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

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

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

$x - \frac{1}{x} = 4$, $x^2 + \frac{1}{x^2} = 4^2 + 2$ 18

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

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

1. If $x + \frac{1}{x} = 7$, find the value of $x^3 + \frac{1}{x^3}$.

यदि $x + \frac{1}{x} = 7$, तो $x^3 + \frac{1}{x^3}$ का मान ज्ञात कीजिए

A) 343

B) 332

C) 340

~~D) 322~~

$7^3 - 3 \times 7$

$343 - 21 \Rightarrow$ 322

④ if $x - \frac{1}{x} = k$, $x^3 - \frac{1}{x^3} = k^3 + 3k$

$x - \frac{1}{x} = 3$, $x^3 - \frac{1}{x^3} = 3^3 + 3 \times 3$ 36

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

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

A) 27

B) 81

C) 48

~~D) 47~~

$$\begin{aligned}
 &a + \frac{1}{a} = 3 \\
 &\rightarrow a^2 + \frac{1}{a^2} = 3^2 - 2 = \textcircled{7} \\
 &\rightarrow a^4 + \frac{1}{a^4} = 7^2 - 2 = 49 - 2 = \textcircled{47}
 \end{aligned}$$

$$a + \frac{1}{a} = k$$

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

$$322 \times 47 =$$

$$15134 - 7$$

$$\boxed{15127}$$

Ans

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

यदि $a + \frac{1}{a} = 7$, तो $a^5 + \frac{1}{a^5}$ इसके बराबर है:

A) 15127

B) 13127

C) 14527

D) 11512

$$a + \frac{1}{a} = 7$$

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

$$a^3 + \frac{1}{a^3} = 7^3 - 3 \times 7 \quad (322)$$

$$\begin{array}{r} 322 \\ \times 47 \\ \hline 2254 \\ 1288 \times \\ \hline 15134 \\ - 7 \\ \hline 15127 \end{array}$$

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

$$x - \frac{1}{x} = \sqrt{10^2 - 4} \Rightarrow \sqrt{96}$$

$$x^3 - \frac{1}{x^3} = (\sqrt{96})^3 + 3\sqrt{96}$$

4. If $x + \frac{1}{x} = 10$, then $x^3 - \frac{1}{x^3}$ is equal to:

यदि $x + \frac{1}{x} = 10$, तो $x^3 - \frac{1}{x^3}$ इसके बराबर है:

A) 970

B) 1000

C) 1030

D) 1100

$$10^3 - 3 \times 10 = 970$$

$$\rightarrow x + \frac{1}{x} = k, \quad x - \frac{1}{x} = \sqrt{k^2 - 4}$$

$$\rightarrow x - \frac{1}{x} = k, \quad x + \frac{1}{x} = \sqrt{k^2 + 4}$$

$$3\left(y - \frac{1}{y}\right) = 5$$

$$y - \frac{1}{y} = \frac{5}{3}$$

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

$$\frac{y^4 - 1}{y^2} = \frac{25}{9} + 2 \Rightarrow \frac{43}{9}$$

5. If $\left(3y - \frac{3}{y}\right) = 5$, find the value of $\left(y^2 + \frac{1}{y^2}\right)$.

यदि $\left(3y - \frac{3}{y}\right) = 5$, तो $\left(y^2 + \frac{1}{y^2}\right)$ का मान ज्ञात कीजिए।

