150} + \frac{1}{x^{150}} = ?$

[A] 8.7

[C] 6.7

[B] 8.6

[D] 7.6

$$\frac{6-\sqrt{x}}{6+\sqrt{x}} + \frac{6+\sqrt{x}}{6-\sqrt{x}}$$

$$= \frac{2 \cdot (36+x)}{(36-x)}$$

$$= \frac{2 \times 57.9}{15.5} = 7.6$$

28. If the value of $\frac{3x\sqrt{y} + 2y\sqrt{x}}{3x\sqrt{y} - 2y\sqrt{x}} - \frac{3x\sqrt{y} - 2y\sqrt{x}}{3x\sqrt{y} + 2y\sqrt{x}}$ is same as that of $\sqrt{x} \sqrt{y}$, then which of the following relations:

$\frac{3x\sqrt{y} + 2y\sqrt{x}}{3x\sqrt{y} - 2y\sqrt{x}} - \frac{3x\sqrt{y} - 2y\sqrt{x}}{3x\sqrt{y} + 2y\sqrt{x}}$ का मान $\sqrt{x} \sqrt{y}$ के मान के बराबर है तो x और y के बीच निम्न में कौनसा संबंध सही है?

[A] $9x - 4y = 36$

[B] $9x + 4y = 24$

[C] $9x + 4y = 36$

[D] $9x - 4y = 24$

$$\frac{4x\cancel{3x\sqrt{y}} \times \cancel{2y\sqrt{x}}}{9\cancel{x^2y} - 4\cancel{y^2x}} \Rightarrow \sqrt{x}\sqrt{y}$$

$$\cancel{4x\sqrt{y}} = \cancel{2y\sqrt{x}} \cdot (9x - 4y)$$

29. If $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, then find the value of $x^2 - y^2$.

यदि $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ और $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$ है, तो $x^2 - y^2$ का मान ज्ञात करें।

[A] $\sqrt{5}$

[C] $3\sqrt{5}$

[B] $2\sqrt{5}$

[D] $4\sqrt{5}$

$(x-y) \cdot (x+y)$

$$= \frac{4 \times \sqrt{5} \times 1}{4} \times \frac{2 \cdot (5+1)}{4}$$
$$= 3\sqrt{5}$$

30. If $A = \frac{1+2x}{1-2x}$ and $B = \frac{1-2x}{1+2x}$, then the value of $\frac{A+B}{A-B}$ is:

यदि $A = \frac{1+2x}{1-2x}$ और $B = \frac{1-2x}{1+2x}$ है, तो $\frac{A+B}{A-B}$ का मान है:

[A] $x + \frac{1}{4x}$

[B] $x - \frac{1}{4x}$

[C] $\frac{1}{4x} - x$

[D] $\frac{1}{4x^2} + x^2$

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

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

31. If $x = \sqrt{6} + 2$ and $y = \sqrt{6} - 2$, then what is the value of $\left(\frac{x}{y} + \frac{y}{x}\right)^2 - 3$?

यदि $x = \sqrt{6} + 2$ और $y = \sqrt{6} - 2$, तो $\left(\frac{x}{y} + \frac{y}{x}\right)^2 - 3$ का मान क्या होगा?

[A] 42

[B] 97

[C] 35

[D] 22

$$\frac{x}{y} + \frac{y}{x}$$

$$\frac{\sqrt{6}+2}{\sqrt{6}-2} + \frac{\sqrt{6}-2}{\sqrt{6}+2} = \frac{2 \times 10}{2} = 10$$



Rationalization (परिमेयकरण) $\div \rightarrow$

$$\frac{1}{3+2\sqrt{2}} = \frac{1}{3+2\sqrt{2}} \times \frac{3-2\sqrt{2}}{3-2\sqrt{2}} = \frac{3-2\sqrt{2}}{3^2-(2\sqrt{2})^2} = \frac{3-2\sqrt{2}}{9-8} = 3-2\sqrt{2}$$



1

$$\frac{1}{7+4\sqrt{3}} = 7-4\sqrt{3}$$

$49-16=1$

2

$$\frac{1}{\sqrt{5}+2} = \sqrt{5}-2$$

$5-4=1$

3

$$\frac{1}{5-2\sqrt{6}} = 5+2\sqrt{6}$$

$25-24=1$

4

$$\frac{1}{7+5\sqrt{2}} = \frac{7-5\sqrt{2}}{-1} = 5\sqrt{2}-7$$

$49-50=-1$


$$\frac{1}{3+\sqrt{2}} = 3-\sqrt{2}$$

$$9-8$$




$$\frac{1}{a+\sqrt{b}} \times \frac{a-\sqrt{b}}{a-\sqrt{b}}$$


5

$$\frac{1}{5\sqrt{3} \oplus 2\sqrt{11}} = \frac{5\sqrt{3} - 2\sqrt{11}}{31}$$

$75 - 44$



Example:-

$$\begin{aligned} x &= 9 + 4\sqrt{5} \\ - \\ \frac{1}{x} &= 9 - 4\sqrt{5} \end{aligned}$$

