

19. If $x^2 - 290x = 289\sqrt{x}$, $x > 0$, then find $\sqrt{x} - \sqrt{x}$?

यदि $x^2 - 290x = 289\sqrt{x}$, $x > 0$ तो $\sqrt{x} - \sqrt{x}$ ज्ञात कीजिए।

[A] 17

[B] 18

[C] 15

[D] 19

$$x^2 - x - 289x = 289\sqrt{x}$$

$$x^2 - \sqrt{x} = 289(\sqrt{x})$$

$$(\cancel{x + \sqrt{x}}) \cdot (\cancel{x - \sqrt{x}}) = 289 \cdot (\cancel{x + \sqrt{x}})$$

$$\sqrt{x} - \sqrt{x} = \sqrt{289} \\ = 17$$



(125Q
Algebra)

20. If $x + \frac{1}{y} = 4$, $y + \frac{1}{z} = 1$ and $z + \frac{1}{x} = \frac{7}{3}$, then find the value of xyz .

यदि $x + \frac{1}{y} = 4$, $y + \frac{1}{z} = 1$ और $z + \frac{1}{x} = \frac{7}{3}$, तो xyz का मान ज्ञात कीजिए।

[A] $\frac{2}{3}$

[C] 1

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

[D] 2

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

$$\Rightarrow xyz = 1$$



⚙️ If $x \ominus \frac{1}{y} = a$, $y \ominus \frac{1}{z} = \underline{b}$, $z \ominus \frac{1}{x} = \underline{c}$ then $xyz \ominus \frac{1}{xyz} = abc + (a + b + c)$ ⚙️

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

$$y + \frac{1}{z} = b$$

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

Multiply

$$\rightarrow \left(x + \frac{1}{y}\right) \cdot \left(y + \frac{1}{z}\right) \cdot \left(z + \frac{1}{x}\right) = abc$$

$$\rightarrow \left(xy + \frac{x}{z} + 1 + \frac{1}{yz}\right) \left(z + \frac{1}{x}\right) = abc$$

$$\rightarrow \left(xyz + y + x + \frac{1}{z} + \underline{z} + \frac{1}{x} + \frac{1}{y} + \frac{1}{xyz}\right) = abc$$

$$xyz + \frac{1}{xyz} = abc - (a + b + c) \checkmark$$

21. **If $a + \frac{1}{c} = 5$, $b + \frac{1}{a} = 29$ & $abc = 1$, then find $c + \frac{1}{b}$?**

यदि $a + \frac{1}{c} = 5$, $b + \frac{1}{a} = 29$ & $abc = 1$ है, तो $c + \frac{1}{b}$ ज्ञात कीजिये?

[A] $\frac{1}{2}$

[B] $\frac{1}{3}$

[C] $\frac{1}{4}$

[D] $\frac{1}{5}$

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22. If $x - \frac{1}{y} = 1$, $y - \frac{1}{z} = 2$ and $z - \frac{1}{x} = 3$ then $xyz = ?$

यदि $x - \frac{1}{y} = 1$, $y - \frac{1}{z} = 2$ और $z - \frac{1}{x} = 3$ तो $xyz = ?$

[A] $12 \pm \sqrt{143}$

[B] $6 \pm \sqrt{35}$

[C] $6 \pm \sqrt{37}$

[D] $9 \pm \sqrt{82}$

$$xyz - \frac{1}{xyz} = 12$$

$$1 \cdot (xyz)^2 - 12(xyz) - 1 = 0$$

$$\begin{aligned} xyz &= \frac{12 \pm \sqrt{144}}{2} \\ &= 6 \pm \sqrt{37} \end{aligned}$$



if, $\boxed{x + \frac{1}{x} = C + \frac{1}{C}}$

तो $x = \overset{\checkmark}{C}, \overset{\checkmark}{\frac{1}{C}}$

23. Find the possible value of x in equation $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{25}{12}$?

a $\frac{1}{a}$

$$\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{25}{12}$$

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[A] ~~12/25~~ or 13/25

[C] ~~8/25~~ or 17/25

~~[B] 19/25 or 6/25~~

~~[D] 9/25 or 16/25~~

$a = \frac{3}{4}, \frac{4}{3}$

$$a + \frac{1}{a} = \left(\frac{3}{4}\right) + \left(\frac{4}{3}\right)$$

$$x = \frac{9}{25}$$

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

$$\frac{x}{1-x} = \frac{9}{16} \Rightarrow 15x = 9$$



24. If $(a+b+c)=20$ & $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} \neq 30$, then find the value of $\left(\frac{a}{b} + \frac{b}{a} + \frac{b}{c} + \frac{c}{b} + \frac{c}{a} + \frac{a}{c}\right)$?
 यदि $(a+b+c)=20$ & $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 30$ है, तो $\left(\frac{a}{b} + \frac{b}{a} + \frac{b}{c} + \frac{c}{b} + \frac{c}{a} + \frac{a}{c}\right)$ का मान ज्ञात कीजिये?
 $= 20 \times 30 - 3$
 $= 597$
- [A] 597 [B] 599
 [C] 600 [D] cannot find

$$1 + \frac{a}{b} + \frac{a}{c} + \frac{b}{a} + 1 + \frac{b}{c} + \frac{c}{a} + \frac{c}{b} + 1 = 20 \times 30$$