A) $\frac{47}{9}$

B) $\frac{49}{9}$

C) $\frac{41}{9}$

☒ D) $\frac{43}{9}$

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

$$\left(x - \frac{1}{x}\right)^2 = 9^2$$

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

$$(\sqrt{85})^3 - 3 \times \sqrt{85}$$

$$\sqrt{85}(85 - 3)$$

$$\underline{\underline{\sqrt{85} \times 82}}$$

$$\left(x + \frac{1}{x}\right)^2 = 85$$

$$\underline{\underline{x + \frac{1}{x} = \sqrt{85}}}$$

$$729 + 27$$

$$\underline{\underline{756}}$$

6. If $x > 1$ and $x^2 + \frac{1}{x^2} = 83$ then, $x^3 + \frac{1}{x^3}$ is.

यदि $x > 1$ और $x^2 + \frac{1}{x^2} = 83$ तो, $x^3 + \frac{1}{x^3}$ है।

(a) 884

(b) 876

(c) 754

(d) 756

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

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

$$\left(x - \frac{1}{x}\right)^2 = 9^2$$

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

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

7. If $\sqrt{x} + \frac{1}{\sqrt{x}} = 7$ then the value of $x + \frac{1}{x}$ is equal to:

यदि $\sqrt{x} + \frac{1}{\sqrt{x}} = 7$ तो $x + \frac{1}{x}$ का मान बराबर है:

- (a) 47
- (b) 49
- (c) 51
- (d) 45

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

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

$$(\sqrt{x})^2 = \sqrt{x} \times \sqrt{x} = \boxed{x}$$

$$\sqrt{x} - \frac{1}{\sqrt{x}} = 7$$

Ans. $x + \frac{1}{x} = 49 + 2$ (51)

Ans. $x^2 + \frac{1}{x^2} = (51)^2 - 2$

$2601 - 2$
2599 Ans

8. If $\sqrt{x} - \frac{1}{\sqrt{x}} = 7$ then $x^2 + \frac{1}{x^2}$ is equal to:

यदि $\sqrt{x} - \frac{1}{\sqrt{x}} = 7$ तो $x^2 + \frac{1}{x^2}$ इसके बराबर है:

(a) 192

(b) 326

(c) 322

(d) 256

$$\left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2 = (7)^2$$

$$x + \frac{1}{x} - 2 \times \sqrt{x} \times \frac{1}{\sqrt{x}} = 49$$

$$x + \frac{1}{x} = 51$$

$$x^2 + \frac{1}{x^2} = \underline{51^2 - 2}$$

9. If $\left(x + \frac{1}{x}\right) = 7, x > 0$, The positive value of $\left(x - \frac{1}{x}\right)$ is.

यदि $\left(x + \frac{1}{x}\right) = 7, x > 0$, $\left(x - \frac{1}{x}\right)$ का धनात्मक मान।

A) $5\sqrt{4}$

B) $5\sqrt{5}$

C) $3\sqrt{5}$

D) $4\sqrt{5}$

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

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

$$\sqrt{49 - 4}$$

$$\sqrt{45}$$

$$\sqrt{9 \times 5}$$

$$3\sqrt{5}$$

Ans

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

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

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

10. If x is an integer such that $x + \frac{1}{x} = \frac{65}{8}$, then find the value of $x - \frac{1}{x}$.

यदि x एक पूर्णांक है जैसे $x + \frac{1}{x} = \frac{65}{8}$, तो $x - \frac{1}{x}$ का मान ज्ञात कीजिए।