$$\text{तो } x + \frac{1}{x} = 18$$

$$x - \frac{1}{x} = 8\sqrt{5}$$

32. If $x = 8 + 3\sqrt{7}$, $x > 0$, then the value of $\sqrt{x} - \frac{1}{\sqrt{x}}$ is:

यदि $x = 8 + 3\sqrt{7}$, $x > 0$ है, तो $\sqrt{x} - \frac{1}{\sqrt{x}}$ का मान क्या है?

(SSC CGL PRE 2022)

[A] 4 $+ x = 8 + 3\sqrt{7}$
[C] 6 $+ \frac{1}{x} = 8 - 3\sqrt{7}$

[B] $\sqrt{14}$
[D] $2\sqrt{7}$

$$\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 = x + \frac{1}{x} - 2$$
$$= 16 - 2$$
$$= 14$$

33. If $x = 10 + 3\sqrt{11}$, then find $\sqrt{x} + \frac{1}{\sqrt{x}}$?

यदि $x = 10 + 3\sqrt{11}$ है, तो $\sqrt{x} + \frac{1}{\sqrt{x}}$ ज्ञात कीजिये?

~~[A] 4.84~~

~~[C] 4.69~~

~~[B] 5.69~~

~~[D] 3.92~~

$$\begin{aligned} \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2 &= x + \frac{1}{x} + 2 \\ &= 10 + 3\sqrt{11} + \frac{1}{10 + 3\sqrt{11}} + 2 \\ &= 12 + 3\sqrt{11} + \frac{1}{10 + 3\sqrt{11}} \end{aligned}$$

$$4.8^2 = 23.04$$



34. If $x + \frac{1}{x} = 10$, then find the value of $\frac{7x}{x^2 + 1 - 8x}$.

यदि $x + \frac{1}{x} = 10$ है, तो $\frac{7x}{x^2 + 1 - 8x}$ का मान ज्ञात कीजिए।

(SSC CGL 2022)

[A] 3.5

[C] 2.5

[B] 4.5

[D] 5.5

$$\begin{aligned} &= \frac{7}{\left(x + \frac{1}{x}\right) - 8} \\ &= \frac{7}{10 - 8} = 3.5 \end{aligned}$$

35. If $a^2 + \frac{2}{a^2} = 16$, then find the value of $\frac{72a^2}{a^4+2+8a^2}$.

यदि $a^2 + \frac{2}{a^2} = 16$ है, तो $\frac{72a^2/a^2}{a^4+2+8a^2/a^2}$ का मान ज्ञात करें।

[A] 3

[B] 1

[C] 4

[D] 2

$$= \frac{72}{\left(a^2 + \frac{2}{a^2}\right) + 8}$$

$$= \frac{\cancel{72}}{\cancel{24}} = 3$$

36. If $x + \frac{1}{x} = 15$, then the value of $\frac{7x^2 - 9x + 7}{x^2 - x + 1}$?

यदि $x + \frac{1}{x} = 15$, तो $\frac{7x^2 - 9x + 7}{x^2 - x + 1}$ का मान क्या होगा?

SSC CGL Pre 2024

[A] $-48/7$

[B] $-22/7$

✓ [C] $48/7$

[D] $22/7$

$$7\left(x + \frac{1}{x}\right)$$

$$\frac{7x^2 - 9x + 7}{x^2 - x + 1} = \frac{105 - 9}{14} = \frac{96}{14}$$

37. If $x^2 + 7x + 8 = 0$, then find the value of $\frac{4x}{x^2 - 5x + 8}$?
यदि $x^2 + 7x + 8 = 0$, तो $\frac{4x}{x^2 - 5x + 8}$ का मान ज्ञात कीजिये?

SSC CGL Pre 2024

[A] $\frac{1}{2}$

[C] $-\frac{1}{3}$

[B] $-\frac{1}{4}$

[D] $\frac{1}{6}$

$$x^2 + 8 = -7x$$

$$= \frac{\cancel{4x}}{\cancel{-12x}} = -\frac{1}{3}$$

38. If $\frac{2x}{5x^2+10x-5} = 1$, then find the value of $\left(x - \frac{1}{x}\right)$
यदि $\frac{2x}{5x^2+10x-5} = 1$ है, तो $\left(x - \frac{1}{x}\right)$ का मान ज्ञात कीजिए।

[A] -1

[C] 0

[B] $\frac{5}{2}$

[D] $\frac{-8}{5}$

$\frac{5}{2} \rightarrow -\frac{8}{5}$

$$\frac{2}{5x^2+10x-5} = 1$$

$$5x^2+10x-5 = 2$$



39. If $x^8 - 32x^4 + 256 = 0$, then positive value of $\left(x^2 + \frac{1}{x^2}\right)$ is:

यदि $x^8 - 32x^4 + 256 = 0$ है तो $\left(x^2 + \frac{1}{x^2}\right)$ का धनात्मक मान क्या होगा?

