Special case of
$$x + \frac{1}{x}$$

$x + \dfrac{1}{x} = \pm 2, \pm\sqrt{3}, \pm 1$

coaching center

Concept:

If $x + \dfrac{1}{x} = 2$ then $x = 1$

& If $x + \dfrac{1}{x} = -2$ then $x = -1$

If $x + \dfrac{1}{x} = \pm 2$

then $x = \pm 1$

Proof:

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

$$x^2 - 2x + 1 = 0$$

$$\Rightarrow (x-1)^2 = 0$$

$$\Rightarrow x - 1 = 0$$

$$\Rightarrow x = 1$$

$$x + \frac{1}{x} = 2 \quad \Rightarrow x = 1$$

$$\frac{a}{b} + \frac{b}{a} = 2 \quad \Rightarrow \frac{a}{b} = 1$$

$$\frac{x}{3} + \frac{3}{x} = -2 \quad \Rightarrow \frac{x}{3} = -1$$

$$x^5 + \frac{1}{x^5} = 2 \quad \Rightarrow x^5 = 1$$

3

257. **If $x + \dfrac{1}{x} = 2$, then $x^7 + \dfrac{1}{x^5} = ?$**

अगर $x + \dfrac{1}{x} = 2$ है तो $x^7 + \dfrac{1}{x^5} = ?$

a) 2^5 b) 2^{12} c) 2   d) 2^7

$x = 1$

$1 + \dfrac{1}{1} = 2$

258. If $x + \frac{1}{x} = -2$, then $x^{17} + \frac{1}{x^{19}} = ?$

अगर $x + \frac{1}{x} = -2$ है तो $x^{17} + \frac{1}{x^{19}} = ?$

a) 1   b) 0   c) 2   d) -2

$x = -1$

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

$(-1)^{17} + \frac{1}{(-1)^{19}}$

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

$= -1 - 1 = -2$

5

259. If $a + \dfrac{1}{a} = -2$ then the value of $a^{1000} + a^{-1000}$ is

यदि $a + \dfrac{1}{a} = -2$ तो $a^{1000} + a^{-1000}$ का मान निकालें

a) 2   b) 0   c) 1   d) $\dfrac{1}{2}$

$a = -1$

$1 + \dfrac{1}{a^{1000}} = 1 + 1 = 2$

If $a + \dfrac{1}{a} + 2 = 0$**, then the value of** $a^{37} - \dfrac{1}{a^{100}}$ **is**

अगर $a + \dfrac{1}{a} + 2 = 0$ **है तो** $a^{37} - \dfrac{1}{a^{100}}$ **का मान**

a) 0   b) -2   c) 1   d) 2

$$a + \frac{1}{a} = -2$$

$$a = -1$$

$$-1 - 1 = -2$$

261. If $\frac{a}{b} + \frac{b}{a} = 2$, then the value of $a - b = ?$

अगर $\frac{a}{b} + \frac{b}{a} = 2$ है तो $a - b = ?$

a) 2　　　　b) -1　　　　c) 0　　　　d) 1

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

$$\Rightarrow a = b$$

$$\Rightarrow a - b = 0$$

8

262. If $x + \dfrac{1}{1+x} = 1$, **then** $(x+1)^5 + \dfrac{1}{(x+1)^5} = ?$

अगर $x + \dfrac{1+1}{1+x} = 1 + $ है तो $(x+1)^5 + \dfrac{1}{(x+1)^5} = ?$

a) 1   b) 2   c) 4   d) 8

$$(x+1) + \dfrac{1}{(x+1)} = 2$$

$$\downarrow$$

$$1$$

$$1 + 1 = 2$$

$$x + 1 = 1$$

$$\Rightarrow x = 0$$

263. If $m + \dfrac{1}{m-2} = 4$, then $m^2 + \dfrac{9}{m} = ?$

अगर $m + \dfrac{1}{m-2} = 4$ है तो $m^2 + \dfrac{9}{m} = ?$

-2   -2

    a) 12   b) 9   c) 14   d) 10

$$(m-2) + \frac{1}{(m-2)} = 2$$

$$9 + \frac{\overset{3}{\cancel{9}}}{\cancel{3}} = 12$$

$$m - 2 = 1$$

$$\Rightarrow m = 3$$

10

264. **If** $x + \frac{1}{x+3} = -5$, **then** $x^2 + \frac{32}{x^2} = ?$

यदि $x + \frac{1}{x+3} = -5$ है, तो $x^2 + \frac{32}{x^2}$ का मान बराबर है :

