$$\begin{cases} (a+b)^3 = a^3+b^3+3a^2b+3ab^2 = a^3+b^3+3ab(a+b) \\ (a-b)^3 = a^3-b^3-3a^2b+3ab^2 = a^3-b^3-3ab(a-b) \end{cases}$$

$$\begin{cases} a^3+b^3 = (a+b)^3-3ab(a+b) = (a+b)(a^2+b^2-ab) \\ a^3-b^3 = (a-b)^3+3ab(a-b) = (a-b)(a^2+b^2+ab) \end{cases}$$

86. If $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ and $(x^2 - y^2) : (x - y) = 7 : 1$, then the ratio $2x : 3y$ equals

अगर $(x^3 - y^3) : (x^2 + xy + y^2) = 5 : 1$ और $(x^2 - y^2) : (x - y) = 7 : 1$ है तो $2x : 3y$ पता करो|

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

$x - y = 5$

$x + y = 7$

$x = \frac{5+7}{2} = 6$

$y = \frac{7-5}{2} = 1$

$\frac{2x}{3y} = \frac{12}{3} \frac{4}{1}$

87. Simplify the following expression.

निम्नलिखित व्यंजक को हल कीजिए।

$$\frac{(62 \times 62 \times 62) - 3(62 \times 62 \times 22) + 3(62 \times 22 \times 22) - (22 \times 22 \times 22)}{8 \times 8 \times 8}$$

a) 225 b) 1250 c) 125 d) 25

a b

$(62-22)^3$

$$\frac{a^3 - 3a^2b + 3ab^2 - b^3}{8 \times 8 \times 8} = \frac{40 \times 40 \times 40}{8 \times 8 \times 8}$$

5 5 5

88. $\frac{(253)^3+(247)^3}{25.3\times2.53-62.491+2.47\times24.7} = 50\times10^k,\ k=?$

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

$a^3+b^3 = (a+b)(\quad)$

a^2-ab+b^2

$1000\times500 = 50\times10^k$

$= 50\times10^4 = 50\times10^k$

$(250+3)(250-3)$

$\frac{57}{1.312} = \frac{57\times1000}{1312}$

62500

-9

89. $\frac{775\times775\times775+225\times225\times225}{77.5\times77.5+22.5\times22.5-77.5\times22.5}$ is equal to:

$\frac{775\times775\times775+225\times225\times225}{77.5\times77.5+22.5\times22.5-77.5\times22.5}$ का मान ज्ञात करें।

a) 100 b) 10000

c) 100000 d) 10

a^3+b^3

a^2+b^2-ab

100×1000

$$\frac{1}{25} \times \frac{(a+b)(\quad)}{a^2-ab+b^2} \qquad \frac{a^3+b^3}{}$$

$$= \frac{1}{25} \times \frac{013}{1000}$$

$$= \frac{1}{10^3} \times \frac{13}{25}$$

$$= 10^{-3} \times \frac{13}{25}$$

$$\frac{1}{a^n} = a^{-n}$$

90. Simplify the following.

$$\frac{0.01 \times 0.01 \times 0.01 + 0.003 \times 0.003 \times 0.003}{0.05 \times 0.05 - 0.015 \times 0.05 + 0.015 \times 0.015}$$

निम्नलिखित को सरलीकरण कीजिए|

$$\frac{0.01 \times 0.01 \times 0.01 + 0.003 \times 0.003 \times 0.003}{0.05 \times 0.05 - 0.015 \times 0.05 + 0.015 \times 0.015}$$

a) $\frac{13}{25} \times 10^3$

b) $\frac{13}{15} \times 10^{-3}$

c) $\frac{13}{15} \times 10^3$

d) $\frac{13}{25} \times 10^{-3}$

91. The simplified value of $\left(1-\frac{2xy}{x^2+y^2}\right)\div\left(\frac{x^3-y^3}{x-y}-3xy\right)$ is

मान निकालें : $\left(1-\frac{2xy}{x^2+y^2}\right)\div\left(\frac{x^3-y^3}{x-y}-3xy\right)$

a) $\frac{1}{x^2-y^2}$ b) $\frac{1}{x^2+y^2}$ c) $\frac{1}{x-y}$ d) $\frac{1}{x+y}$

