

Foundation Batch



MATHS

Algebra

(बीजगणित)

Part -5

LIVE

20-12-2024

07:00PM



83. If $\left(x^2 - \frac{1}{x^2}\right) = 4\sqrt{6}$ and $x > 1$, what is the value of $\left(x^3 - \frac{1}{x^3}\right)$?

यदि $\left(x^2 - \frac{1}{x^2}\right) = 4\sqrt{6}$ और $x > 1$, $\left(x^3 - \frac{1}{x^3}\right)$ का मान क्या है?

(SSC CGL Pre 21/07/2023)

(a) $18\sqrt{2}$

(b) $24\sqrt{2}$

(c) $22\sqrt{2}$

(d) $20\sqrt{2}$

$$x^4 + \frac{1}{x^4} = (4\sqrt{6})^2 + 2$$
$$96 + 2 = 98$$

$$x^2 + \frac{1}{x^2} = \sqrt{98 + 2} = 10$$

$$x - \frac{1}{x} = \sqrt{10 - 2} = \underline{\underline{\sqrt{8}}}$$

$$\downarrow K^3 + 3K$$

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

$$8\sqrt{8} + 3\sqrt{8}$$

$$11\sqrt{8}$$

$$11 \times 2\sqrt{2}$$

$$= \underline{\underline{22\sqrt{2}}}$$

$$(\sqrt{a})^3 = a\sqrt{a}$$

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

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

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

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

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

$$x^8 + \frac{1}{x^8} = Q^2 - 2$$

$$\underbrace{x^4 - \frac{1}{x^4}}_{\rightarrow} = \left(x^2 - \frac{1}{x^2}\right) \left(x^2 + \frac{1}{x^2}\right)$$

$\downarrow$

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



$$\text{If } x + \frac{1}{x} = a, \text{ then, } x^4 + \frac{1}{x^4} = (a^2 - 2)^2 - 2$$

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



84. If $a + \frac{1}{a} = 3$, then the value of $a^4 + \frac{1}{a^4}$ is.

यदि $a + \frac{1}{a} = 3$ है, तब $a^4 + \frac{1}{a^4}$ का मान है।

(a) 81

(b) 27

(c) 47

(d) 48

$$a^2 + \frac{1}{a^2} = 3^2 - 2 = 7$$

$$a^4 + \frac{1}{a^4} = 7^2 - 2 = 47$$

(SSC CPO Pre 04/10/2023)

85. If $\left(x - \frac{1}{x}\right) = 10$, what is the value of $\left(x^4 - \frac{1}{x^4}\right)$

यदि $\left(x - \frac{1}{x}\right) = 10$, $\left(x^4 - \frac{1}{x^4}\right)$ का मान क्या है?

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

(a) 10406

(b) 10404

(c) 10400

(d) $1020\sqrt{104}$

$$\begin{aligned} x + \frac{1}{x} &= \sqrt{x^2 + 4} \\ &= \sqrt{10^2 + 4} \\ &= \sqrt{104} \end{aligned}$$

$$x - \frac{1}{x} = 10$$

$$\begin{aligned} x^2 + \frac{1}{x^2} &= 10^2 + 2 \\ &= 102 \end{aligned}$$

(SSC CGL Pre 26/07/2023)

$$10 \times 102 \times \sqrt{104}$$

$$1020\sqrt{104}$$

86. If $x > 1$ and $x^2 + \frac{1}{x^2} = 2\sqrt{5}$, what is the value of $\left(x^4 - \frac{1}{x^4}\right)$?

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

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

(a) $8\sqrt{5}$

(b) $4\sqrt{30}$

(c) $8\sqrt{6}$

(d) $4\sqrt{5}$

(SSC Selection Post 2023)