a) 18   b) -18   c) 14   d) -14

$+3 \quad +3$

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

$$16 + \frac{\overset{2}{\cancel{32}}}{\cancel{16}} = 18$$

$$\Rightarrow \quad x+3 = -1$$

$$\Rightarrow \quad x = -4$$

coaching center

11

265. If $r + \frac{64}{r} = 16$, then the value of $r^4 + \frac{1}{r^3}$ is _____.

$\frac{1}{8}$ × यदि $\left(r + \frac{64}{r} = 16 \right)$ है, तो $r^4 + \frac{1}{r^3}$ का मान _____ है।

a) 4096

b) $4096\frac{1}{512}$

c) 512

d) $512\frac{1}{4096}$

$2^{10} = 1024$

$\frac{r}{8} + \frac{8}{r} = 2$

$\Rightarrow \frac{r}{8} = 1$

$\Rightarrow r = 8 = 2^3$

$(2^3)^4 + \frac{1}{8^3}$

$= 4096 + \frac{1}{512}$

266. If $\frac{x}{2} + \frac{18}{x} + 6 = 0$, then $(x+7)^{2021} + (x+5)^{-2021} = ?$

यदि $\frac{x}{2} + \frac{18}{x} + 6 = 0$ है, तो $(x+7)^{2021} + (x+5)^{-2021}$ का मान बराबर है :

a) 0   b) 1   c) 2   d) -1

$$\left(\frac{x}{2} + \frac{18}{x} = -6\right) \div 3$$

$$\frac{x}{6} + \frac{6}{x} = -2$$

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

$$\Rightarrow x = -6$$

$$\frac{1}{(-1)^{2021}} = \frac{1}{-1}$$

$$1 - 1 = 0$$

13

267. If $x^2 + \frac{1}{x^2} = 2$, $x < 0$, then $x^4 - x - 1 = ?$

यदि $x^2 + \frac{1}{x^2} = 2$, $x < 0$ है, तो $x^4 - x - 1$ का मान बराबर है :

a) -1   b) 1   c) 0   d) Can't say

$$\Rightarrow x^2 = 1$$

$$x = \pm 1$$

$$x = -1$$

$$1 + 1 - 1 = 1$$

14

268. If $m^4 + \dfrac{1}{m^2} + 2m = 0$ then $m^2 - \dfrac{1}{m^4} = ?$

$\dfrac{1}{m} \times$ यदि $\left(m^4 + \dfrac{1}{m^2} + 2m = 0\right)$ है, तो $m^2 - \dfrac{1}{m^4}$ का मान बराबर है :

a) 1   b) 0   c) -1   d) Can't say

$$m^3 + \dfrac{1}{m^3} + 2 = 0$$

$$\Rightarrow \quad m^3 + \dfrac{1}{m^3} = -2$$

$$\Rightarrow \quad m^3 = -1$$

$$\boxed{m^6 = 1}$$

$$\dfrac{m^6 - 1}{m^4} \Rightarrow \dfrac{1-1}{m^4} = 0$$

15

269. If $a + b = 10$ and $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$, then what is the value

of $3ab + 4a^2 + 5b^2$?

यदि $\overset{5}{a} + \overset{5}{b} = 10$ तथा $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$ है, तो $3ab + 4a^2 + 5b^2$ का

मान क्या है?