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

$x^2+y^2+xy-3xy$

92. If $a^3 + b^3 = 110$ and $a + b = 5$, then $(a + b)^2 - 3ab$ is equal to

अगर $a^3 + b^3 = 110$ और $a + b = 5$, तो $(a + b)^2 - 3ab$ बराबर है

a) 52 b) 32

c) 42 d) 22

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

$$a^3+b^3 = (a+b)\left[(a+b)^2-3ab\right]$$

$$110 = 5 \times ? \rightarrow \frac{110}{5} = 22$$

93. If $a^3 + b^3 = 1344$ and $a + b = 28$, then $(a + b)^2 - 3ab$ is equal to

अगर $a^3 + b^3 = 1344$ और $a + b = 28$, तो $(a + b)^2 - 3ab$ बराबर है

a) 24 b) 16

c) 32 d) 48

$a^3+b^3 = (a+b)\left[(a+b)^3 - 3ab\right]$

$1344 = 28 \times ?$

48 ~~192~~

$\frac{1344}{28} = ?$

~~28~~ 4

$$\frac{x^3-y^3}{x(x^2+y^2-xy)} \times \frac{x^3+y^3}{y(x^2+y^2+xy)} \times \frac{4xy}{(x+y)(x-y)}$$

$= 4$

94. On simplification, $\frac{x^3-y^3}{x[(x+y)^2-3xy]} \div \frac{y[(x-y)^2+3xy]}{x^3+y^3} \times \frac{(x+y)^2-(x-y)^2}{x^2-y^2}$ is equal to:

सरलीकरण पर, $\frac{x^3-y^3}{x[(x+y)^2-3xy]} \div \frac{y[(x-y)^2+3xy]}{x^3+y^3} \times \frac{(x+y)^2-(x-y)^2}{x^2-y^2}$ इसके बराबर है:

a) 4
b) 1
c) $\frac{1}{2}$
d) $\frac{1}{4}$

$P \div Q \times R = P \times \frac{1}{Q} \times R$

$(x+y)(x^2+y^2-xy)$

$\frac{x^3+y^3}{(x^2+y^2-xy)} \times \frac{x^3-y^3}{(x^2+y^2-xy)} \times \frac{2(x^2+y^2)}{(x-y)(x+y)}$

95. If $P = \frac{x^3+y^3}{(x-y)^2+3xy}$, $Q = \frac{(x+y)^2-3xy}{x^3-y^3}$ and $R = \frac{(x+y)^2+(x-y)^2}{x^2-y^2}$, then what is the value of $(P \div Q) \times R$?

अगर $P = \frac{x^3+y^3}{(x-y)^2+3xy}$, $Q = \frac{(x+y)^2-3xy}{x^3-y^3}$ और $R = \frac{(x+y)^2+(x-y)^2}{x^2-y^2}$, तो $(P \div Q) \times R$ का मान क्या है?

a) $2(x^2+y^2)$ b) $4xy$
c) x^2+y^2 d) $2xy$

$P \times Q \div R = P \times Q \times \frac{1}{R}$

$\frac{x(x^3-2^3)}{x(x^2-x-2)} \times \frac{(x+1)^2}{(x-5)(x+1)} \times \frac{x-5}{2(x^2+2x+4)}$

$(x-2)(x^2+4+2x)$ $\quad (x-2)(x+1)$

$x \to -2 < 2$

$+ \to -1 \quad 1$

96. If $P = \frac{x^4-8x}{x^3-x^2-2x}$, $Q = \frac{x^2+2x+1}{x^2-4x-5}$ and $R = \frac{2x^2+4x+8}{x-5}$, then $(P \times Q) \div R$ is equal to:

