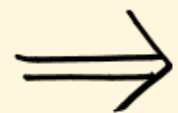


$$a^3 + b^3 + c^3 - 3abc = \underbrace{(a+b+c)}_{\text{any no}} \cdot (a^2 + b^2 + c^2 - ab - bc - ca)$$

यदि, $a+b+c=0$

तो {
$$\begin{aligned} a^3 + b^3 + c^3 - 3abc &= 0 \\ \text{या} \\ a^3 + b^3 + c^3 &= 3abc \end{aligned}$$

If $a + b + c = 0$, then



$$a^3 + b^3 + c^3 - 3abc = 0$$

or

$$a^3 + b^3 + c^3 = 3abc$$

$$a^3 + b^3 + c^3 - 3abc = \frac{1}{2}(a+b+c) \cdot [(a-b)^2 + (b-c)^2 + (c-a)^2]$$

If, $a^3 + b^3 + c^3 - 3abc = 0$

या $a^3 + b^3 + c^3 = 3abc$

$a + b + c = 0$

या

$a = b = c$

If $a^3 + b^3 + c^3 = 3abc$ and a, b & c are real positive numbers, then which of the following option is correct?

(A) $a + b + c = 0$

(B) $a = b = c$

(C) $a \neq b \neq c$

(D) $a + b - c = 0$

$a + b + c = 0$ ✗
या
 $a = b = c$ ✓

If $a^3 + b^3 + c^3 = 3abc$ and a, b & c are distinct numbers, then which of the following options is correct?

(A) $a + b + c = 0$ ✓

(B) $a = b = c$ ✗

(C) $a \neq b \neq c$

(D) $a + b - c = 0$

67. $x^a \cdot x^b \cdot x^c = 1$, then $a^3 + b^3 + c^3 = ?$

यदि $x^a \cdot x^b \cdot x^c = 1$, तो $a^3 + b^3 + c^3 = ?$

[A] 9

[C] $a+b+c$

[B] abc

[D] $3abc$

$$x^0 = 1$$

$$x^{a+b+c} = 1$$

$$\Rightarrow a+b+c=0$$

68. $(32)^3 + (79)^3 - (111)^3 + 3 \times 32 \times 79 \times 111$ is equal to.

$(32)^3 + (79)^3 - (111)^3 + 3 \times 32 \times 79 \times 111$ किसके बराबर है?

[A] 10000

[B] 0

[C] 30007

[D] 1

$$(32)^3 + (79)^3 + (-111)^3 - 3 \times 32 \times 79 \times (-111) = 0$$

यदि $32 + 79 + (-111) = 0$

69. $55^3 + 17^3 - 72^3 + 201960$ is equal to:

$55^3 + 17^3 + (-72)^3 + 201960$ बराबर है:

(SSC CPO 2025)

✓ [A] 0

[C] 2

[B] 1

[D] 3

$$55 + 17 + (-72) = 0$$

70. If $p = 8.15$, $q = 9.06$ and $r = -17.21$, then the value of $p^3 + q^3 + r^3 - 3pqr$ is:
यदि $p = 8.15$, $q = 9.06$ और $r = -17.21$ है, तो $p^3 + q^3 + r^3 - 3pqr$ का मान क्या होगा?

(SSC CGL 2022)

[A] -3.81

[B] -5.62

[C] 4.75

[D] 0

$$\Rightarrow p + q + r = 0$$

71. If $a = 323$, $b = 427$ & $c = 750$, then find the value of $a^3 + b^3 - c^3 + 3abc$?
यदि $a = 323$, $b = 427$ & $c = 750$ है, तो $a^3 + b^3 - c^3 + 3abc$ का मान ज्ञात किजिए?