a) 450   b) 300   c) 600   d) 750

$\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = 2$

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

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

$= 12\,a^2$

$= 12 \times 25$
       $\underbrace{}_{4}$

$= 300$

$$\underbrace{x^2 + \frac{1}{x^2} + 2}_{} + y^2 + \frac{1}{y^2} + 2 = 0$$

$$\left(x + \frac{1}{x}\right)^2 + \left(y + \frac{1}{y}\right)^2 = 0$$

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

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

$$\Rightarrow x^2 = -1$$

If $x^2 + y^2 + \frac{1}{x^2} + \frac{1}{y^2} + 4 = 0$, **then** $x^2 + y^2 = ?$

अगर $x^2 + y^2 + \frac{1}{x^2} + \frac{1}{y^2} + 4 = 0$ **है तो** $x^2 + y^2 = ?$

$$-1 - 1 = -2$$

a) 2   b) 4   c) -2   d) -4

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

$$\underset{-2 \quad -2}{\diagdown\diagup}$$

$$= -2 \qquad\qquad = -2$$

$$\Rightarrow x^2 = -1 \qquad\qquad \Rightarrow y^2 = -1$$

17

271. If $a^4 + 1 = \left[\frac{a^2}{b^2}\right](4b^2 - b^4 - 1)$, then what is the value of $a^4 + b^4$?

यदि $a^4 + 1 = \left[\frac{a^2}{b^2}\right](4b^2 - b^4 - 1)$ है, तो $a^4 + b^4$ का मान क्या है?

a) 2   b) 16   c) 32   d) 64

$$1 + 1 = 2$$

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

$$\Rightarrow \left(a^2 + \frac{1}{a^2}\right) + \left(b^2 + \frac{1}{b^2}\right) = 4$$

$= 2 \qquad = 2$

$\qquad 2 \quad 2$

$\Rightarrow a^2 = 1 \qquad \Rightarrow b^2 = 1$

$\Rightarrow a^4 = 1 \qquad \Rightarrow b^4 = 1$

$$\frac{a^2 + 1}{a^2} - 2 + b^2 + \frac{1}{b^2} - 2 = 0$$

$$\left(a - \frac{1}{a}\right)^2 + \left(b - \frac{1}{b}\right)^2 = 0$$

$$a - \frac{1}{a} = 0$$

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

$$\Rightarrow a^2 = 1$$

18

272. If $ax + by - 2 = 0$ and $axby = 1$, where $a \neq 0, b \neq 0$, then what is $(a^2x + b^2y)$ equal to?

यदि $ax + by - 2 = 0$ और $axby = 1$ है, जहां $a \neq 0, b \neq 0$ हैं, तो $(a^2x + b^2y)$ किसके बराबर है ?

a) $a + b$ b) $2ab$ c) $a^3 + b^3$ d) $a^4 + b^4$

$$ax + by = 2$$

$$\Rightarrow ax + \frac{1}{ax} = 2$$

$$\Rightarrow ax = 1$$

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

$$\frac{ax \cdot by}{} = 1$$

$$by = \frac{1}{ax}$$

$$by = 1$$

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

$$a^2 \cdot \frac{1}{a} + b^2 \frac{1}{b}$$

$$= a + b$$

19

Case II

If $x + \dfrac{1}{x} = \pm\sqrt{3}$ then $x^3 + \dfrac{1}{x^3} = 0$ & $x^6 = -1$

Proof:

$x + \dfrac{1}{x} = \sqrt{3}$

$\Rightarrow x^3 + \dfrac{1}{x^3} = 3\sqrt{3} - 3\sqrt{3} = 0$

$x + \dfrac{1}{x} = -\sqrt{3}$

$x^3 + \dfrac{1}{x^3} = -3\sqrt{3} - \left(-3\sqrt{3}\right) = 0$

$x^3 + \dfrac{1}{x^3} = 0 \Rightarrow x^3 = \dfrac{-1}{x^3} \Rightarrow x^6 = -1$

20

$$\frac{x}{2} + \frac{2}{x} = \pm\sqrt{3}$$

$$\Rightarrow \left(\frac{x}{2}\right)^3 + \left(\frac{2}{x}\right)^3 = 0 \qquad \& \quad \left(\frac{x}{2}\right)^6 = -1$$

273. $\left(a + \frac{1}{a}\right)^2 = 3$, then $a^3 + \frac{1}{a^3} = ?$

अगर $\left(a + \frac{1}{a}\right)^2 = 3$ है तो $a^3 + \frac{1}{a^3} = ?$

a) $2\sqrt{3}$ b) 2   c) $3\sqrt{3}$ d) 0

$$a + \frac{1}{a} = \pm\sqrt{3}$$

274. If x is real, $x + \frac{1}{x} \neq 0$ and $x^3 + \frac{1}{x^3} = 0$, then the value of $\left(x + \frac{1}{x}\right)^4 = ?$