$x^2-5x+x-5$

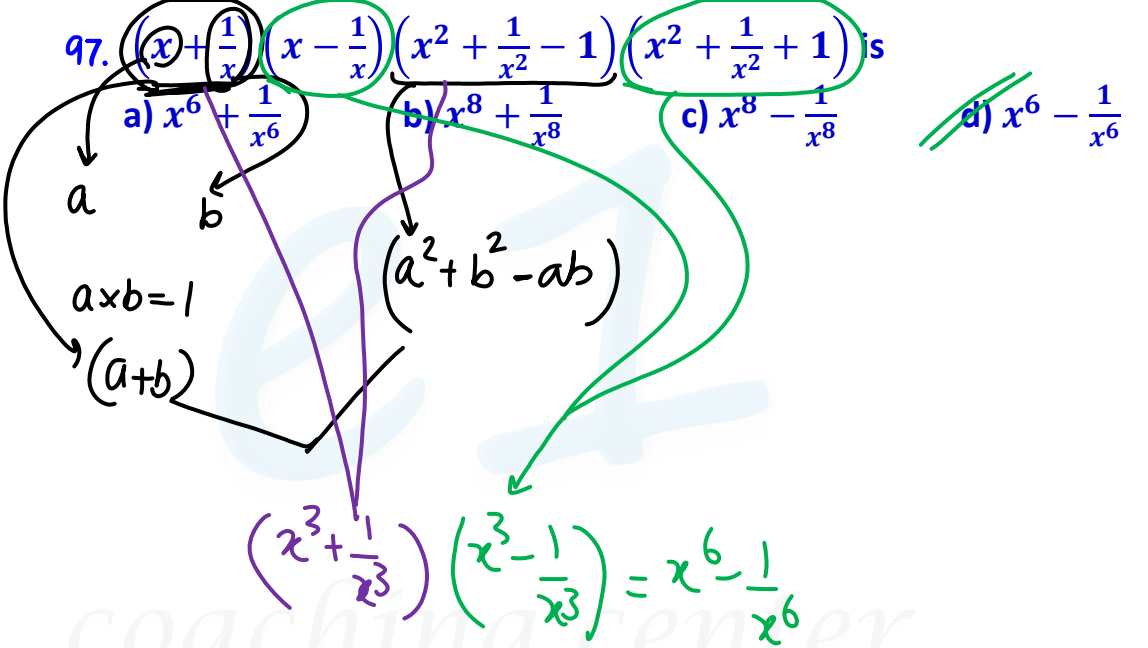
अगर $P = \frac{x^4-8x}{x^3-x^2-2x}$, $Q = \frac{x^2+2x+1}{x^2-4x-5}$ और $R = \frac{2x^2+4x+8}{x-5}$ तो $(P \times Q) \div R$ बराबर है:

a) $\frac{1}{2}$ b) 1

c) 2 d) 4

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

a) $x^6+\frac{1}{x^6}$ b) $x^8+\frac{1}{x^8}$ c) $x^8-\frac{1}{x^8}$ d) $x^6-\frac{1}{x^6}$



98. If $x^6 + \frac{1}{x^6} = k\left(x^2 + \frac{1}{x^2}\right)$, then k is equal to

यदि $x^6 + \frac{1}{x^6} = k\left(x^2 + \frac{1}{x^2}\right)$ है, तो k बराबर है :

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

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

$$(x^2)^3 + \left(\frac{1}{x^2}\right)^3 = \left(x^2 + \frac{1}{x^2}\right)\left(x^4 + \frac{1}{x^4} - 1\right)$$