25. If a, b, c are positive integers such that $a^2 + 2(b-1)(c-1) = 73$, $b^2 + 2(c-1)(a-1) = 75.5$, $c^2 + 2(a-1)(b-1) = 78.5$ then find $a + b + c = ?$

यदि a, b, c धनात्मक पूर्णांक हैं $a^2 + 2(b-1)(c-1) = 73$, $b^2 + 2(c-1)(a-1) = 75.5$, $c^2 + 2(a-1)(b-1) = 78.5$ तो $a + b + c =$ ज्ञात कीजिए?

[A] ~~16~~

[B] 17

[C] ~~18~~

[D] 19

$$a^2 + 2bc - 2b - 2c + 2 = 73$$

$$b^2 + 2ca - 2c - 2a + 2 = 75.5$$

$$c^2 + 2ab - 2a - 2b + 2 = 78.5$$

add

$$(a+b+c)^2 - 4(a+b+c) = 221$$

$$289 - 68 = 221$$



26. If $5x + \frac{1}{2x} = \sqrt{5}$, then find $50x^4 + \frac{1}{100x^4}$?

यदि $5x + \frac{1}{2x} = \sqrt{5}$ है, तो $50x^4 + \frac{1}{100x^4}$ ज्ञात कीजिये?

[A] -1

[C] -4/3

$\times 4x^2$

$$25x^2 + \frac{1}{4x^2} = 0$$

$$100x^4 + 1 = 0$$

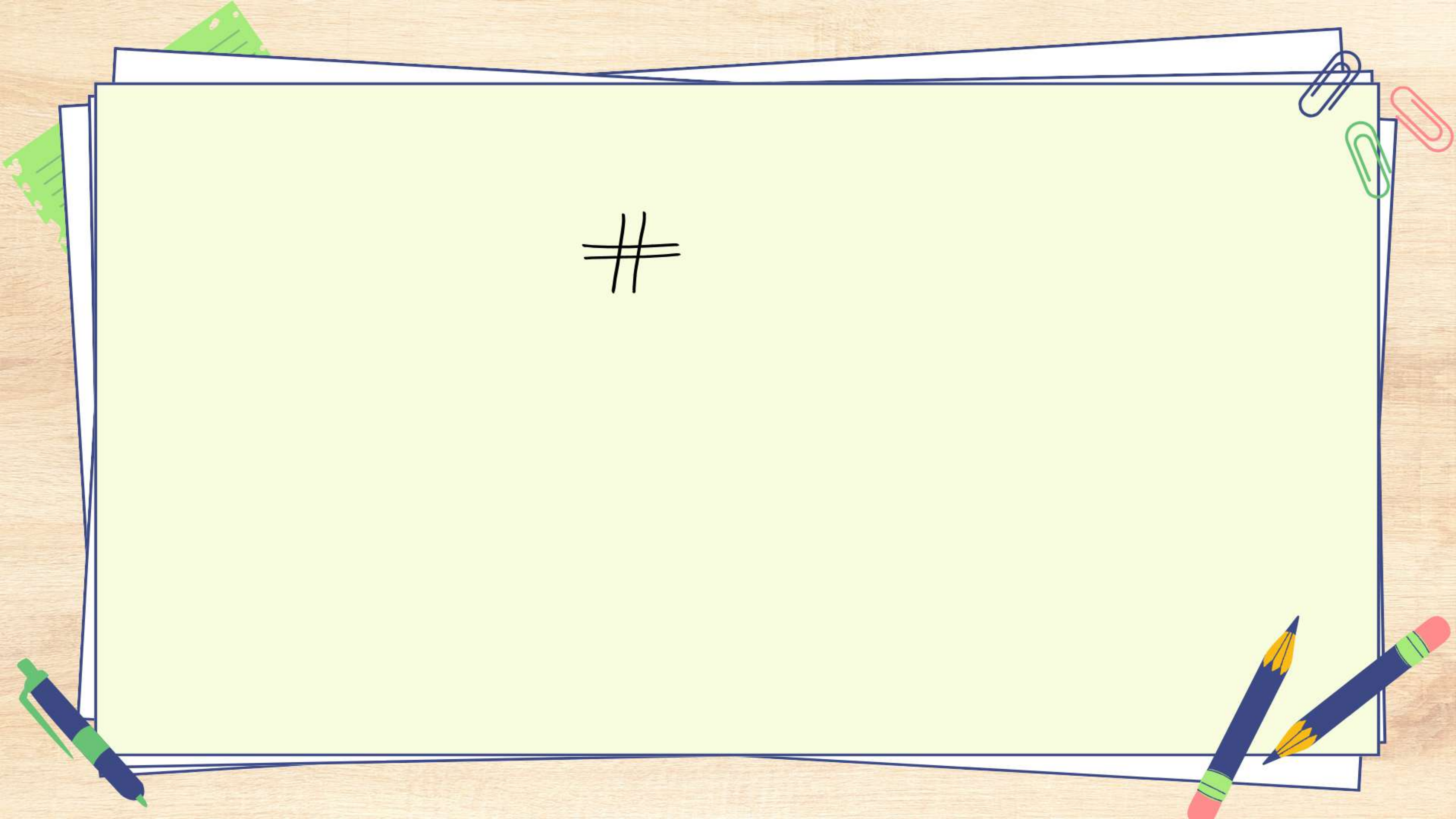
$$100x^4 = -1$$

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

[B] -1/2

✓ [D] -3/2





x, y, z are real number

$x^2 + y^2 + z^2 = 0$

↓ ↓ ↓
0 0 0

Then,

$x = 0$ ✓

$y = 0$ ✓

$z = 0$ ✓

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If, $a \in \text{real no}$

$a^2 \geq 0$

1. If $(r \cos \theta - \sqrt{3})^2 + (r \sin \theta - 1)^2 = 0$, Then $\frac{r \tan \theta + \sec \theta}{r \sec \theta + \tan \theta} = ?$

यदि $(r \cos \theta - \sqrt{3})^2 + (r \sin \theta - 1)^2 = 0$, तो $\frac{r \tan \theta + \sec \theta}{r \sec \theta + \tan \theta} = ?$

[A] $\frac{4}{5}$ ✓