X एक वास्तविक संख्या है; अगर $x + \frac{1}{x} \neq 0$ और $x^3 + \frac{1}{x^3} = 0$, तो $\left(x + \frac{1}{x}\right)^4 = ?$

a) 4   b) 9   c) 16   d) 2

$x + \frac{1}{x} = \pm\sqrt{3}$ & $x^6 = -1$

$\left(\pm\sqrt{3}\right)^4 = 9$

23

275. If $\left(x + \frac{1}{x}\right)^2 = 3$, then what is the value of $x^6 + x^{-6}$?

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

a) 6   b) 2   c) -6 d) -2

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

$$\Rightarrow \quad x^6 = -1$$

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

$$= -1 - 1 = -2$$

276. If $x + \dfrac{1}{x} = \sqrt{3}$, then $x^{18} + x^{12} + x^6 + 1 =$?

अगर $x + \dfrac{1}{x} = \sqrt{3}$ है तो $x^{18} + x^{12} + x^6 + 1 =$?

a) 0   b) 1   c) 2   d) 3

$\Rightarrow x^6 = -1$

$x^6 = -1$

$(a^2)^3 = a^6$

$(x^6)^3 \quad (x^6)^2$

$(-1)^3 \quad (-1)^2$

$-1 \quad +1$

$-1 + 1 = 0$

277. If $x^2 - \sqrt{3}x + 1 = 0$, then $x^{36} + x^{24} + x^{12} - 2 = ?$

यदि $x^2 - \sqrt{3}x + 1 = 0$ है, तो $x^{36} + x^{24} + x^{12} - 2$ का मान बराबर है:

a) 1   b) 2   c) 3   d) 4

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

$$\Rightarrow x^3 + \frac{1}{x^3} = 0 \quad \& \quad x^6 = -1$$

$$\left(x^6\right)^6 + \left(x^6\right)^4 + \left(x^6\right)^2$$

$$= (-1)^6 + (-1)^4 + (-1)^2$$

$$= 1 + 1 + 1 - 2$$

$$= 1$$

26

278. If $\left(a + \frac{1}{a}\right)^2 = 3$, then the value of $a^{20} + a^{14} + a^8 + a^2 + 1 = ?$

अगर $\left(a + \frac{1}{a}\right)^2 = 3$ है तो $a^{20} + a^{14} + a^8 + a^2 + 1 = ?$

a) 0   b) 20   c) 1   d) -1

$$\Rightarrow a + \frac{1}{a} = \pm\sqrt{3}$$

$$\Rightarrow a^3 + \frac{1}{a^3} = 0 \quad \& \quad a^6 = -1$$

$$\boxed{a^6 + 1 = 0}$$

$$\underbrace{a^{14}(a^6 + 1)}_{0} + \underbrace{a^2(a^6 + 1)}_{0} + 1$$

$$0 \quad + \quad 0 + 1 = 1$$

$$a^{87} + a^{81} + \underbrace{a^{70} + a^{64}}_{0}$$

27

279. If $\left(x + \frac{1}{x}\right)^2 = 3$, then $x^{95} + x^{89} + x^{54} + x^{24} + x^6 + 1 = ?$

अगर $\left(x + \frac{1}{x}\right)^2 = 3$ है तो $\underbrace{x^{95} + x^{89}} + x^{54} + x^{24} + x^6 + 1 = ?$