[A] 1500

[B] 731290

[C] 77

☒ [D] 0

$$a^3 + b^3 + (-c)^3 - 3 \times a \times b \times (-c) \\ = 0$$

$$\Rightarrow a + b + (-c) = 0$$

72. If $x + 3y + 2 = 0$, then value of $x^3 + 27y^3 + 8 - 18xy$ is:

यदि $x + 3y + 2 = 0$ है, तो $x^3 + 27y^3 + 8 - 18xy$ का मान ज्ञात कीजिए।

[A] 1

☒ [B] 0

[C] 2

[D] -2



73. If $x^3 + 27y^3 + 64z^3 = 36xyz$, then the relationship between x , y and z is:

यदि $x^3 + 27y^3 + 64z^3 = 36xyz$ है, तो x , y और z का संबंध है:

[A] $x + y + z = 0$

[B] $x - 3y + 4z = 0$

[C] $x + 3y = 4z$

[D] $x + 3y + 4z = 0$

$$x^3 + (3y)^3 + (4z)^3 = 36xyz$$

74. **Given** $x + y + z = 0$, **and** $x^3 + y^3 + z^3 = 3xyz$, **evaluate** $(x - y)^3 + (y - z)^3 + (z - x)^3$.

दिया गया है $x + y + z = 0$, और $x^3 + y^3 + z^3 = 3xyz$, $(x - y)^3 + (y - z)^3 + (z - x)^3$ का मूल्यांकन करें।

(SSC CGL 2025 PRE)

[A] 0

[B] $9(x - y)(y - z)(z - x)$

[C] $27xyz$

✓ [D] $3(x - y)(y - z)(z - x)$

$$= 3(x - y)(y - z)(z - x)$$

$$(x - y) + (y - z) + (z - x) = 0$$

75. If $\sqrt{2}x + 2\sqrt{2}y + z = 0$ & $(2\sqrt{2}x^3 + 16\sqrt{2}y^3 + z^3) = kxyz$, then find the value of k?

यदि $\sqrt{2}x + 2\sqrt{2}y + z = 0$ & $(2\sqrt{2}x^3 + 16\sqrt{2}y^3 + z^3) = kxyz$ है, तो k का मान ज्ञात कीजिये?

[A] -6

[B] 6

[C] 12

[D] -12

$$= 3 \times \sqrt{2}x^3 + 16 \times \sqrt{2}y^3 + z^3$$

$$= 12xyz$$

76. If $p + q = r$; $pqr = -36$ then find $p^3 + q^3 - r^3 = ?$

यदि $p + q = r$ और $pqr = -36$ है, तो $p^3 + q^3 + (-r)^3$ का मान ज्ञात कीजिए।

[A] 72

[B] 105

[C] 0

[D] 108

$$= 3p(-r)$$

$$= -3 \times -36$$

$$= 108$$

$$p + q + (-r) = 0$$

77. If $a = \frac{1}{14}$, $b = \frac{1}{14}$ and $c = -\frac{1}{7}$, then value of $a^3 + b^3 + c^3$ is:

यदि $a = \frac{1}{14}$, $b = \frac{1}{14}$ और $c = -\frac{1}{7}$ है, तो $a^3 + b^3 + c^3$ का मान ज्ञात कीजिए।

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

[A] ~~$\frac{3}{1372}$~~
[C] ~~$\frac{-1}{1372}$~~

[B] ~~$\frac{1}{1372}$~~
[D] $\frac{-3}{1372}$

$3 \times \frac{1}{196} \times -\frac{1}{7}$

$$a + b + c = 0$$
$$\frac{1}{14} + \frac{1}{14} + \left(-\frac{1}{7}\right) = 0$$

78. $[(4a-5b)^3 + (5b-3c)^3 - (4a-3c)^3]$ is equal to:-

$[(4a-5b)^3 + (5b-3c)^3 \ominus (4a-3c)^3]$ का मान क्या होगा?