[A] 3.75

[B] 5.75

[C] 2.25

[D] 4.25

40. If $x + \frac{81}{x} = 18$ where $x > 0$, then the value of $x^2 + \frac{162}{x^2}$ is:

यदि $x + \frac{81}{x} = 18$ है, जहाँ $x > 0$ है, तो $x^2 + \frac{162}{x^2}$ का मान ज्ञात करें।

[A] 78

[B] 83

[C] 85

[D] 81

41. If $a - \frac{24}{a} = 5$, where $a > 0$, then the value of $a^2 + \frac{64}{a^2}$ is:

यदि $a - \frac{24}{a} = 5$, है, जहाँ $a > 0$, है, तो $a^2 + \frac{64}{a^2}$ का मान ज्ञात करें।

[A] 45

[B] 56

[C] 60

[D] 65

42. If $x + \frac{49}{x+48} = -34$, then find $(2x + 83)^3 + \frac{1}{(2x+83)^3}$?

यदि $x + \frac{49}{x+48} = -34$ है, तो $(2x + 83)^3 + \frac{1}{(2x+83)^3}$ ज्ञात कीजिये?

[A] 7

[B] 2

[C] -2

[D] 1







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

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





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

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



If, $x + \frac{1}{x} = 9$

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



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

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



If, $z^7 + \frac{1}{z^7} = 25$

$z^{14} + \frac{1}{z^{14}} = ?$



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

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



If, $y^3 + \frac{1}{y^3} = 10$

$y^6 + \frac{1}{y^6} = ?$

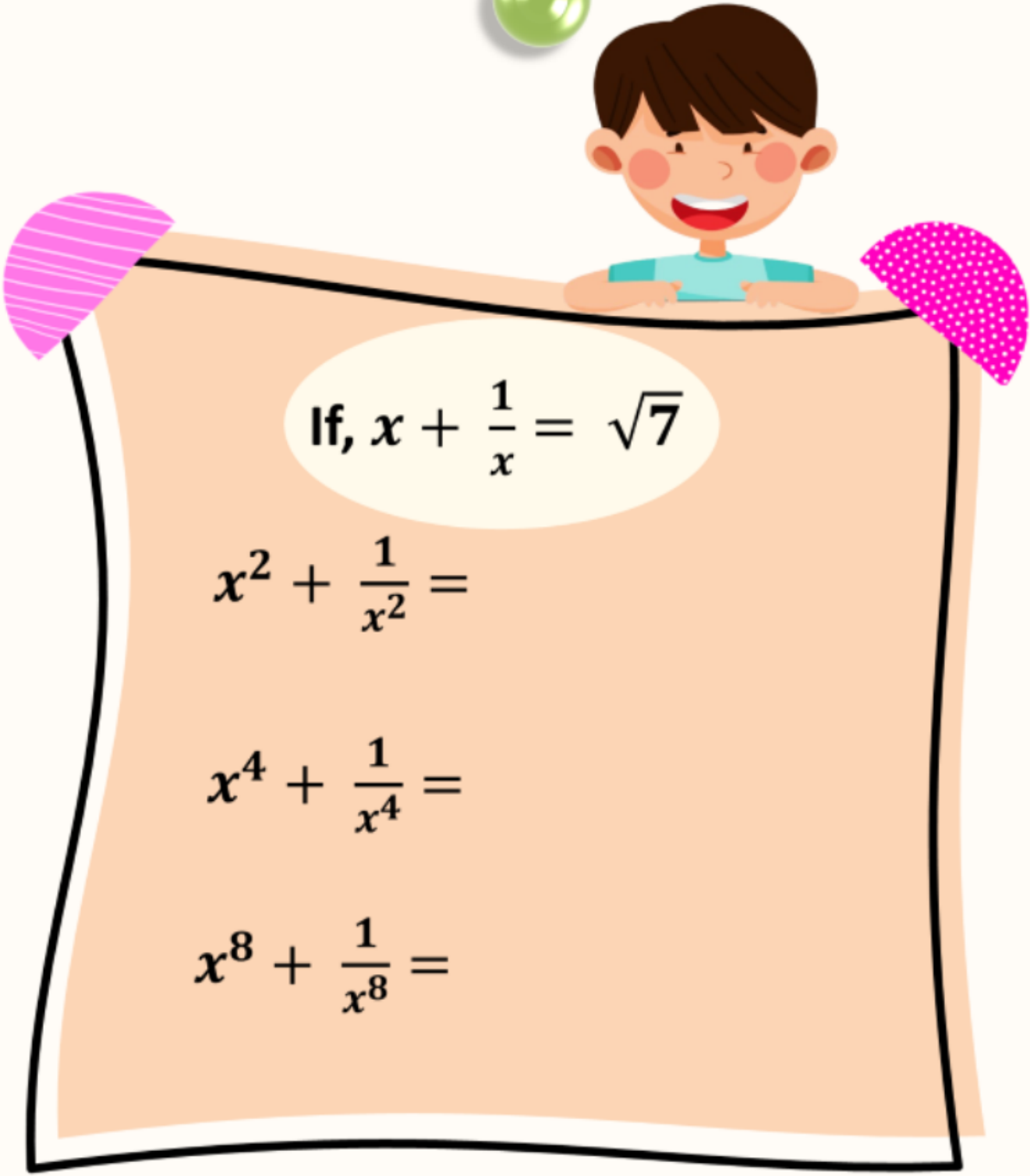
If, $x + \frac{1}{x} = k$ तो $x^2 + \frac{1}{x^2} = k^2 - 2$