$$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$$

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

$$(x - \frac{1}{x})(x + \frac{1}{x})(x^2 + \frac{1}{x^2})$$

$$(\sqrt{2\sqrt{5} - 2})(\sqrt{2\sqrt{5} + 2})(2\sqrt{5})$$

$$\sqrt{(2\sqrt{5} - 2)(2\sqrt{5} + 2)} (2\sqrt{5})$$

$$\sqrt{20 - 4} \times 2\sqrt{5}$$

$$4 \times 2\sqrt{5} = 8\sqrt{5}$$

87. If $x^2 - \frac{1}{x^2} = 4\sqrt{2}$, what is the value of $x^4 - \frac{1}{x^4}$?

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

(a) $8\sqrt{2}$

(b) $24\sqrt{2}$

(c) $32\sqrt{2}$

(d) $16\sqrt{2}$

$$\begin{aligned} &\rightarrow x^4 + \frac{1}{x^4} = 32 + 2 \\ &= 34 \end{aligned}$$

$$\begin{aligned} &\downarrow \\ &x^2 + \frac{1}{x^2} = \sqrt{34 + 2} \\ &= 6 \end{aligned}$$

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

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

$$4\sqrt{2} \times 6$$

$$24\sqrt{2}$$

(SSC CGL Pre 27/07/2023)



88. If $\sqrt{x} - \frac{1}{\sqrt{x}} = 4$, then $x^2 + \frac{1}{x^2}$ is equal to:

यदि $\sqrt{x} - \frac{1}{\sqrt{x}} = 4$, तो $x^2 + \frac{1}{x^2}$ बराबर है:

A. 192

B. 326

~~C. 322~~

D. 256

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

$$x + \frac{1}{x} = 18$$

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

$$322$$



89. If $x - 3 = \frac{1}{2x}$, then find the value of $\left(x^4 + \frac{1}{16x^4}\right)$ is.

यदि $x - 3 = \frac{1}{2x}$ है, तो $\left(x^4 + \frac{1}{16x^4}\right)$ का मान ज्ञात कीजिए।

(a) 11

(b) $99\frac{1}{2}$

(c) 10

(d) 98

$$x - \frac{1}{2x} = 3$$

$$x^2 + \frac{1}{4x^2} = 3^2 + 2 \times 3 \times \frac{1}{2}$$

$$x^4 + \frac{1}{16x^4} = 10^2 - 2 \times 10 \times \frac{1}{4}$$

$$100 - \frac{1}{2} = 99\frac{1}{2}$$

(SSC CHSL Pre 16/04/2021)

90. If $x^4 + \frac{1}{x^4} = 1154$ ($x > 0$), then the value of $\left(x + \frac{1}{x}\right)$ is.

यदि $x^4 + \frac{1}{x^4} = \underline{1154}$ ($x > 0$) है, तो $\left(x + \frac{1}{x}\right)$ का मान ज्ञात करें।

(a) $\sqrt{32}$

(b) $\sqrt{34}$

(c) 18

(d) 6

$$x^2 + \frac{1}{x^2} = \sqrt{1154 + 2}$$
$$\sqrt{1156}$$
$$= 34$$

$$x + \frac{1}{x} = \sqrt{34 + 2} = \sqrt{36} = 6$$

(SSC CHSL Pre 09/08/2021)

$$x - \frac{1}{x} = \sqrt{34 - 2} = \underline{\underline{\sqrt{32}}}$$



91. If $k^4 + \frac{1}{k^4} = 194$, then find the value of $k^3 + \frac{1}{k^3}$ is.

यदि $k^4 + \frac{1}{k^4} = 194$ है, तो $k^3 + \frac{1}{k^3}$ का मान ज्ञात कीजिए।

(a) 42

(b) 18

(c) 52

(d) 36

$$k^2 + \frac{1}{k^2} = \sqrt{194 + 2} = 14$$

↓

$$k + \frac{1}{k} = \sqrt{14 + 2} = 4$$

↓

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

$$64 - 12 = 52$$

(SSC CGL Pre 02/12/2022)

$$\underline{\left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right)}$$

$$x^5 + \frac{1}{x} + x + \frac{1}{x^5}$$

$$\left[x^5 + \frac{1}{x^5} + \left(x + \frac{1}{x}\right) \right] - \left(x + \frac{1}{x}\right)$$

