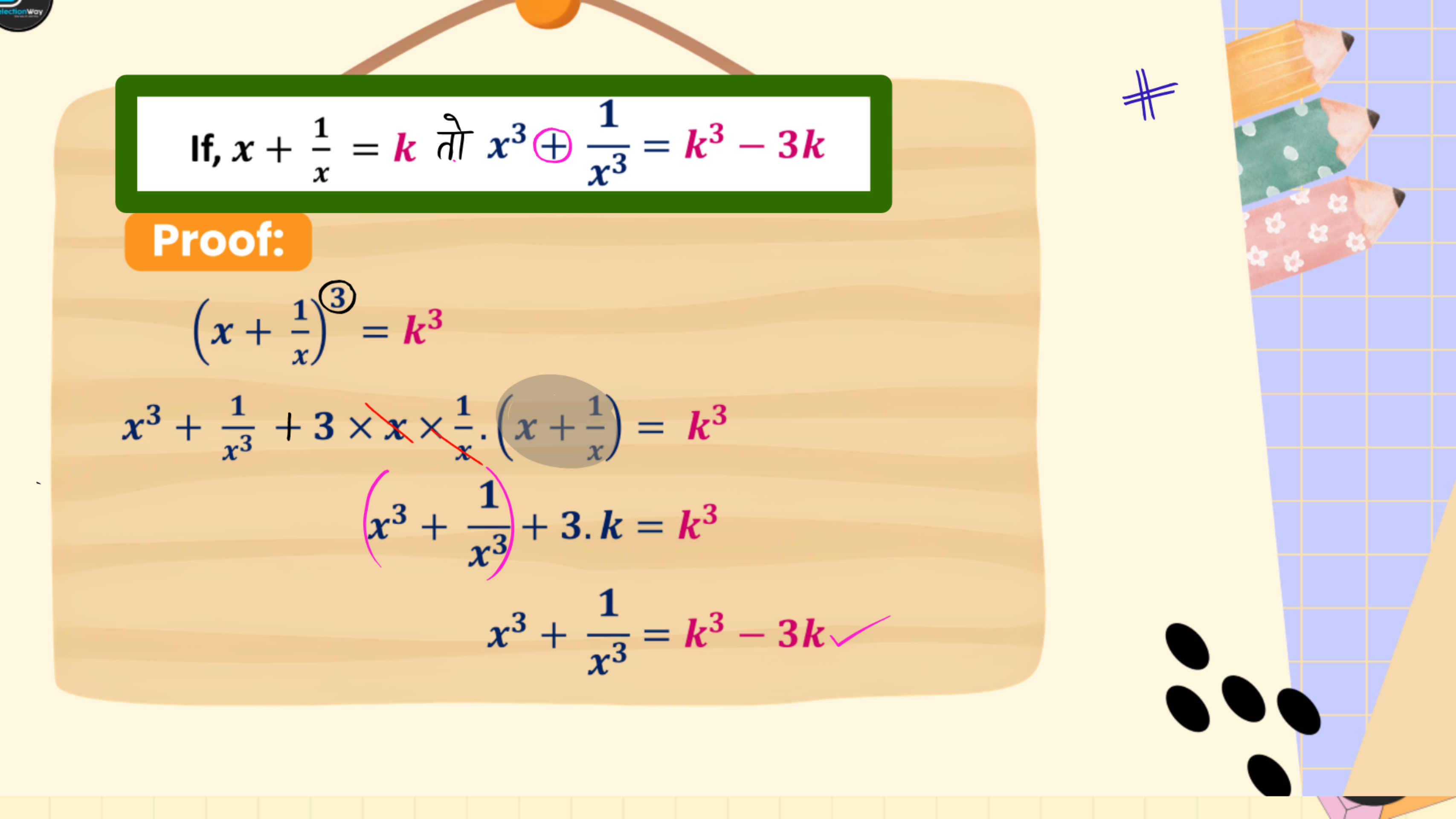




selectionWay

$$\text{If, } x + \frac{1}{x} = k \text{ तो } x^3 \oplus \frac{1}{x^3} = k^3 - 3k$$

