

81. 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

[B] 4

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

[D] -5

#

$\Rightarrow 11x - 5 = 0$

$x = \frac{5}{11}$

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

$a + b + c = 0$ या

$a = b = c$

$4x - 3 = 2x + 5$

$2x = 8$

$x = 4$



$$a^3 + b^3 + c^3 - 3abc = (a + b + c) \cdot (a^2 + b^2 + c^2 - ab - bc - ca) \quad \text{--- (1)}$$

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

$$a^3 + b^3 + c^3 - 3abc = (a + b + c) \cdot [(a + b + c)^2 - 3(ab + bc + ca)] \quad \text{--- (3)}$$

(v.v.v.vier)

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

?

$a+b+c$ ✓
 $a^2+b^2+c^2$ ✓

$$a^3 + b^3 + c^3 - 3abc = (a + b + c) \cdot [a^2 + b^2 + c^2 - (ab + bc + ca)] \quad \text{--- ①}$$

$$a^2 + b^2 + c^2 = (a + b + c)^2 - 2 \cdot (ab + bc + ca) \quad \checkmark$$

$$a^3 + b^3 + c^3 - 3abc = (a + b + c) \cdot \{(a + b + c)^2 - 3(ab + bc + ca)\} \quad \checkmark$$

?

$a+b+c \checkmark$
 $ab+bc+ca \checkmark$

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

82. If $x + y + z = 25$, $x^3 + y^3 + z^3 = 85$ and $xyz = 20$, then find the value of $x^2 + y^2 + z^2 - xy - yz - zx$.

यदि $x + y + z = 25$, $x^3 + y^3 + z^3 = 85$ और $xyz = 20$ है, तो $x^2 + y^2 + z^2 - xy - yz - zx$ का मान ज्ञात करें।

[A] 2

[B] 1

[C] 4

[D] 3

$$\underline{x^3 + y^3 + z^3 - 3xyz} = (x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$$

$$\cancel{85 - 3 \times 20} = \cancel{25} \times ?$$

$$1 = ?$$

83. If $2x + 3y + 4z = 11$, $8x^3 + 27y^3 + 64z^3 = 105$ and $xyz = 1$, then the value $4x^2 + 9y^2 + 16z^2 - 6xy - 12yz - 8xz$ is:

यदि $2x+3y+4z=11$, $8x^3+27y^3+64z^3=105$ और $xyz=1$ है, तो $4x^2+9y^2+16z^2-6xy-12yz-8xz$ का मान बताएं।

[A] 3

[B] 4

[C] 5

[D] 1

a → 22

b → 38

c → 42

$$105 - 3 \times 24 = 11x (\text{-----})$$

$$\frac{33}{11} = ?$$

84. If, $a^3 + b^3 + c^3 - 3abc = 273$, and $(a+b+c) = 13$, find the value of $(a-b)^2 + (b-c)^2 + (c-a)^2$.
यदि $a^3 + b^3 + c^3 - 3abc = 273$ और $(a+b+c) = 13$ है, तो $(a-b)^2 + (b-c)^2 + (c-a)^2$ का मान ज्ञात कीजिए।

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[A] 42
[C] 36

[B] 54
[D] 50

$$\cancel{273} = \cancel{\frac{1}{2}} \times 13 \times ?$$

85. If $a + b + c = 11$ & $ab + bc + ca = 28$, then find the value of $a^3 + b^3 + c^3 - 3abc$?
यदि $a + b + c = 11$ & $ab + bc + ca = 28$ है, तो $a^3 + b^3 + c^3 - 3abc$ का मान ज्ञात कीजिये?

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

✓ [A] 407

[B] 1639

[C] 2255

[D] 1093

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

$$= 11 \times (11^2 - 3 \times 28)$$

$$= 11 \times 37$$

$$= 407$$

86. If $a + b + c = 9$ and $ab + bc + ca = -22$, then the value $a^3 + b^3 + c^3 - 3abc$ is:
यदि $a + b + c = 9$ and $ab + bc + ca = -22$ है, तो $a^3 + b^3 + c^3 - 3abc$ का मान क्या है?

(RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] 1323
[C] 783

[B] 1571
[D] 487

$$\downarrow$$
$$= 9 \times (9^2 - 3 \times -22)$$

$$= 9 \times 147$$

$$\frac{66}{781}$$

87. If $a + b + c = 7$, $a^3 + b^3 + c^3 - 3abc = 175$, then the what is The value of $ab + bc + ca = ?$

यदि $a + b + c = 7$ और $a^3 + b^3 + c^3 - 3abc = 175$ हो, तो $ab + bc + ca$ का मान क्या होगा?