a) 0   b) 1   c) 84   d) 206

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

$$\Rightarrow x^3 + \frac{1}{x^3} = 0 \quad \& \quad x^6 = -1$$

$$-1 + 1 - 1 + 1 = 0$$

28

280. If $x^3 + \frac{1}{x^3} = 0$ then the value of $x^{50} + \frac{1}{x^{50}}$ is

अगर $x^3 + \frac{1}{x^3} = 0$ है तो $x^{50} + \frac{1}{x^{50}}$ का मान बताओ।

a) $\frac{1}{\sqrt{3}}$ b) $\sqrt{3}$ c) 1   d) 0

$x^{48} \cdot x^2 + \dfrac{1}{x^{48} \cdot x^2}$

$x + \dfrac{1}{x} = \pm\sqrt{3}$ & $x^6 = -1$

$(x^6)^8 = (-1)^8$

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

$\Rightarrow x^{48} = 1$

$2x$

$3 - 2 = 1$

29

281. If $x + \frac{1}{x} + \sqrt{3} = 0$ then the value of $x^{17} + \frac{1}{x^{17}}$ is

अगर $x + \frac{1}{x} + \sqrt{3} = 0$ है तो $x^{17} + \frac{1}{x^{17}}$ का मान बताओ।

a) $-\sqrt{3}$ b) $\sqrt{3}$ c) 1   d) $\frac{1}{\sqrt{3}}$

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

$$\Rightarrow x^3 + \frac{1}{x^3} = 0 \quad \& \quad x^6 = -1$$

$$x^{18} = -1$$

$$\frac{x^{18}}{x} + \frac{x}{x^{18}}$$

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

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

$$= -(-\sqrt{3}) = \sqrt{3}$$

30

282. If $x + \frac{1}{x} = \sqrt{3}$, then $x^{75} + \frac{1}{x^{75}} = ?$

यदि $x + \frac{1}{x} = \sqrt{3}$ है, तो $x^{75} + \frac{1}{x^{75}}$ का मान बराबर है:

a) $\sqrt{3}$ b) $-\sqrt{3}$ c) 0   d) -1

$x^3 + \frac{1}{x^3} = 0$ & $x^6 = -1$

$(x^6)^{12} = (-1)^{12}$

$\Rightarrow x^{72} = 1$

$x^{72} x^3 + \frac{1}{x^{72} x^3}$

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

$= 0$

31

283. If $x^4 + \dfrac{1}{x^4} = \sqrt{3}$, then $x^{124} + x^{100} + x^{96} + x^{72} + x^{52} + \dfrac{1}{x^{52}} =$?

यदि $x^4 + \dfrac{1}{x^4} = \sqrt{3}$ है, तो $\underbrace{x^{124} + x^{100}}_{0} + \underbrace{x^{96} + x^{72}}_{0} + x^{52} + \dfrac{1}{x^{52}}$ का मान बराबर है:

a) 1   b) 0   c) $\sqrt{3}$ d) $-\sqrt{3}$

$a^1 + \dfrac{1}{a^1} = \sqrt{3} \implies a^3 + \dfrac{1}{a^3} = 0$ & $a^6 = -1$

→ chi multiple/की gap

$x^4 + \dfrac{1}{x^4} = \sqrt{3} \implies x^{12} + \dfrac{1}{x^{12}} = 0$ & $x^{24} = -1$

$x^{48} = 1$

$x^{48} \cdot x^4 + \dfrac{1}{x^{48} \cdot x^4} = x^4 + \dfrac{1}{x^4} = \sqrt{3}$

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Case III:

If $x + \dfrac{1}{x} = 1$ then $x^3 = -1$

If $x + \dfrac{1}{x} = -1$ then $x^3 = 1$

If $x + \dfrac{1}{x} = \pm 1$

then $x^3 = \mp 1$

Proof:

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

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

$$\boxed{x^3 = -1}$$

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

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

284. If $\frac{x}{y} + \frac{y}{x} = -1$ (x, y $\neq$ 0), then find the value of $x^3 - y^3$.

यदि $\frac{x}{y} + \frac{y}{x} = -1$ (x, y $\neq$ 0) है, तो $x^3 - y^3$ का मान ज्ञात करो।

a) 1   b) -1   c) 0   d) 2

$$\Rightarrow \left(\frac{x}{y}\right)^3 = 1$$

$$\Rightarrow x^3 = y^3$$

$$\Rightarrow x^3 - y^3 = 0$$

36

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

यदि $\frac{x}{3} + \frac{3}{x} = 1$ हो तो x^3 का मान ज्ञात करो ।

a) 1   b) -1 c) 27   d) -27

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

$$\Rightarrow \frac{x^3}{27} = -1$$

$$\Rightarrow x^3 = -27$$

$$x^3 = -27$$

$$\Rightarrow x^3 + 27 = 0$$

$$\Rightarrow x^3 + 3^3 = 0$$

$$\Rightarrow (x+3)(x^2 - 3x + 9) = 0$$

either $x + 3 = 0 \longrightarrow x = -3$

OR $x^2 - 3x + 9 = 0 \longrightarrow x = 2$ Values.