Proof:

$$\left(x + \frac{1}{x}\right)^{\textcircled{3}} = k^3$$

$$x^3 + \frac{1}{x^3} + 3 \times \cancel{x} \times \cancel{\frac{1}{x}} \cdot \left(x + \frac{1}{x}\right) = k^3$$

$$\left(x^3 + \frac{1}{x^3}\right) + 3.k = k^3$$

$$x^3 + \frac{1}{x^3} = k^3 - 3k \checkmark$$

If, $x + \frac{1}{x} =$ **3, 4, 5, 6, 7, 8, 9, 10**



तो, $x^3 + \frac{1}{x^3} =$ 18, 52, 110, 198, 342, 488, 702, 970

$$3^3 - 3 \times 3$$

$$4^3 - 3 \times 4$$

$$5^3 - 3 \times 5$$

$$6^3 - 3 \times 6$$

216-18

$$7^3 - 3 \times 7$$

$$9^3 - 3 \times 9$$



$$\text{If, } z^5 + \frac{1}{z^5} = 12$$

$$\text{तो, } z^{15} + \frac{1}{z^{15}} = 12^3 - 3 \times 12$$

$$= 1728 - 36$$

$$(z^5)^3 = z^{15} = 1692$$

$$\text{If, } x + \frac{1}{x} = \frac{9}{4}$$

$$\text{तो } x^3 + \frac{1}{x^3} = x \cdot (x^2 - 3)$$

$$= \frac{9}{4} \times \left(\frac{81}{16} - 3 \right)$$

$$= \frac{9}{4} \times \frac{33}{16}$$

$$= \frac{297}{64}$$

$$\text{If, } x - \frac{1}{x} = k \text{ तब } x^3 - \frac{1}{x^3} = k^3 + 3k \quad \checkmark$$

Proof:

$$\left(x - \frac{1}{x}\right)^3 = k^3$$

$$\left(x^3 - \frac{1}{x^3}\right) - 3 \times x \times \frac{1}{x} \cdot \left(x - \frac{1}{x}\right) = k^3$$

$$x^3 - \frac{1}{x^3} = k^3 + 3k$$

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

3,

4,

5,

6,.....



$$\text{तो, } x^3 - \frac{1}{x^3} =$$

36, 76, 140, 234,

$$3^3 + 3 \times 3$$

$$4^3 + 3 \times 4$$

$$6^3 + 3 \times 6$$

If, $x^{8\sqrt{3}} - \frac{1}{x^{8\sqrt{3}}} = 8$

तो, $x^{2.4\sqrt{3}} - \frac{1}{x^{2.4\sqrt{3}}} = 8^3 + 3 \times 8$
 $= 536$

$(x^{8\sqrt{3}})^3$

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

$\Rightarrow x - \frac{1}{x} = \sqrt{4^2 - 4} = \sqrt{12}$

तो, $x^3 - \frac{1}{x^3} = \sqrt{12}^3 + 3\sqrt{12}$
 $= 12\sqrt{12} + 3\sqrt{12}$
 $= 15\sqrt{12}$
 $= 15 \times 2\sqrt{3}$
 $= 30\sqrt{3}$

$\sqrt{12}^2 = 12$
 $\sqrt{12}^3 = 12\sqrt{12}$

72. If $x + \frac{1}{x} = 2\sqrt{3}$, then find the value of $x^3 + \frac{1}{x^3}$.
यदि $x + \frac{1}{x} = 2\sqrt{3}$ है, तो $x^3 + \frac{1}{x^3}$ का मान क्या होगा?

(SSC CGL MAINS 2025)

[A] $6\sqrt{3}$

[C] $10\sqrt{3}$

[B] $18\sqrt{3}$

[D] $24\sqrt{3}$

$$(2\sqrt{3})^3 - 3 \times 2\sqrt{3}$$

$$= 24\sqrt{3} - 6\sqrt{3}$$

73. If $x + \frac{1}{x} = 42$, then find the value of $x^3 + \frac{1}{x^3}$.

यदि $x + \frac{1}{x} = 42$ है, तो $x^3 + \frac{1}{x^3}$ का मान ज्ञात कीजिए।

[RRB Group D-2022]

[A] 74,130

[C] 72,629

[B] 73,962

[D] 74,926

$$42^3 - 3 \times 42$$

$$= 74,088 - 126$$

$$= 73,962$$

74. If $a + \frac{1}{a} = -30$ then find the value of $a^3 + \frac{1}{a^3}$:

अगर $a + \frac{1}{a} = -30$ तो $a^3 + \frac{1}{a^3}$ का मान ज्ञात करें:

[RRB RPF Consstable-18/01/2019 (Shift-III)]

[A] 27090 ✗

[B] 26910 ✗

[C] -26910 ✓

[D] -27090

$$(-30)^3 - 3 \times (-30)$$

$$-27000 + 90$$

75. If $x^{15} + \frac{1}{x^{15}} = 15$, then $x^{45} + \frac{1}{x^{45}} = ?$

यदि $x^{15} + \frac{1}{x^{15}} = 15$, है, तो $x^{45} + \frac{1}{x^{45}}$ का मान क्या होगा?