[A] 7

[B] 8

[C] 6

[D] 9


$$\cancel{7} \times [7^9 - 3(ab + bc + ca)] = \cancel{175}^{25}$$

$$\cancel{24}^8 = 3(ab + bc + ca)$$

88. If $a + b + c = 14$, $ab + bc + ca = 47$ and $abc = 15$, then the value of $a^3 + b^3 + c^3$ is:
 यदि $a+b+c=14$, $ab+bc+ca=47$ और $abc=15$ है, तो $a^3 + b^3 + c^3$ का मान कितना है?

(RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] 851

[B] 859

[C] 802

☒ [D] 815

$$\underline{a^3 + b^3 + c^3} - 3 \times 15 = 14 \times (14^2 - 3 \times 47)$$

$$? = 14 \times 55 + 45$$

89. If $a + b + c = 1$, $ab + bc + ca = -22$ and $abc = -40$, then what is the value of $(a^3 + b^3 + c^3) + 5$?
 यदि $a + b + c = 1$, $ab + bc + ca = -22$ और $abc = -40$ है, तो $(a^3 + b^3 + c^3) + 5$ का मान क्या है?
 (RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] -53

[B] 57

[C] -48

[D] 45

$$? - 3 \times (-40) = 1 \times (1^3 - 3 \times 1 \times (-22))$$

$$? = -120 + 67$$

$$? = -53$$

90. If $a + b + c = 6$, $abc = -60$ and $a^3 + b^3 + c^3 = 162$, find the value of $ab + bc + ca$.

यदि $a + b + c = 6$, $abc = -60$ और $a^3 + b^3 + c^3 = 162$ है, तो $ab + bc + ca$ का मान ज्ञात कीजिए।

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[A] -7

[B] -21

[C] 11

[D] 14

$$162 - 3 \times (-60) = 6 \times [6^2 - 3 \times ?]$$

$$\cancel{342}^{57} = \cancel{6} \times (36 - 3?)$$

$$91 = -3 \times ?$$

$$-7 = ?$$

91. If $x+y+z=11$, $xy+yz+zx=-6$ & $x^3 + y^3 + z^3 = 1604$, then find the value of xyz ?

यदि $x+y+z=11$, $xy+yz+zx=-6$ & $x^3 + y^3 + z^3 = 1604$ है, तो xyz का मान ज्ञात कीजिये?

[A] 25

[B] 24

[C] 35

[D] 21

$$1604 - 3xyz = 11 \times (11^2 - 3 \times -6)$$

$$1604 - 3xyz = 1599$$

$$11 \times 139$$

$$1590 - 11$$

$$75 = 3xyz$$

$$25 = xyz$$

92. If $a + b + c = 1$, $ab + bc + ca = -8$ and $a^3 + b^3 + c^3 = -11$, then what is the value of $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$?

यदि $a + b + c = 1$, $ab + bc + ca = -8$ और $a^3 + b^3 + c^3 = -11$ है, तो $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$ का मान क्या है?

[A] $\frac{4}{3}$
[C] $\frac{7}{12}$

[B] $-\frac{17}{12}$
[D] $-\frac{5}{4}$

$$= \frac{a^2 + b^2 + c^2}{abc} = \frac{17}{-12}$$

$$\begin{aligned} a^3 + b^3 + c^3 &= (a + b + c)^3 - 3(ab + bc + ca) \\ &= 1^3 - 3 \times (-8) = 17 \end{aligned}$$

$$-11 - 3abc = 1 \times (1^3 - 3 \times -8)$$

$$-11 - 3abc = 25$$

$$-3abc = 36 \Rightarrow abc = -12$$

93. If $a + b + c = 3$, $ab + bc + ca = -10$ and $abc = -24$, the the value of $\frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab}$ is:

यदि $a + b + c = 3$, $ab + bc + ca = -10$ और $abc = -24$ है, तो $\frac{a^2}{bc} + \frac{b^2}{ac} + \frac{c^2}{ab}$ का मान क्या होगा?

[A] $-\frac{15}{8}$

[B] $\frac{63}{8}$

[C] $\frac{15}{8}$

[D] $-\frac{39}{8}$

$$= \frac{a^3 + b^3 + c^3}{abc} = \frac{45}{-24} = -\frac{15}{8}$$

$$? - 3(-24) = 3(3^2 - 3(-24) - 10)$$

$$? = 117 - 72$$

$$? = 45$$

94. If $a + b + c = 5$, and $a^2 + b^2 + c^2 = 33$, then the value of $a^3 + b^3 + c^3 - 3abc$:

यदि $a + b + c = 5$ और $a^2 + b^2 + c^2 = 33$ है, तो $a^3 + b^3 + c^3 - 3abc$ का मान है:

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[A] 195

[B] 180

[C] 175

[D] 185



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

$$= \frac{1}{2} \times 5 \times [99 - 25]$$

$$= \frac{1}{2} \times 5 \times 74$$

95. The sum of three numbers x , y and z is 12 and their squares sum is 20. What will be the value of $x^3 + y^3 + z^3 - 3xyz$?