$a = x^2$

$b = \frac{1}{x^2}$

99. If $a + b = 1$ and $a^3 + b^3 + 3ab = k$, then the value of k is

अगर $(a + b)^3 = 1$ और $a^3 + b^3 + 3ab = k$ तो k का मान:

a) 1 b) 3 c) 5 d) 7

$a^3 + b^3 + 3ab(a+b) = 1$

$*1$

100. If $p^3 - q^3 = (p-q)\{(p-q)^2 - xpq\}$, then the value of x is

अगर $p^3 - q^3 = (p-q)\{(p-q)^2 - xpq\}$ है तो x का मान:

a) -1 b) 3 c) 1 d) -3

equate

$= (p-q)(p^2+q^2+pq)$

$= (p-q)[(p-q)^2 + 3pq]$

$-x = +3$

$x = -3$

101. The value of $\left(x^{\frac{1}{3}}+x^{\frac{-1}{3}}\right)\left(x^{\frac{2}{3}}-1+x^{\frac{-2}{3}}\right)$ is:

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

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

c) $x^{\frac{1}{3}}+x^{-1}$ d) $x+x^{-1}$

a

b

$(a+b)\left(a^2-ab+b^2\right)$

$= a^3+b^3$

$= x+x^{-1}$

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

$= a^2$

ab

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

Q2. If $(a^2+b^2)^3=(a^3+b^3)^2$, then the value of $\frac{a}{b}+\frac{b}{a}$ is

यदि $(a^2+b^2)^3=(a^3+b^3)^2$ है, तो $\frac{a}{b}+\frac{b}{a}$ का मान है :

a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $-\frac{1}{3}$ d) $-\frac{2}{3}$

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

$$\Rightarrow \frac{a^2+b^2}{ab}=\frac{2}{3}$$

$$\frac{a^2}{ab}+\frac{b^2}{ab}$$

$$\Rightarrow \frac{a}{b}+\frac{b}{a}=\frac{2}{3}$$

103. If x is a rational number and $\frac{(x+1)^3-(x-1)^3}{(x+1)^2-(x-1)^2}=2$, then the sum of numerator and denominator of x is:

अगर x एक परिमेय संख्या है और $\frac{(x+1)^3-(x-1)^3}{(x+1)^2-(x-1)^2}=2$ है तो x के अंश और हर का जोड़ ज्ञात करें:

a) 3 b) 4

c) 5 d) 7

$$\frac{3(2x^2+2)}{4x}=21$$

$$\Rightarrow 3x^2-4x+1=0$$

$$\Rightarrow x=\frac{4\pm2}{6}=1,\frac{1}{3}$$

$$\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

16−12

$$x^3+1+3x^2+3x$$

$$-x^3\mp1\mp3x^2\pm3x$$

$$6x^2+2$$

104. If $xy(x+y)=1$, then the value of $\frac{1}{x^3y^3}-x^3-y^3$

अगर $xy(x+y)=1$, तो $\frac{1}{x^3y^3}-x^3-y^3$:

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

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

$$\Rightarrow x^3+y^3+3xy\times\frac{1}{xy}=\frac{1}{x^3y^3}$$

105. If $x(x-3) = -1$, then the value of $x^3(x^3-18)$ is

अगर $x(x-3) = -1$, तो $x^3(x^3-18)$ का मान:

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

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

$$\Rightarrow x^3 - 27 - 3x\left(x + \frac{1}{x}\right) = -\frac{1}{x^3}$$

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

$$\Rightarrow x^3 - 27 + 9 = -\frac{1}{x^3}$$

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

$$\Rightarrow x^3(x^3 - 18) = -1$$

$a^x \times a^y = a^{x+y}$

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

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

अगर $x = 2 + 2^{\frac{1}{3}} + 2^{\frac{2}{3}}$ है तो $x^3 - 6x^2 + 6x$ का मान क्या होगा?

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

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

(on Cubing) $\Rightarrow x^3 - 8 + 12x - 6x^2 = 2 + 4 + 3 \cdot 2^{\frac{1}{3}} \cdot 2^{\frac{2}{3}}(x-2)$

$6 + 6x - 12$

$\Rightarrow x^3 - 6x^2 + 12x - 6x = 2$

$\Rightarrow x^3 - 6x^2 + 6x = 2$

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

$\left(2^{\frac{2}{3}}\right)^3 = 2^{\frac{2}{3}\times 3} = 2^2 = 4$