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

$$\left(x^2 + \frac{1}{x^2}\right)\left(x^3 - \frac{1}{x^3}\right)$$

$$x^5 - \frac{1}{x} + x - \frac{1}{x^5}$$

$$x^5 - \frac{1}{x^5} + \left(x - \frac{1}{x}\right) - \left(x - \frac{1}{x}\right)$$

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

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



If $x + \frac{1}{x} = a$, then, $x^5 + \frac{1}{x^5} = (a^2 - 2)(a^2 - 3a) - a$

If $x - \frac{1}{x} = a$, then, $x^5 - \frac{1}{x^5} = (a^2 + 1)(a^3 + 4a) + a$

92. If $\left(x + \frac{1}{x}\right) = 5$, then the value of $\left(x^5 + \frac{1}{x^5}\right)$ is.

यदि $\left(x + \frac{1}{x}\right) = 5$ है, तब $\left(x^5 + \frac{1}{x^5}\right)$ का मान है।

(a) 2515

(b) 2540

(c) 2535

(d) 2525

$$\left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$$

$$\rightarrow x^2 + \frac{1}{x^2} = 5^2 - 2 = 23$$

$$\begin{aligned} x^3 + \frac{1}{x^3} &= 5^3 - 3 \times 5 \\ &= 125 - 15 = 110 \end{aligned}$$

$$23 \times 110 - 5$$

$$2530 - 5$$

$$\underline{2525}$$

(SSC CHSL Pre 07/08/2023)



93. If $a + \frac{1}{a} = 7$, then $a^5 + \frac{1}{a^5}$ is equal to?

यदि $a + \frac{1}{a} = 7$ है, तो $a^5 + \frac{1}{a^5}$ का मान किसके बराबर है?

(a) 13127

(b) 14527

(c) 15127

(d) 11512

$$(a^2 + \frac{1}{a^2})(a^3 + \frac{1}{a^3}) - (a + \frac{1}{a})$$

$$a^2 + \frac{1}{a^2} = 7^2 - 2 = 47$$

$$a^3 + \frac{1}{a^3} = 7^3 - 3 \times 7$$

$$343 - 21$$

$$= 322$$

$$47 \times 322 - 7$$

$$15134 - 7$$

$$= 15127$$

(SSC CGL Pre 17/07/2023)

94. If $x - \frac{1}{x} = -6$, then what will be the value of $x^5 - \frac{1}{x^5}$?

यदि $x - \frac{1}{x} = -6$ है, तो $x^5 - \frac{1}{x^5}$ का मान कितना होगा?

(a) -8892

(b) -8896

(c) -8898

(d) -8886

(SSC CGL Pre 18/07/2023)

$$\left(x^2 + \frac{1}{x^2}\right)\left(x^3 - \frac{1}{x^3}\right) - \left(x - \frac{1}{x}\right)$$

$$x^2 + \frac{1}{x^2} = (-6)^2 + 2 = 38$$
$$x^3 - \frac{1}{x^3} = (-6)^3 + 3(-6) = -216 - 18 = -234$$

$$38 \times (-234) - (-6) = -8892 + 6 = -8886$$

$$= -234$$

95. If $x^2 - \sqrt{7}x + 1 = 0$, then what is the value of $x^5 + \frac{1}{x^5}$?

यदि $x^2 - \sqrt{7}x + 1 = 0$ है, तो $x^5 + \frac{1}{x^5}$ का मान क्या होगा?

(a) $21\sqrt{7}$ $x + \frac{1}{x} = +\sqrt{7}$

(b) $19\sqrt{7}$

(c) $17\sqrt{7}$

(d) None of these

(SSC CGL Mains 29/01/2022)

$$\rightarrow \left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$$

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

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

$$7\sqrt{7} - 3\sqrt{7}$$

$$5 \times 4\sqrt{7} - \sqrt{7}$$

$$20\sqrt{7} - \sqrt{7}$$

$$= 19\sqrt{7}$$

$$= 4\sqrt{7}$$

96. If $x > 0$ and $x^4 + \frac{1}{x^4} = 254$, what is the value of $x^5 + \frac{1}{x^5}$?

यदि $x > 0$ है और $x^4 + \frac{1}{x^4} = 254$ है, तब $x^5 + \frac{1}{x^5}$ का मान कितना है?