[A] 3303

[B] 3330

[C] 3030

[D] 3420

$$\begin{aligned}
 & \rightarrow 15^3 - 3 \times 15 \\
 & = 3375 - 45 \\
 & = 3330
 \end{aligned}$$

76. **If $x + \frac{1}{x} = 2\cos\theta$, then $x^3 + \frac{1}{x^3}$?**

यदि $x + \frac{1}{x} = 2\cos\theta$ है, तो $x^3 + \frac{1}{x^3}$?

[A] $2\cos 2\theta$

[B] $\cos 3\theta$

[C] $2\cos 3\theta$

[D] $\cos 2\theta$

$$8\cos^3\theta - 6\cos\theta$$

$$= 2 \times (4\cos^3\theta - 3\cos\theta)$$

$$= 2\cos 3\theta$$

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

तो $x^3 + \frac{1}{x^3} = (t - 3)\sqrt{t}$

If, $x + \frac{1}{x} = \sqrt{19}$

तो $x^3 + \frac{1}{x^3} = 16\sqrt{19}$

If, $x - \frac{1}{x} = \sqrt{t}$

तो $x^3 - \frac{1}{x^3} = (t + 3)\sqrt{t}$

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

$\Rightarrow x - \frac{1}{x} = \sqrt{7^2 - 4} = \sqrt{45}$

**तो $x^3 - \frac{1}{x^3} = 48\sqrt{45}$
 $= 48 \times 3\sqrt{5} = 144\sqrt{5}$**

यदि, $\sqrt{x} - \frac{1}{\sqrt{x}} = 14$

तो $x\sqrt{x} - \frac{1}{x\sqrt{x}} = 14^3 + 3 \times 14$
 $= 2744 + 42$
 $= 2786$

$\sqrt[3]{x} = x\sqrt{x}$



77. If $\sqrt{x} + \frac{1}{\sqrt{x}} = 11, x > 0$, then $x\sqrt{x}(x\sqrt{x} - 1298) + 11 = ?$

यदि $\sqrt{x} + \frac{1}{\sqrt{x}} = 11, x > 0$ हो तो $x\sqrt{x}(x\sqrt{x} - 1298) + 11 = ?$

[A] 10

[B] 12

[C] 11

[D] 8

$$\sqrt{x}^3 + \frac{1}{\sqrt{x}^3} = 11^3 - 3 \times 11$$

$$x\sqrt{x} + \frac{1}{x\sqrt{x}} = 1298$$

$$\Rightarrow x\sqrt{x} - 1298 = \frac{-1}{x\sqrt{x}}$$

78. If $\sqrt{x} - \frac{1}{\sqrt{x}} = \sqrt{7}$, then what is the value of $x^3 + \frac{1}{x^3}$?

यदि $\sqrt{x} - \frac{1}{\sqrt{x}} = \sqrt{7}$ हो, तो $x^3 + \frac{1}{x^3}$ का मान कितना है?

RRB NTPC Graduate Level CBT-1 2024

[A] 679

[B] 702

[C] 756

[D] 729

$$\begin{aligned} x + \frac{1}{x} &= \sqrt{7}^2 + 2 \\ &= 9 \end{aligned}$$

$$9^3 - 3 \times 9 = 702$$

79. If $x^2 + \frac{1}{x^2} = 167$ ($x > 0$), then the value of $x^3 + \frac{1}{x^3}$ is
यदि $x^2 + \frac{1}{x^2} = 167$ ($x > 0$) हो तो $x^3 + \frac{1}{x^3}$ का मान बताइए?

(SSC CGL Mains 2016)

[A] 2171

[C] 2158 ✓

[B] 2194

[D] 2233

$$\begin{aligned} & \rightarrow 13^3 - 3 \times 13 \\ & = 2197 - 39 \end{aligned}$$

$$x + \frac{1}{x} = \sqrt{167 + 2} = 13$$

80. If $\frac{m^{28}+1}{m^{14}} = 23$, then find $\frac{m^{42}+1}{m^{21}}$?

यदि $\frac{m^{28}+1}{m^{14}} = 23$, तो $\frac{m^{42}+1}{m^{21}}$ ज्ञात करें?