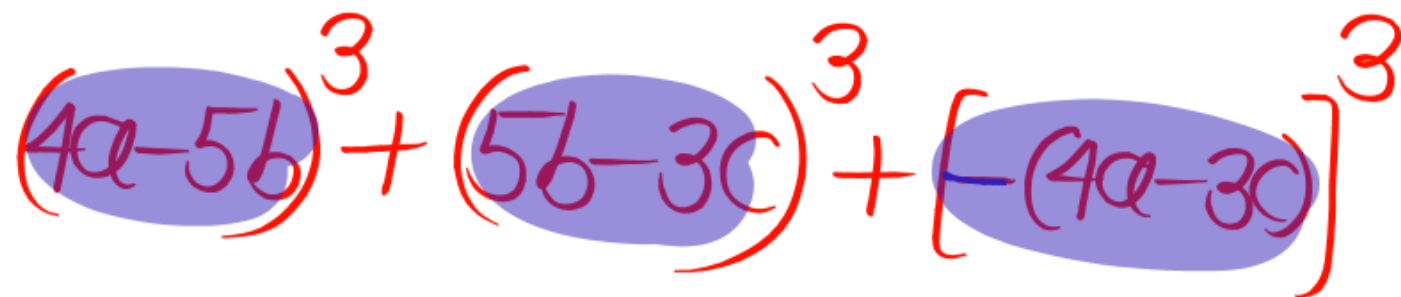
☒ [A] $-3(4a-5b)(5b-3c)(4a-3c)$

[B] $60abc$

[C] 0

[D] $3(4a-5b)(5b-3c)(4a-3c)$

$$-x^3 = (-x)^3$$


$$(4a-5b)^3 + (5b-3c)^3 + [- (4a-3c)]^3$$

79. If $a+b+c=27$, then what is the value of $(a-7)^3 + (b-9)^3 + (c-11)^3 - 3(a-7)(b-9)(c-11)$?

यदि $a + b + c = 27$, तो $(a-7)^3 + (b-9)^3 + (c-11)^3 - 3(a-7)(b-9)(c-11)$ का मान क्या है?

[A] 0

[B] 9

[C] 27

[D] 81

$$(a-7) + (b-9) + (c-11) = 27 - 27 \\ = 0$$

80. If $x = a(b - c)$, $y = b(c - a)$, $z = c(a - b)$, then $\left(\frac{x}{a}\right)^3 + \left(\frac{y}{b}\right)^3 + \left(\frac{z}{c}\right)^3 = ?$

यदि $x = a(b - c)$, $y = b(c - a)$, $z = c(a - b)$, तो $\left(\frac{x}{a}\right)^3 + \left(\frac{y}{b}\right)^3 + \left(\frac{z}{c}\right)^3 = ?$

[A] $\frac{xyz}{3abc}$
[C] $\frac{3xyz}{abc}$ ✓

[B] $3xyzabc$

[D] $\frac{xyz}{abc}$

$= \frac{3xyz}{abc}$

$\frac{x}{a} = b - c$

$\frac{y}{b} = c - a$

$\frac{z}{c} = a - b$

$\left(\frac{x}{a}\right)^3 + \left(\frac{y}{b}\right)^3 + \left(\frac{z}{c}\right)^3 = 0$

81. If $x + y + z = 0$, then $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy} = ?$

यदि $x + y + z = 0$ है, तो $\frac{x^2}{yz} + \frac{y^2}{zx} + \frac{z^2}{xy} = ?$

SSC CHSL TIER – I 2022

[A] 2

[C] 0

[B] 3

[D] 1

$$= \frac{x^3 + y^3 + z^3}{xyz} = \frac{3xyz}{xyz} = 3$$

(V.V.V Imp)

82. If $2x - y + 3z = 0$, then find the value of $\frac{4x^2}{yz} - \frac{y^2}{2xz} + \frac{27z^2}{2xy}$?

यदि $2x - y + 3z = 0$ है, तो $\frac{4x^2}{yz} - \frac{y^2}{2xz} + \frac{27z^2}{2xy}$ का मान ज्ञात कीजिये?

[A] -9 ✓

[B] 18

[C] -3

[D] 9

$$= \frac{4x^3 - y^3 + 27z^3}{2xyz} = \frac{3 \times 2x - y + 3z}{2xyz} = -9$$

83. If $x+y+z=120$, then find $\frac{(x-20)^3+(y-40)^3+(z-60)^3}{(x-20)(y-40)(z-60)}$?

यदि $x+y+z=120$ है, तो $\frac{(x-20)^3+(y-40)^3+(z-60)^3}{(x-20)(y-40)(z-60)}$?