(a) $720\sqrt{2}$

(b) $723\sqrt{2}$

(c) $717\sqrt{2}$

(d) $726\sqrt{2}$

(SSC CGL Pre 14/07/2023)

$$x^2 + \frac{1}{x^2} = \sqrt{254 + 2} = 16$$

$$x + \frac{1}{x} = \sqrt{16 + 2} = \sqrt{18}$$

$$x^3 + \frac{1}{x^3} = (\sqrt{18})^3 - 3\sqrt{18}$$

$$18\sqrt{18} - 3\sqrt{18}$$

$$15\sqrt{18}$$

$$\underline{\underline{15\sqrt{18}}}$$

$$\left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$$

$$16 \times 15\sqrt{18} - \sqrt{18}$$

$$240\sqrt{18} - \sqrt{18}$$

$$239\sqrt{18}$$

$$9 \times 2$$

$$239 \times 3\sqrt{2}$$

$$717\sqrt{2}$$

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

$$x^6 + \frac{1}{x^6} = \left(x^2 + \frac{1}{x^2}\right)^3 - 3\left(x^2 + \frac{1}{x^2}\right)$$

$$x^3 + \frac{1}{x^3} = 3^3 - 3 \times 3 = 18 \quad \underline{\text{ex}}$$

↓
Square

$$(x^3)^2 + \frac{1}{(x^3)^2} = 18^2 - 2$$

322

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

$$x^2 + \frac{1}{x^2} = 3^2 - 2 = \textcircled{7}$$

$$(x^2)^3 + \frac{1}{(x^2)^3} = 7^3 - 3 \times 7 = \textcircled{322}$$

$$x^6 + \frac{1}{x^6}$$

$$x^6 - \frac{1}{x^6} = \left(x^3 - \frac{1}{x^3}\right) \left(x^3 + \frac{1}{x^3}\right)$$



$$\text{If } x + \frac{1}{x} = a, \text{ then, } x^6 + \frac{1}{x^6} = (a^3 - 3a)^2 - 2$$

$$x^6 - \frac{1}{x^6} = \left(x^3 - \frac{1}{x^3}\right) \left(x^3 + \frac{1}{x^3}\right)$$



97. If $x + \frac{1}{x} = 7$, then the value of $x^6 + \frac{1}{x^6}$ is?

यदि $x + \frac{1}{x} = 7$ है, तो $x^6 + \frac{1}{x^6}$ का मान क्या है?

(a) 103882

(b) 103862

(c) 113682

(d) 103682

$$x^2 + \frac{1}{x^2} = 7^2 - 2$$
$$= 47$$

6 4

$$x^6 + \frac{1}{x^6} = 47^3 - 3 \times 47$$

9 28

$$47(47^2 - 3)$$

$$(2209 - 3) \times 47 = 2206 \times 47$$

103682

98. If $\left(x + \frac{1}{x}\right) = 2\sqrt{2}$ and $x > 1$, what is the value of $\left(x^6 - \frac{1}{x^6}\right)$?

यदि $\left(x + \frac{1}{x}\right) = 2\sqrt{2}$ है, और $x > 1$ तब $\left(x^6 - \frac{1}{x^6}\right)$ का मान कितना है?