A) $\frac{63}{6}$

☒ B) $\frac{63}{8}$

C) $\frac{36}{8}$

D) $\frac{32}{6}$

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

$$\frac{63}{8}$$

$$x - \frac{1}{x} = \frac{0.4}{10} \quad \text{5/10}$$

$$x + \frac{1}{x} = \sqrt{\frac{4}{25} + 4}$$

$$\sqrt{\frac{26 \times 4}{25}} = \frac{2}{5} \sqrt{26}$$

11. If $\left(x - \frac{1}{x}\right) = 0.4$, and $x > 0$, what is the value of $\left(x^2 - \frac{1}{x^2}\right)$?

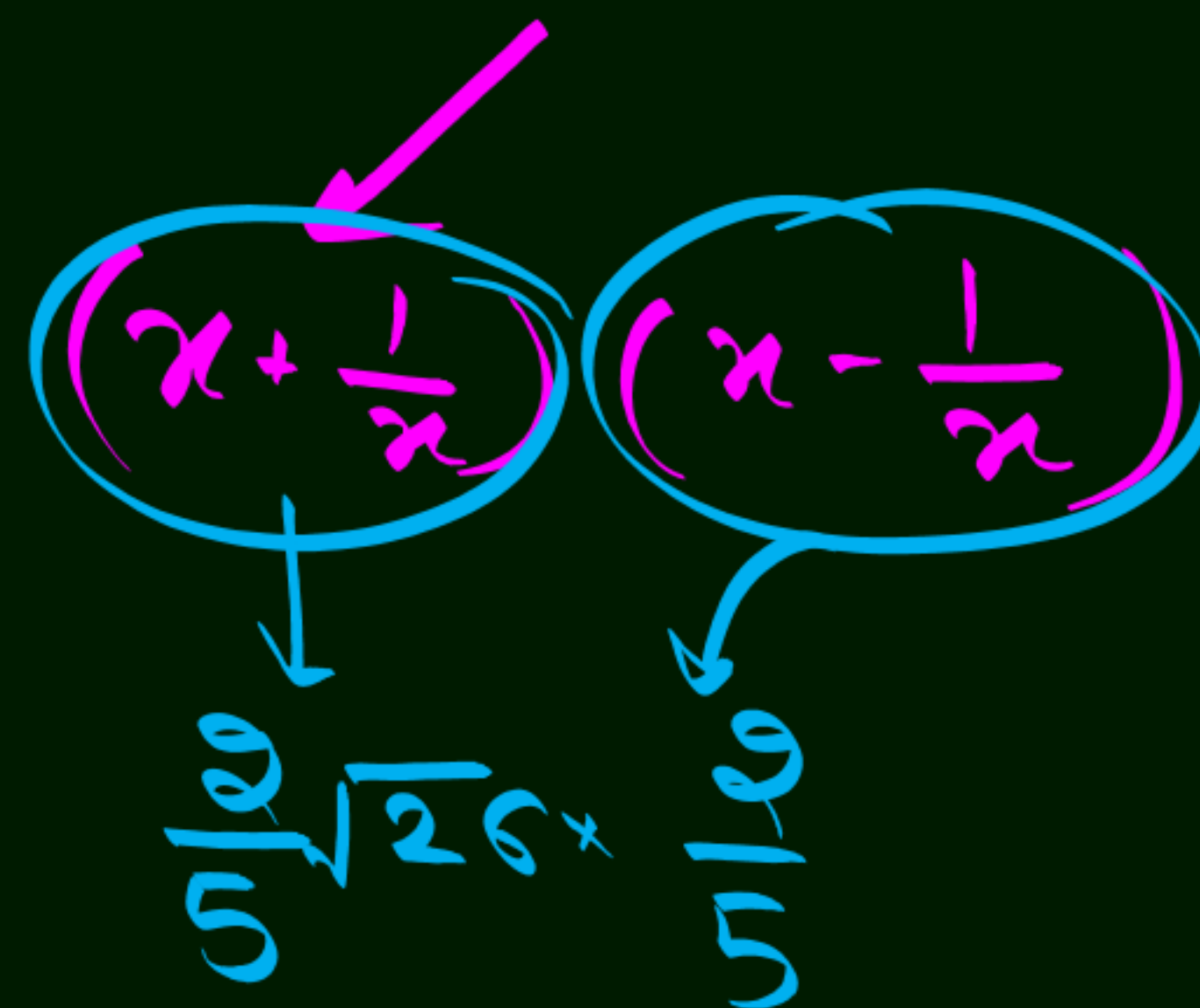
यदि $\left(x - \frac{1}{x}\right) = 0.4$, और $x > 0$, तो $\left(x^2 - \frac{1}{x^2}\right)$ का मान क्या है?