[A] 3 ✓

[C] 1

[B] 0

[D] 2

$$(x-20) + (y-40) + (z-60) = 0$$

$$= \frac{3(x-20)(y-40)(z-60)}{(x-20)(y-40)(z-60)} \\ = 3$$

84. The value of $[(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3] \div [(a - b)^3 + (b - c)^3 + (c - a)^3]$ is equal to: (Given $a \neq b \neq c$)

$[(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3] \div [(a - b)^3 + (b - c)^3 + (c - a)^3]$ का मान बराबर है: (दिया हुआ $a \neq b \neq c$)

[A] $(a + b)(b + c)(c + a)$

[B] $(a^2 - b^2)(b^2 - c^2)(c^2 - a^2)$

[C] $(a^2 + b^2)(b^2 + c^2)(c^2 + a^2)$

[D] $(a - b)(b - c)(c - a)$

$$\frac{(a^2 - b^2)^3 + (b^2 - c^2)^3 + (c^2 - a^2)^3}{(a - b)^3 + (b - c)^3 + (c - a)^3} = \frac{3(a^2 - b^2)(b^2 - c^2)(c^2 - a^2)}{3(a - b)(b - c)(c - a)} = (a + b)(b + c)(c + a)$$

85. **Simplify the following expression:**
निम्नलिखित व्यंजक का मान ज्ञात कीजिए:

$$\frac{(a^2 - 4b^2)^3 + (4b^2 - 16c^2)^3 + (16c^2 - a^2)^3}{(a - 2b)^3 + (2b - 4c)^3 + (4c - a)^3}$$

- [A] ~~X~~ $-(a+2b)(b+2c)(4c+a)$
[B] ☒ $2(a+2b)(b+2c)(4c+a)$
[C] ~~X~~ $(a+2b)(b+2c)(4c+a)$
[D] ~~X~~ $4(a+2b)(b+2c)(4c+a)$

$$(a+2b) \times (b+4c) \cdot (4c+a)$$

86.

$$\frac{(4.53-3.07)^2}{(3.07-2.15)(2.15-4.53)} + \frac{(3.07-2.15)^2}{(2.15-4.53)(4.53-3.07)} + \frac{(2.15-4.53)^2}{(4.53-3.07)(3.07-2.15)}$$

$$\frac{(4.53-3.07)^2}{(3.07-2.15)(2.15-4.53)} + \frac{(3.07-2.15)^2}{(2.15-4.53)(4.53-3.07)} + \frac{(2.15-4.53)^2}{(4.53-3.07)(3.07-2.15)}$$

is simplified to:

$$\begin{aligned} 4.53 &= a \\ 3.07 &= b \\ 2.15 &= c \end{aligned}$$

को सरल करने पर प्राप्त होता है:

[A] 0

[B] 1

[C] 2

[D] 3

$$\frac{(a-b)^2}{(b-c)(c-a)} + \frac{(b-c)^2}{(c-a)(a-b)} + \frac{(c-a)^2}{(a-b)(b-c)} = \frac{(a-b)^3 + (b-c)^3 + (c-a)^3}{(a-b)(b-c)(c-a)}$$

$$= 3$$



87. If a, b, c are three distinct real numbers such that $a^3 + b^3 + c^3 = 3abc$ then $\frac{(a+b)^2}{2ab} + \frac{(b+c)^2}{2bc} + \frac{(c+a)^2}{2ca} = ?$

अगर a, b, c तीन अलग-अलग वास्तविक संख्याएँ हैं जैसे $a^3 + b^3 + c^3 = 3abc$ तो $\frac{(a+b)^2}{2ab} +$

$$\frac{(b+c)^2}{2bc} + \frac{(c+a)^2}{2ca} = ?$$

[A] 3

[C] 1.5 ✓

[B] 1

[D] 2

$$a+b+c=0$$

$$= \frac{c^2}{2ab} + \frac{a^2}{2bc} + \frac{b^2}{2ca}$$

$$= \frac{3abc}{2abc}$$

88. If $3^x = 4^y = 12^{-z}$, then find $(x^{-3} + y^{-3} + z^{-3})$?

यदि $3^x = 4^y = 12^{-z}$ है, तो $(x^{-3} + y^{-3} + z^{-3})$ ज्ञात कीजिये?