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



$$\frac{y^5}{\sqrt{3}} + \frac{\sqrt{3}}{y^5} = 7\sqrt{6}$$

तो $\frac{y^{10}}{3} + \frac{3}{y^{10}} = ?$



If, $x + \frac{1}{x} = \sqrt{7}$

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

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

$$x^8 + \frac{1}{x^8} =$$

43. If $x + \frac{1}{x} = 13$, then what is the value of $x^2 + \frac{1}{x^2}$?

यदि $x + \frac{1}{x} = 13$ है, तो $(x^2 + \frac{1}{x^2})$ का मान कितना है?

RRB Group-D 2024

[A] 171

[B] 167

[C] 163

[D] 169

44. If $x + \frac{1}{x} = 17$, then what is the value of $x^2 + \frac{1}{x^2}$?

यदि $x + \frac{1}{x} = 17$ है, तो $\left(x^2 + \frac{1}{x^2}\right)$ का मान कितना है?

RRB Group-D 2024

[A] 289

[B] 291

[C] 283

[D] 287

45. If $\left(x + \frac{1}{x}\right) = 8.5$, what is the value of $\left(x^2 + \frac{1}{x^2}\right)$?

यदि $\left(x + \frac{1}{x}\right) = 8.5$ है, तो $\left(x^2 + \frac{1}{x^2}\right)$ का मान ज्ञात करें।

[A] 70.25

[B] 74.25

[C] 72.25

[D] 75.25

46. If the sum of a number and its reciprocal is 15. What is the sum of the square of the number and the square of its reciprocal?

अगर किसी संख्या और उसके व्युत्क्रम का योग 15 है। संख्या के वर्ग और उसके व्युत्क्रम के वर्ग का योग क्या है?

[A] $111 \times 2 + 1$

[B] $111 \times 2 + 2$

[C] $111 \times 2 + 3$

[D] $111 \times 2 + 4$

47. If $x^2 + \frac{1}{x^2} = 10$, then what is the value of $x^4 + \frac{1}{x^4}$?

यदि $x^2 + \frac{1}{x^2} = 10$, तो $x^4 + \frac{1}{x^4}$ का मान क्या है?

(IB ACIO Grade-2 2023) RRB Technician Grade-3 2025

[A] 98

[C] 96

[B] 100

[D] 102

48. If $x^{12.5} + \frac{1}{x^{12.5}} = 16$, then $x^{25} + \frac{1}{x^{25}} = ?$

यदि $x^{12.5} + \frac{1}{x^{12.5}} = 16$ हो तो, $x^{25} + \frac{1}{x^{25}} = ?$

[A] 254

[B] 258

[C] 260

[D] 256

49. If $\frac{x^{42}+1}{x^{21}} = 7$, then $\frac{x^{84}+1}{x^{42}} = ?$

यदि $\frac{x^{42}+1}{x^{21}} = 7$ हो तो, $\frac{x^{84}+1}{x^{42}} = ?$

[A] 51

[B] 49

[C] 53

[D] 47

50. If $\frac{x^{200}}{y^{200}} + \frac{y^{200}}{x^{200}} = 8$, then find $\frac{x^{400}}{y^{400}} + \frac{y^{400}}{x^{400}}$?

यदि $\frac{x^{200}}{y^{200}} + \frac{y^{200}}{x^{200}} = 8$ है, तो $\frac{x^{400}}{y^{400}} + \frac{y^{400}}{x^{400}}$ ज्ञात कीजिये?

[A] 60

[B] 62

[C] 64

[D] 66