- (a) $140\sqrt{2}$
- (b) $144\sqrt{2}$
- (c) $116\sqrt{2}$
- (d) $128\sqrt{2}$

(SSC CGL Pre 19/07/2023)

$$\begin{aligned}x^3 + \frac{1}{x^3} &= (2\sqrt{2})^3 - 3 \times 2\sqrt{2} \\&= 16\sqrt{2} - 6\sqrt{2} \\&= 10\sqrt{2}\end{aligned}$$

$$\begin{aligned}&\left(x^3 - \frac{1}{x^3}\right)\left(x^3 + \frac{1}{x^3}\right) \\&= 14 \times 10\sqrt{2}\end{aligned}$$

$$140\sqrt{2}$$

99. If $\left(y - \frac{1}{y}\right) = 4$, find the value of $\left(y^6 + \frac{1}{y^6}\right)$

यदि $\left(y - \frac{1}{y}\right) = 4$, $\left(y^6 + \frac{1}{y^6}\right)$ का मान ज्ञात कीजिए।

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

(a) 5776

(b) 4096

(c) 5774

(d) 5778

$$y^6 + \frac{1}{y^6} = 18^3 - 3 \times 18$$
$$18 [18^2 - 3]$$

(SSC CGL Pre 25/07/2023)

$$18 \times 321$$
$$5778$$

100. If $\left(x - \frac{1}{x}\right) = 2\sqrt{2}$ and $x > 1$, what is the value of

$$\left(x^6 - \frac{1}{x^6}\right)?$$

यदि $\left(x - \frac{1}{x}\right) = 2\sqrt{2}$ और $x > 1$ है, तो $\left(x^6 - \frac{1}{x^6}\right)$ का मान क्या है?

(a) $420\sqrt{6}$

(b) $396\sqrt{6}$

(c) $372\sqrt{6}$

(d) $384\sqrt{6}$

(SSC CGL Pre 20/07/2023)

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

$$\sqrt{8+4}$$

$$= \sqrt{12}$$

$$\frac{1}{x^3} = (\sqrt{12})^3 - 3 \times \sqrt{12}$$

$$12\sqrt{12} - 3\sqrt{12}$$

$$9\sqrt{12}$$

$$= 18\sqrt{3}$$

$$x^3 - \frac{1}{x^3} = (2\sqrt{2})^3 + 3 \times 2\sqrt{2}$$
$$16\sqrt{2} + 6\sqrt{2}$$

$$22\sqrt{2}$$

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

$$22\sqrt{2} \times 18\sqrt{2}$$

$$396\sqrt{6}$$



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

यदि $x^2 + 3x + 1 = 0$ हो, तो $x^6 + \frac{1}{x^6}$ का मान क्या है?

(a) 320

☒ (b) 322

(c) 324

(d) N.O.T.

$$x + \frac{1}{x} + 3 = 0$$

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

$$x^2 + \frac{1}{x^2} = (-3)^2 - 2 = 7$$

$$x^6 + \frac{1}{x^6} = 7^3 - 3 \times 7 = 322$$

$$\underline{x^3 \times x^4 = x^7}$$

$$\left(x^3 + \frac{1}{x^3}\right) \left(x^4 + \frac{1}{x^4}\right)$$

$$x^7 + \frac{1}{x} + x + \frac{1}{x^7}$$

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

$$x^7 + \frac{1}{x^7} = \left(x^3 + \frac{1}{x^3}\right) \left(x^4 + \frac{1}{x^4}\right) - \left(x + \frac{1}{x}\right)$$



$$x^7 + \frac{1}{x^7} = \left(x^4 + \frac{1}{x^4}\right) \left(x^3 + \frac{1}{x^3}\right) - \left(x + \frac{1}{x}\right)$$

102. If $x + \frac{1}{x} = 3, x \neq 0$, then the value of $x^7 + \frac{1}{x^7}$ is?

यदि $x + \frac{1}{x} = 3, x \neq 0$ है, तो $x^7 + \frac{1}{x^7}$ का मान क्या है?

(a) 849

$$x^3 + \frac{1}{x^3} = 3^3 - 3 \times 3 = 18$$

(b) 746

(c) 749

$$x^2 + \frac{1}{x^2} = 3^2 - 2 = 7$$

(d) 843

$$x^4 + \frac{1}{x^4} = 7^2 - 2 = 47$$

$$\left(x^3 + \frac{1}{x^3}\right)\left(x^4 + \frac{1}{x^4}\right) - \left(x + \frac{1}{x}\right)$$

$$18 \times 47 - 3$$

$$846 - 3$$

$$= 843$$

(SSC CGL Mains 03/02/2022)

103. If $x > 0$ and $x^4 + \frac{1}{x^4} = 142$, what is the value of $x^7 + \frac{1}{x^7}$?

यदि $x > 0$ और $x^4 + \frac{1}{x^4} = 142$ है, $x^7 + \frac{1}{x^7}$ का मान क्या है?