[A] $3xy^{-1}z^{-1}$

[B] $3x^{-1}y^{-1}z^{-1}$

[C] $x^{-1}y^{-1}z^{-1}$

[D] $3x^{-3}y^{-3}z^3$

$$3^x = 4^y = 12^{-z}$$

$$\Rightarrow 3^1 \times 4^1 = 12^1$$

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

$$\Rightarrow x^{-1} + y^{-1} + z^{-1} = 0$$

$$(x^{-1})^3 + (y^{-1})^3 + (z^{-1})^3$$

89. If $4s = x + y + z$, then $(3s - x)^3 + (s - y)^3 + 3(3s - x)(s - y)z = ?$

यदि $4s = x + y + z$ है, तो $(3s - x)^3 + (s - y)^3 + 3(3s - x)(s - y)z = z^3$

[A] z^3

[B] $-z^3$

[C] $2z^3$

[D] 0

$$(3s - x) + (s - y) + (-z) = 0$$

90. If $a - b + c = \sqrt{6}$ & $a^3 + 3abc = b^3 - c^3$, then find $a(a+b) + b(b+c) + c(c-a)$?

यदि $a - b + c = \sqrt{6}$ & $a^3 + 3abc = b^3 - c^3$ है, तो $a(a+b) + b(b+c) + c(c-a)$ ज्ञात कीजिये?

[A] 0

[B] 1

[C] -1

[D] 3

$$a^2 + b^2 + c^2 + ab + bc - ca = 0$$

$$a - b + c = \sqrt{6} \checkmark$$

$$a^3 - b^3 + c^3 + 3abc = 0$$

$$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$$

0

$\sqrt{6}$

X

0



91. **Simplify the following**
निम्नलिखित को सरल करें।

$$25^3 - 75^3 + 50^3$$

RRB RPF SI 2019

[A] ~~-281250~~ ✓

[C] ~~271250~~

[B] ~~281350~~

[D] ~~-281450~~ ✗

$$(25)^3 + (-75)^3 + (50)^3 = 3 \times 25 \times -75 \times 50$$

$$\div 125$$

92. Find the value of $23^3 + (-11)^3 + (-12)^3$?

$23^3 + (-11)^3 + (-12)^3$ का मान ज्ञात कीजिये?

[A] ~~8908~~

[B] ~~8608~~

☒ [C] 9108

[D] ~~8708~~

$$= 3 \times 23 \times -11 \times -12$$

93. The value of $\frac{(0.545)(0.081)(0.51)(5.2)}{(0.324)^3 + (0.221)^3 - (0.545)^3}$ is:

$\frac{(0.545)(0.081)(0.51)(5.2)}{(\textcircled{0.324})^3 + (\textcircled{0.221})^3 + (\textcircled{-0.545})^3}$ का मान है:

$$.324 + .221 + (-.545) = 0$$

[A] -3

[C] $\textcircled{-1}$

[B] ~~3~~

[D] ~~1~~

$$\frac{\cancel{.545} \times \cancel{.081} \times \cancel{.51} \times \cancel{5.2}}{\cancel{3} \times \cancel{.324} \times \cancel{.221} - \cancel{.545}} = -1$$

