

110. 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

[B] 18

[C] 16

[D] 20

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

$$\text{माना } x - 6 = y \\ \Rightarrow x = y + 6$$

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

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

111. 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

[B] 2207

[C] 1154

[D] 1286

माना $x + 4 = y$
 $\Rightarrow x = y - 4$

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

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

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

$$y^2 + \frac{1}{y^2} = 6^2 - 2 = 34$$

112. If $x^2 - 12x + 33 = 0$, then what is the value of $(x - 4)^4 + [1/(x - 4)^4]$?

यदि $x^2 - 12x + 33 = 0$ है, तो $(x - 4)^4 + [1/(x - 4)^4]$ का मान क्या है?

[A] 227

[B] 326

[C] 167

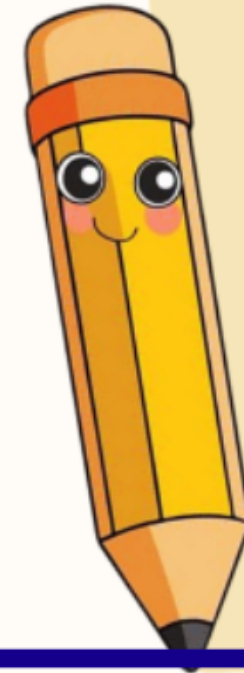
☒ [D] 194

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

तो $x^3 + \frac{1}{x^3} = k^3 - 3k$

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

तो $x^3 - \frac{1}{x^3} = k^3 + 3k$



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

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

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

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

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

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

$x^3 + \frac{1}{x^3} = 18, 52, 110, 198, 322, 488, 702, 970$

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

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

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



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

तो $z^{15} + \frac{1}{z^{15}} = 12^3 - 3 \times 12$
 $= 1692$



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

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

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

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

if, $x - \frac{1}{x} = 3, 4, 5, 6, \dots$

$$x^3 - \frac{1}{x^3} = 36, 76, 140, 234$$



if $x^{\cdot 8\sqrt{3}} \div \frac{1}{x^{\cdot 8\sqrt{3}}} = 8$

तो $x^{2 \cdot 4\sqrt{3}} \div \frac{1}{x^{2 \cdot 4\sqrt{3}}} = \frac{8^3 + 3 \times 8}{= 536}$

if, $x + \frac{1}{x} = 4 \quad \& \quad x > 1$

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

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

$$\sqrt{x}^3 = x\sqrt{x}$$

$$\sqrt{12} = \sqrt{4 \times 3} = 2\sqrt{3}$$



113. 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] $24\sqrt{3}$

$8 \times 3\sqrt{3}$

$(2\sqrt{3})^3 - 3 \times 2\sqrt{3} = 24\sqrt{3} - 6\sqrt{3}$

114. If $x^{0.18} + \frac{1}{x^{0.18}} = 8$, then find $x^{0.54} + \frac{1}{x^{0.54}}$?

यदि $x^{0.18} + \frac{1}{x^{0.18}} = 8$ है, तो $x^{0.54} + \frac{1}{x^{0.54}}$ ज्ञात कीजिये?

☒ [A] 488

[C] 523

[B] 536

[D] 62

$\rightarrow 8^3 - 3 \times 8$

115. 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

[C] 3030

[B] 3330

[D] 3420

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

116. If $\frac{a+b}{\sqrt{ab}} = 4$, then $\left(\frac{a}{b}\right)^{\frac{3}{2}} + \left(\frac{b}{a}\right)^{\frac{3}{2}} = ?$

यदि $\frac{a+b}{\sqrt{ab}} = 4$ है, तो $\left(\frac{a}{b}\right)^{\frac{3}{2}} + \left(\frac{b}{a}\right)^{\frac{3}{2}} = ?$ $4^3 - 3 \times 4$

☒ [A] 52

[B] 60

[C] 48

[D] 68

$$\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = 4$$

117. If $\left(x + \frac{1}{x}\right) = \frac{11}{5}$, what is the value of $\left(x^3 + \frac{1}{x^3}\right)$?

यदि $\left(x + \frac{1}{x}\right) = \frac{11}{5}$ है, तो $\left(x^3 + \frac{1}{x^3}\right)$ का मान ज्ञात करें।

[A] $4\frac{6}{125}$

[B] $5\frac{101}{125}$

[C] $10\frac{81}{125}$

[D] $17\frac{31}{125}$

$\rightarrow n \cdot (n^2 - 3)$

$= \frac{11}{5} \cdot \left(\frac{121}{25} - 3\right)$

$= \frac{11}{5} \times \frac{46}{25} = \frac{506}{125}$

118. If $\frac{x}{x^2-4x+1} = \frac{1}{9}$, then the value of $x^3 + \frac{1}{x^3}$ is:

यदि $\frac{x}{x^2-4x+1} = \frac{1}{9}$, तो $x^3 + \frac{1}{x^3}$ का मान ज्ञात कीजिए।

(RRB JE 2025)

[A] 729

[C] 1839

[B] 1256

[D] 2158

→ 2197-39

$$\frac{x^3-4x+1}{x} = 9$$

$$x-4+\frac{1}{x} = 9$$

$$x+\frac{1}{x} = 13$$

119. 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] $2\cos 2\theta$

☒ [C] $2\cos 3\theta$

[B] $\cos 3\theta$

[D] $\cos 2\theta$


$$\begin{aligned} & 8\cos^3\theta - 6\cos\theta \\ &= 2 \cdot (4\cos^3\theta - 3\cos\theta) \\ &= 2 \cdot \cos 3\theta \end{aligned}$$

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

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

[A] 10

[C] 11

[B] 12

[D] 8

$$\sqrt{x} + \frac{1}{\sqrt{x}} = 11$$

$$\sqrt{x} \cdot (\sqrt{x} - 11) = -1$$



121. 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

$$x + \frac{1}{x} = \sqrt{7}^2 + 2 = 9$$

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

122. 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

[B] 2194

☒ [C] 2158

[D] 2233

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

$$13^3 - 3 \times 13$$

123. 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

$$m^{14} + \frac{1}{m^{14}} = 23$$

$$m^{21} + \frac{1}{m^{21}} = 5^3 - 3 \times 5$$

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

124. 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

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

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

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

125. 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

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

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

126. If $4x^2 - 6x + 1 = 0$, then the value of $8x^3 + (8x^3)^{-1}$ is:

यदि $4x^2 - 6x + 1 = 0$, हो, तो $8x^3 + (8x^3)^{-1}$ का मान होगा?

[A] 36

[B] 13

[C] 18

[D] 11

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

$$(x)^3 + \frac{1}{(x)^3} = 3^3 - 3 \times 3$$

127. 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] $630\sqrt{3}$

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

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

$$= 630\sqrt{3}$$

128. If $X + \frac{1}{x+2} = 6$, determine the value of $(x+2)^3 + \frac{1}{(x+2)^3}$?

यदि $X + \frac{1}{(x+2)} = 6$, तो $(x+2)^3 + \frac{1}{(x+2)^3}$ का मान निर्धारित करें?

[A] 488

[B] 386

[C] 250

[D] 405

$\rightarrow 8^3 - 3 \times 8$

$$(x+2) + \frac{1}{(x+2)} = 8$$

129. 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

$6^3 - 3 \times 6$

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

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

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

130. 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~~

[C] ~~472~~

[B] ~~476~~

[D] 488

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

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

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

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

131. 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

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

$$a + \frac{1}{a} = 2 \times \frac{13}{1} = 26$$

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

$$= \dots 6 - \dots 8$$