(a) $1563\sqrt{14}$

(b) $1560\sqrt{14}$

(c) $1561\sqrt{14}$

(d) $1562\sqrt{14}$

(SSC CGL Pre 20/07/2023)

$$\begin{aligned} x^2 + \frac{1}{x^2} &= \sqrt{142 + 2} \\ &= 12 \end{aligned}$$

$$x + \frac{1}{x} = \sqrt{12 + 2} = \sqrt{14}$$

$$x^3 + \frac{1}{x^3} = (\sqrt{14})^3 - 3\sqrt{14}$$

$$14\sqrt{14} - 3\sqrt{14}$$

$$\left(x^3 + \frac{1}{x^3}\right)\left(x^4 + \frac{1}{x^4}\right) - \left(x + \frac{1}{x}\right)$$

$$11\sqrt{14} \times 142 - \sqrt{14}$$

$$1562\sqrt{14} - \sqrt{14}$$

$$\underline{1561\sqrt{14}}$$



$$(x^4 + \frac{1}{x^4})(x^4 - \frac{1}{x^4})$$

$$x^8 - \frac{1}{x^8} = \left(x^4 + \frac{1}{x^4}\right) \left(x^2 + \frac{1}{x^2}\right) \left(x + \frac{1}{x}\right) \left(x - \frac{1}{x}\right)$$

$$x^8 + \frac{1}{x^8} \xrightarrow{\text{Given}} \left(x - \frac{1}{x}\right) \xrightarrow{\text{Step II}} \left(x^2 + \frac{1}{x^2}\right)$$

$$\xrightarrow{\text{Step III}} \left(x^4 + \frac{1}{x^4}\right) \text{ VI } x^8 + \frac{1}{x^8}$$



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

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

$$\hookrightarrow x^2 + \frac{1}{x^2} = 1^2 + 2 = 3$$

$$x^4 + \frac{1}{x^4} = 3^2 - 2 = 7$$

$$x^8 + \frac{1}{x^8} = 7^2 - 2 = 47$$

(a) 47

(b) 3

(c) 119

(d) -1

(SSC CGL Pre 13/08/2021)

105. If $\left(x + \frac{1}{x}\right) = 5$ and $x > 1$, then the value of $\left(x^8 - \frac{1}{x^8}\right)$ is?

यदि $\left(x + \frac{1}{x}\right) = 5$ और $x > 1$ है, तो $\left(x^8 - \frac{1}{x^8}\right)$ का मान है?

(a) $60705\sqrt{21}$

(b) $60725\sqrt{21}$

(c) $60615\sqrt{21}$

(d) $60605\sqrt{21}$

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

$$x - \frac{1}{x} = \sqrt{5^2 - 4} = \sqrt{21}$$

$$x^2 + \frac{1}{x^2} = 5^2 - 2 = 23$$

$$x^4 + \frac{1}{x^4} = 23^2 - 2 = 527$$

$$\sqrt{21} \times 5 \times 23 \times 527$$

$$|21| 21 \times 5 \text{ रि} \\ \underline{60605 \text{ रि}}$$

107. If $\left(x - \frac{1}{x}\right) = \sqrt{6}$ and $x > 1$, what is the value of $\left(x^8 - \frac{1}{x^8}\right)$?

यदि $\left(x - \frac{1}{x}\right) = \sqrt{6}$ और $x > 1$ है, तो $\left(x^8 - \frac{1}{x^8}\right)$ का मान कितना है?

(a) $998\sqrt{15}$

(b) $1024\sqrt{15}$

(c) $992\sqrt{15}$

(d) $1012\sqrt{15}$

(SSC CGL Pre 17/07/2023)