94. The expression $(a + b - c)^3 + (a - b + c)^3 - 8a^3$ is equal to:

व्यंजक $(a + b - c)^3 + (a - b + c)^3 + (-2a)^3$ का मान ज्ञात करें।

[A] ~~$6a(a + b - c)(a - b + c)$~~

[B] $6a(a - b + c)(c - a - b)$

[C] ~~$3a(a + b - c)(a - b + c)$~~

[D] ~~$3a(a - b + c)(c - a - b)$~~

~~$-6a(a + b - c)(a - b + c)$~~



#



95. If $(2x + 3)^3 + (x - 8)^3 + (x + 13)^3 = (2x + 3)(3x - 24)(x + 13)$, then what is the value of x ?

यदि $(2x + 3)^3 + (x - 8)^3 + (x + 13)^3 = 3(2x + 3)(x - 8)(x + 13)$, तो x का मान क्या है?

[A] -1.5

[B] -2.5

[C] -2

[D] -1

$$4x + 8 = 0$$
$$x = -2$$

$$a^3 + b^3 + c^3 = 3abc \Rightarrow a + b + c = 0 \checkmark$$

या

$$a = b = c$$

96. If $(5x + 1)^3 + (x - 3)^3 + 8(3x - 4)^3 = 6(5x + 1)(x - 3)(3x - 4)$, then x is equal to:

यदि $(5x + 1)^3 + (x - 3)^3 + [2(3x - 4)]^3 = 6(5x + 1)(x - 3)(3x - 4)$, तो x बराबर है:

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

[A] $\frac{5}{6}$
[C] $\frac{1}{3}$

[B] $\frac{3}{4}$
[D] $\frac{2}{3}$

$$12x - 10 = 0$$

$$x = \frac{5}{6}$$

If $(9x - 7)^3 + 8(5 - x)^3 - 27(4x + 11)^3 = 18(7 - 9x)(5 - x)(4x + 11)$, then find $\frac{x^4 + x^2 + 1}{x^2 - x + 1}$?

यदि $(9x - 7)^3 + [2(5 - x)]^3 + [-3(4x + 11)]^3 = 18(7 - 9x)(5 - x)(4x + 11)$ है, तो $\frac{x^4 + x^2 + 1}{x^2 - x + 1}$ ज्ञात कीजिये?

(ICAR Assistant 2022)

[A] 33

[C] 31

[B] 30

[D] 27

$$= x^3 + x + 1$$

$$= 36 - 6 + 1$$

$$-5x - 30 = 0$$

$$5x = -30$$

$$x = -6$$

98. If $\left(x - \frac{1}{2}\right)^3 + \left(2x - \frac{3}{2}\right)^3 + \left(3x - \frac{2}{3}\right)^3 = \frac{1}{4}(2x - 1)(4x - 3)(9x - 2)$, then find $\sqrt{x} + \frac{1}{\sqrt{x}}$?

यदि $\left(x - \frac{1}{2}\right)^3 + \left(2x - \frac{3}{2}\right)^3 + \left(3x - \frac{2}{3}\right)^3 = \frac{1}{4}(2x - 1)(4x - 3)(9x - 2)$ है, तो $\sqrt{x} + \frac{1}{\sqrt{x}}$ ज्ञात कीजिए?

[A] ~~13/6~~

[B] ~~25/12~~

[C] 13/3

[D] 8/3

$$= \frac{2}{3} + \frac{3}{2} = \frac{13}{6}$$

$$6x - 2 - \frac{2}{3} = 0$$

$$6x = \frac{8}{3}$$

$$x = \frac{4}{9}$$

99. If $(4x - 3)^3 + (2x + 5)^3 + (5x - 7)^3 = (4x - 3)(6x + 15)(5x - 7)$ and $x \neq \frac{5}{11}$, then $x = ?$

यदि $(4x - 3)^3 + (2x + 5)^3 + (5x - 7)^3 = (4x - 3)(6x + 15)(5x - 7)$ और $x \neq \frac{5}{11}$ तब $x = ?$

[A] 3

[C] $\frac{11}{5}$

[B] 4

[D] -5

~~$11x - 5 = 0$~~
 ~~$x = \frac{5}{11}$~~

$$4x - 3 = 2x + 5$$

$$x = 4$$