☒ [A] 110

[B] 48

[C] 25

[D] 78

$$m^4 + \frac{1}{m^4} = 23$$

$$m^3 + \frac{1}{m^3} = 5^3 - 3 \times 5$$

$$m^7 + \frac{1}{m^7} = \sqrt{23+2} = 5$$

81. If $x^4 + \frac{1}{x^4} = 1154$, where $x > 0$, then what is the value of $x^3 + \frac{1}{x^3}$?

यदि $x^4 + \frac{1}{x^4} = 1154$ है, जहाँ $x > 0$ है, तो $x^3 + \frac{1}{x^3}$ का मान क्या है?

[A] 205

[B] 214

[C] 185

[D] 198

$\rightarrow 6^3 - 3 \times 6$

$$x^2 + \frac{1}{x^2} = \sqrt{1156} = 34$$

$$x + \frac{1}{x} = \sqrt{36} = 6$$

82. If $x + \frac{1}{x} = 79$, then find $x\sqrt{x} + \frac{1}{x\sqrt{x}}$?

यदि $x + \frac{1}{x} = 79$ है, तो $x\sqrt{x} + \frac{1}{x\sqrt{x}}$ ज्ञात कीजिये?

[A] 702

[B] 716

[C] 756

[D] 727

$$\sqrt{x} + \frac{1}{\sqrt{x}} = \sqrt{79+2} = 9$$

$$\sqrt{x}^3 + \frac{1}{\sqrt{x}^3} = 9^3 - 3 \times 9$$

83. If $x^2 - 6\sqrt{3}x + 1 = 0$, then the value of $x^3 + \frac{1}{x^3}$ will be:

यदि $x^2 - 6\sqrt{3}x + 1 = 0$ है, तो $x^3 + \frac{1}{x^3}$ का मान ज्ञात करें।

[A] $234\sqrt{3}$

[B] $216\sqrt{3}$

[C] $666\sqrt{3}$

[D] $630\sqrt{3}$

$$\begin{aligned} & \rightarrow (6\sqrt{3})^3 - 3 \times 6\sqrt{3} \\ & = 648\sqrt{3} - 18\sqrt{3} \end{aligned}$$

$$x + \frac{1}{x} = 6\sqrt{3}$$

84. If $x^2 + 6x + 1 = 0$, then the value of $(x + 6)^3 + \frac{1}{(x+6)^3} = ?$

यदि $x^2 + 6x + 1 = 0$ है, तो $(x + 6)^3 + \frac{1}{(x+6)^3}$ का मान ज्ञात करें।

[A] 245

[B] 216

[C] 186

[D] 198

$$x \cdot (x+6) = -1$$

$$\Rightarrow x = \frac{-1}{(x+6)}$$

$$(x+6) + \frac{1}{(x+6)} = 6$$

$$6^3 - 3 \times 6$$

85. If $x = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ and y is the reciprocal of x , then what is the value of (x^3+y^3) ?

यदि $x = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}$ और y , x का पारस्परिक है, तो $(x^3 + y^3)$ का मान क्या है?

[A] ~~504~~

[B] ~~476~~

[C] ~~472~~

[D] 488

$$x^3 + \frac{1}{x^3} = 8^3 - 3 \times 8 = 488$$

$$y = \frac{1}{x}$$

$$x + \frac{1}{x} = \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}} + \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$$

$$= \frac{\cancel{2} \times (5+3)}{\cancel{(5-3)}} = 8$$

86. If $a = \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$ and $b = \frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$, then find $\frac{a^2}{b} + \frac{b^2}{a} = ?$

यदि $a = \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$ और $b = \frac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ है, तो $\frac{a^2}{b} + \frac{b^2}{a}$ का मान ज्ञात कीजिए?