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286. If $\frac{x}{2} + \frac{2}{x} + 1 = 0$ then find the value of x^3

यदि $\frac{x}{2} + \frac{2}{x} + 1 = 0$ हो तो x^3 का मान ज्ञात करो |

a) 1   b) -1   c) 8   d) -8

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

$$\Rightarrow \left(\frac{x}{2}\right)^3 = 1$$

$$\Rightarrow x^3 = 8$$

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287. If $x + \frac{1}{x} = 1$ then the value of $x^{49} + \frac{1}{x^{49}}$ is

अगर $x + \frac{1}{x} = 1$ है तो $x^{49} + \frac{1}{x^{49}}$ का मान बताओ।

a) -1   b) $\sqrt{3}$ c) 1   d) 0

$$x^3 = -1$$

$$(x^3)^{16} = (-1)^{16}$$

$$\Rightarrow x^{48} = 1$$

$$x^{48} \cdot x + \frac{1}{x^{48} \cdot x}$$

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

$$= 1$$

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288. If $x + \frac{1}{x} = 1$ then find the value of $x^{52} + \frac{1}{x^{52}}$

यदि $x + \frac{1}{x} = 1$ है तो $x^{52} + \frac{1}{x^{52}}$ का मान ज्ञात कीजिये |

a) 0   b) -1   c) 1   d) 2

$$x^3 = -1$$

$$\Rightarrow x^{51} = -1$$

$$x^{51} \cdot x + \frac{1}{x^{51} \cdot x}$$

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

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

$$= -1$$

40

If $x + \frac{1}{x} - 1 = 0$ then the value of $x^{26} + \frac{1}{x^{26}}$ is

(HW)

अगर $x + \frac{1}{x} - 1 = 0$ है तो $x^{26} + \frac{1}{x^{26}}$ का मान बताओ|

a) $-\sqrt{3}$ b) -1   c) 1   d) $\frac{1}{\sqrt{3}}$

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

$\Rightarrow x^3 = -1$

$\Rightarrow (x^3)^9 = (-1)^9$

$\Rightarrow x^{27} = -1$

$\frac{x^{27}}{x} + \frac{x}{x^{27}}$

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

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

$= -1$

41

290. If $x^{\frac{1}{4}} + \frac{1}{x^{\frac{1}{4}}} = 1$, then find the value of $x^{52} + \frac{1}{x^{52}}$

यदि $x^{\frac{1}{4}} + \frac{1}{x^{\frac{1}{4}}} = 1$ हो तो $x^{52} + \frac{1}{x^{52}}$ का मान ज्ञात करो।

a) 0   b) -1   c) 1   d) 2

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

$x^{\frac{3}{4} \times 4} = (-1)^4$

$\Rightarrow x^3 = 1$

$x^{51} = 1$

$x^{51} \cdot x + \frac{1}{x^{51} \cdot x}$

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

If $a + \frac{1}{a} = 1 \quad \Rightarrow a^3 = -1$

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

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

$2x$

291. If $x + \frac{1}{x} = 1$,

Find $x^{103} + x^{100} + x^{90} + x^{87} + x^{81} + x^{72} + x^{54} + x^{45} + x^3 + 3$

यदि $x + \frac{1}{x} = 1$ है, तो

$x^{103} + x^{100} + x^{90} + x^{87} + x^{81} + x^{72} + x^{54} + x^{45} + x^3 + 3$ का मान ज्ञात करो।

a) 0   b) 1   c) 2   d) 3

$x^3 = -1$

Powers = 3 का multiple
3 का gap

$(x^3)^{27} + (x^3)^{24}$

$(-1)^{27} + (-1)^{24}$

$-1 + 1 + 1 - 1 - 1 + 3$

$= 2$

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