A) $\frac{4}{25} \sqrt{26}$

B) $\frac{2}{25} \sqrt{29}$

C) $\frac{7}{25} \sqrt{26}$

D) $\frac{3}{25} \sqrt{29}$



Ans

$$\frac{4}{25} \sqrt{26}$$

12. If $\left(x^2 + \frac{1}{x^2}\right) = 6$, and $0 < x < 1$, what is the value of $x^4 - \frac{1}{x^4}$?

यदि $\left(x^2 + \frac{1}{x^2}\right) = 6$, और $0 < x < 1$, तो $x^4 - \frac{1}{x^4}$ का मान क्या है?

A) $24\sqrt{2}$

~~B) $-24\sqrt{2}$~~

C) $-12\sqrt{10}$

D) $12\sqrt{10}$

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

$$4\sqrt{2}$$

$$\sqrt{36-4}$$

$$\sqrt{32}$$

$$\sqrt{16 \times 2}$$

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

$$\boxed{-24\sqrt{2}}$$

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

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

यदि $x + \frac{1}{x} = 15$ तो $\frac{7x^2 - 9x + 7}{x^2 - x + 1}$ का मान है:

A) $-\frac{48}{7}$

B) $-\frac{22}{7}$

~~C) $\frac{48}{7}$~~

D) $\frac{22}{7}$

$$\frac{7x - 9 + \frac{7}{x}}{x - 1 + \frac{1}{x}}$$

$$\frac{7\left(x + \frac{1}{x}\right) - 9}{\left(x + \frac{1}{x}\right) - 1} = \frac{7 \times 15 - 9}{15 - 1} = \frac{105 - 9}{14} = \frac{96}{14} = \frac{48}{7}$$

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

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

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

A) 3.5

B) 4.5

C) 2.5

D) 5.5

$$\frac{7}{x + \frac{1}{x} - 8}$$

$$\frac{7}{10-8} = \frac{7}{2}$$

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

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

$$125 - 15$$

$$\boxed{110}$$

15. If $x + \frac{1}{x} = 5, x \neq 0$ then the value of $\frac{x^4 + \frac{1}{x^2}}{x^2 - 3x + 1}$ is equal to:

यदि $x + \frac{1}{x} = 5, x \neq 0$ तो $\left(\frac{x^4 + \frac{1}{x^2}}{x^2 - 3x + 1}\right)$ का मान बराबर है:

A) 55

B) 60

C) 65

D) 50

$$\frac{110}{2} = 55$$

$$\boxed{55}$$

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

$$\frac{x^2 + 3x + 1}{x} = \frac{0}{x}$$

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

$$\begin{aligned} x^3 + \frac{1}{x^3} &= (-3)^3 - 3 \times (-3) \\ &= -27 + 9 = -18 \\ \text{Ans. } x^6 + \frac{1}{x^6} &= (-18)^2 - 2 \\ &= 324 - 2 = 322 \end{aligned}$$

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

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

A) 324

~~B) 322~~

C) 318

D) 327

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

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

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

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

$$125 - 15$$

$$\boxed{110}$$

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

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

A) 110

B) 130

C) 160

D) 180

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

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

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

$$27 - 9 = 18$$

18. If $x^2 - 3x + 1 = 0$, then the value of $\frac{x^4 + \frac{1}{x^2}}{x^2 + 5x + 1}$ is:

यदि $x^2 - 3x + 1 = 0$, तो $\frac{x^4 + \frac{1}{x^2}}{x^2 + 5x + 1}$ का मान है:

A) $\frac{9}{4}$

B) $\frac{27}{8}$

C) $\frac{5}{2}$

D) 2

$$\frac{18}{4}$$

$$\frac{9}{2}$$

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

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

$$3 \left(x + \frac{1}{9x} \right) = 3 \times 3$$

$$3x + \frac{1}{3x} = 9$$

$$9x^2 + \frac{1}{9x^2} = 81 - 2 \times 3 \times \frac{1}{3}$$

79

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

यदि $x + \frac{1}{9x} = 3$ तो $9x^2 + \frac{1}{9x^2}$ का मान है:

(a) 87

(b) 81

(c) 77

(d) 79

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

$$\frac{3}{5} \times \left(5x + \frac{1}{3x} \right) = \frac{5 \times 3}{5}$$

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

$$9x^2 + \frac{1}{25x^2} = 9 - 2 \times 3 \times \frac{1}{5}$$

$$9 - 1.2$$

$$\boxed{7.8}$$

20. If $5x + \frac{1}{3x} = 5$, find the value of $9x^2 + \frac{1}{25x^2}$

यदि $5x + \frac{1}{3x} = 5$, तो $9x^2 + \frac{1}{25x^2}$ का मान ज्ञात कीजिए

(a) 0

(b) 5

(c) 4

(d) 7.8

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

21. If $3x + \frac{1}{2x} = 5$ then find $8x^3 + \frac{1}{27x^3}$

यदि $3x + \frac{1}{2x} = 5$ तो $8x^3 + \frac{1}{27x^3}$ खोजें

A) $118\frac{1}{2}$

B) $30\frac{10}{27}$

C) 0

D) 1

22. If $5x + \frac{1}{3x} = 4$, then the value of $9x^2 + \frac{1}{25x^2}$ is:

यदि $5x + \frac{1}{3x} = 4$, तो $9x^2 + \frac{1}{25x^2}$ का मान है:

- A) $\frac{174}{125}$
- B) $\frac{144}{125}$
- C) $\frac{114}{25}$
- D) $\frac{119}{25}$

23. If $x^2 + \frac{1}{x^2} = 27$, then find

यदि $x^2 + \frac{1}{x^2} = 27$, तो ज्ञात कीजिए

i) $x + \frac{1}{x}$

ii) $x - \frac{1}{x}$

24. If $x^4 + x^{-4} = 47$, ($x > 0$), then the value of $(2x - 3)^2$ is:

यदि $x^4 + x^{-4} = 47$, ($x > 0$), तो $(2x - 3)^2$ का मान है:

A) 2

B) 3

C) 5

D) 4

25. If $x^4 + x^{-4} = 194$, ($x > 0$), then the value of $(2x - 4)^2$ is:

यदि $x^4 + x^{-4} = 194$, ($x > 0$), तो $(2x - 4)^2$ का मान है:

A) 15

B) 20

C) 12

D) 16

26. If $x + \frac{1}{x} = 2$, then find the value of

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

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

A) -15

B) 15

C) -10

D) 10

27. If $x + \frac{1}{x} = 2$, then find the value of $\left(x^{2723} + \frac{1}{x^{3356}}\right)$.

यदि $x + \frac{1}{x} = 2$, तो $\left(x^{2723} + \frac{1}{x^{3356}}\right)$ का मान ज्ञात कीजिए।

A) 1

B) 2

C) 0

D) -1

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

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

A) 6

B) 2

C) -2

D) -6

29. If $x + \frac{1}{x} = \sqrt{3}$, then the value of $x^{18} + x^{12} + x^6 + 1$ is:

यदि $x + \frac{1}{x} = \sqrt{3}$, तो $x^{18} + x^{12} + x^6 + 1$ का मान है:

- A) 0
- B) 2
- C) 3
- D) 1

30. If $x = 2 + \sqrt{3}$, find $x + \frac{1}{x}$

यदि $x = 2 + \sqrt{3}$, तो $x + \frac{1}{x}$ खोजें

A) 5

B) 4

C) -4

D) $2\sqrt{3}$

31. If $x = 7 + 5\sqrt{3}$, find $x - \frac{1}{x}$

यदि $x = 7 + 5\sqrt{3}$, खोजें $x - \frac{1}{x}$

A) $8\sqrt{3}$

B) 4

C) -4

D) $-2\sqrt{3}$

THANK YOU



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