[A] 17498

[B] 17550

[C] 17654

[D] 17576

$$a^3 + \frac{1}{a^3} = 26^3 - 3 \times 26$$

$$\dots 6 \dots 8$$

$$a \times b = 1$$

$$\Rightarrow b = \frac{1}{a}$$

$$a + \frac{1}{a} = \frac{2 \times (7+6)}{(7-6)} = 26$$

if, $x - \frac{1}{x} = k$

then, $x^3 - \frac{1}{x^3} = k^3 + 3k$



87. If $x - \frac{1}{x} = 10$, then the value of $x^3 - \frac{1}{x^3}$ is:

यदि $x - \frac{1}{x} = 10$ है, तो $x^3 - \frac{1}{x^3}$ का मान ज्ञात कीजिए।

[A] 986

[C] 992

[B] 1030

[D] 1386

↓
 $= 10^3 + 3 \times 10$

88. If $\frac{x^2-1}{x} = 8$, then find the value of $\frac{x^6-1}{x^3}$.

यदि $\frac{x^2-1}{x} = 8$, है, तो $\frac{x^6-1}{x^3}$ का मान ज्ञात कीजिए।

RRB Group-D 2025

[A] 496

[C] 512

✓ [B] 536

[D] 488

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

$$x^3 - \frac{1}{x^3} = 8^3 + 3 \times 8 = 536$$

89. If $\left(x - \frac{1}{x-2}\right) = 7$, then the value of $(x-2)^3 - \frac{1}{(x-2)^3}$ is:

यदि $\left(x - \frac{1}{x-2}\right) = 7$ है, तो $(x-2)^3 - \frac{1}{(x-2)^3}$ का मान है:

[A] 140

[B] 125

[C] 115

[D] 130

$$(x-2) - \frac{1}{(x-2)} = 5$$

$$\rightarrow 5^3 + 3 \times 5$$

90. If $x = \sqrt{10} + 3$, what is the value of $x^3 - \frac{1}{x^3}$?
 यदि $x = \sqrt{10} + 3$ है, तो $x^3 - \frac{1}{x^3}$ का मान कितना है?

RRB Group-D 2025

[A] 314

[C] 304

[B] 284

[D] 234

$$\begin{aligned} x &= \sqrt{10} + 3 \\ \frac{1}{x} &= \sqrt{10} - 3 \end{aligned}$$

$$x - \frac{1}{x} = 6$$

$$6^3 + 3 \times 6$$

91. If $x + \frac{1}{x} = \sqrt{13}$, then one of the values of $x^3 - \frac{1}{x^3}$ is:

यदि $x + \frac{1}{x} = \sqrt{13}$ है, तो $x^3 - \frac{1}{x^3}$ का एक मान है:

[A] $4\sqrt{11}$

[B] 32

[C] $4\sqrt{13}$

[D] 36

$3^3 + 3 \times 3 = 36$

$x - \frac{1}{x} = \sqrt{13^2 - 4} = 3$

92. If $x^4 = 322 - \frac{1}{x^4}$ and $x \geq 1$, then the value of $x^3 - \frac{1}{x^3}$ is:

यदि $x^4 = 322 - \frac{1}{x^4}$ और $x \geq 1$ है, तो $x^3 - \frac{1}{x^3}$ का मान ज्ञात कीजिए।

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

[A] 76

[B] 72

[C] 64

[D] 62

$$\rightarrow 4^3 + 3 \times 4 = 76$$

$$x^4 + \frac{1}{x^4} = 322$$

$$x^2 + \frac{1}{x^2} = \sqrt{322} = 18$$

$$x - \frac{1}{x} = \sqrt{18 - 2} = 4$$

93. If $x^4 - 83x^2 + 1 = 0$ and $x > 0$, find the value of $\sqrt{x^3 - x^{-3} + 28}$.

यदि $x^4 - 83x^2 + 1 = 0$ और $x > 0$ है, तो $\sqrt{x^3 - x^{-3} + 28}$ का मान ज्ञात कीजिए।

RRB NTPC Graduate Level CBT-1 2025

[A] 29

[B] 27

[C] 28

[B] 26

$$= \sqrt{\left(x^3 - \frac{1}{x^3}\right) + 28}$$

$$x^2 + \frac{1}{x^2} = 83$$

$$x - \frac{1}{x} = \sqrt{83 - 2} = 9$$

$$\Rightarrow x^3 - \frac{1}{x^3} = 9^3 + 3 \times 9 = 756$$

$$= \sqrt{784}$$

$$= 28$$

94. If $x(x - 5) = -1$, then the value of $x^3 (x^3 - 110) = ?$
 यदि $x(x - 5) = -1$ है, तो $x^3 (x^3 - 110)$ का मान ज्ञात करें।

[A] 0

[C] 1

~~[B] -1~~

[D] 2

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

$$\Rightarrow x + \frac{1}{x} = 5$$

$$\Rightarrow x^3 + \frac{1}{x^3} = 110 \Rightarrow x^3 - 110 = -\frac{1}{x^3}$$