तीन संख्याओं x , y और z का योगफल 12 है और उनके वर्गों का योगफल 20 है, तो $x^3 + y^3 + z^3 - 3xyz$ का मान कितना होगा?

(RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] -305

[B] 305

[C] 504

[D] -504

$$\frac{1}{2} \times 12 \times (6 - 14)$$

$$= 6 \times -8$$

$$= -504$$

$$x + y + z = 12$$

$$x^2 + y^2 + z^2 = 20$$

96. If $x + y + z = 2$, $x^3 + y^3 + z^3 - 3xyz = 74$, then $(x^2 + y^2 + z^2)$ is equal to:

यदि $x + y + z = 2$, $x^3 + y^3 + z^3 - 3xyz = 74$ है, तो $(x^2 + y^2 + z^2)$ का मान ज्ञात करें।
 $? = 26$

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[A] 22

[C] 26

[B] 29

[D] 24

$$\cancel{\frac{1}{2}x^2} [3(x^2 + y^2 + z^2) - 2] = 74$$

97. If $x + y + z = 1$, $x^2 + y^2 + z^2 = 2$ and $x^3 + y^3 + z^3 = 3$, then what is the value of xyz ?

यदि $x + y + z = 1$, $x^2 + y^2 + z^2 = 2$ तथा $x^3 + y^3 + z^3 = 3$ है, तो xyz का मान क्या है?

[A] $1/3$

[B] $1/6$

[C] $1/2$

[D] $1/4$

$$x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x+y+z) \cdot [3(x^2 + y^2 + z^2) - (x+y+z)^2]$$

$$3 - 3xyz = \frac{1}{2} \times 1 \times [6 - 1]$$

$$3 - 3xyz = \frac{5}{2}$$

$$\frac{1}{2} = 3xyz$$

98. If $x + y + z = 11$, $x^2 + y^2 + z^2 = 133$ and $x^3 + y^3 + z^3 = 881$, then the value of $\sqrt[3]{xyz}$ is:
यदि $x + y + z = 11$, $x^2 + y^2 + z^2 = 133$ और $x^3 + y^3 + z^3 = 881$, तो $\sqrt[3]{xyz}$ का मान है:

(RRB NTPC GRADUATE LEVEL CBT-1 2025)

[A] -8

[B] 6

[C] 8

[D] -6

$$881 - 3xyz = \frac{1}{2} \times 11 \times [3 \times 133 - 11^2]$$

$$881 - 3xyz = \frac{1}{2} \times 11 \times \cancel{278}^{139}$$

$$881 - 3xyz = 1529$$

$$\cancel{-3xyz} = \cancel{648}$$

$$\sqrt[3]{xyz} = \sqrt[3]{-216} \\ = -6$$

99. If $x + y + z = 6$, $xyz = -10$ and $x^2 + y^2 + z^2 = 30$, then what is the value of $(x^3 + y^3 + z^3)$

यदि $x + y + z = 6$, $xyz = -10$ और $x^2 + y^2 + z^2 = 30$ है, तो $(x^3 + y^3 + z^3)$ का मान क्या होगा?

[A] 135

[C] 130

[B] 127

[D] 132

5 2 (A)

$5 \times 2 \times -1$

$25 + 4 + 1$

$125 + 8 - 1$

100. If $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, $5xyz = 150$ and $(xy + yz + zx) = 31$, then what is the value of $2(x^3 + y^3 + z^3)$?

यदि $x + y + z = 10$, $x^2 + y^2 + z^2 = 38$, $5xyz = 150$ और $(xy + yz + zx) = 31$ है, तो $2(x^3 + y^3 + z^3)$ का मान ज्ञात कीजिए।

Handwritten notes:
 $xyz = 30$
 $2 \times (125 + 27 + 8)$

(RRB NTPC GRADUATE LEVEL CBT-1 2026)

[A] 520

[B] 320

[C] 260

[D] 160

Handwritten notes:
 $xyz = 30$
 $5 \times 3 \times 2$

101. If $x^3 + y^3 + z^3 = 3(1 + xyz)$, $P = y + z - x$, $Q = z + x - y$ and $R = x + y - z$, then what is the value of $P^3 + Q^3 + R^3 - 3PQR$?

यदि $x^3 + y^3 + z^3 = 3(1 + xyz)$, $P = y + z - x$, $Q = z + x - y$ तथा $R = x + y - z$, तो $P^3 + Q^3 + R^3 - 3PQR$ का मान क्या है?

[A] 9

[B] 8

[C] 12

[D] 6

$P = -x$

$Q = x$

$R = x$

$$\begin{aligned}
 &= -x^3 + x^3 + x^3 + 3x^3 \\
 &= 4x^3 \\
 &= 4 \times 3 \\
 &= 12
 \end{aligned}$$

let x, y, z

let $y = z = 0$

$$x^3 = 3$$