[C] $\frac{\sqrt{5}}{4}$

[B] $\frac{3}{5}$

[D] $\frac{\sqrt{3}}{4}$

$$\frac{\frac{2}{\sqrt{3}} + \frac{2}{\sqrt{3}}}{\frac{4}{\sqrt{3}} + \frac{1}{\sqrt{3}}} = \frac{4}{5}$$

$$r \cos \theta = \sqrt{3} \quad \rightarrow \quad r \times \frac{2}{\sqrt{3}} = \sqrt{3}$$

$$r \sin \theta = 1 \quad \rightarrow \quad r = 2$$

$$\cos \theta = \frac{\sqrt{3}}{2} \Rightarrow \theta = 30^\circ$$



2. If $x^2 + 9y^2 + 4z^2 = 12(x - 2y + 2z) - 88$, then the value of $(x - 3y + z)$ is:

यदि $x^2 + 9y^2 + 4z^2 = 12(x - 2y + 2z) - 88$ है, तो $(x - 3y + z)$ का मान ज्ञात करें।

[A] 10

[C] 11

[B] 13

[D] 5

$$6 + 4 + 3 = 13$$

Basic $\Rightarrow$

~~$$(x^2 - 12x + 36) + (9y^2 - 24y + 16) + (4z^2 - 24z + 36) = 0$$~~

~~$$(x - 6)^2 + (3y - 4)^2 + (2z - 6)^2 = 0$$

$$\downarrow \quad \downarrow \quad \downarrow$$
$$x = 6 \quad y = -\frac{4}{3} \quad z = 3$$~~

$$x^2 + 9y^2 + 4z^2 = 12(x - 2y + 2z) - 88$$

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

$$y = -\frac{12}{9} = -\frac{4}{3}$$

$$z = \frac{12}{4} = 3$$



3. If $3x(3x-8) + y(y+1) + 4z^2 - 2z + 16\frac{1}{2} = 0$, then what is the value of $(6x + y + 2z)$?

यदि $3x(3x-8) + y(y+1) + 4z^2 - 2z + 16\frac{1}{2} = 0$ है, तो $(6x+y+2z)$ का मान ज्ञात करें।

[A] 2

[B] 6

[C] 8

[D] 4

$$8 - \frac{1}{2} + \frac{1}{2} = 8$$

$$3x^2 + y^2 + 4z^2 + 16\frac{1}{2} = 2 \cdot (12x - 8 + y + 1z)$$

$$x = \frac{12}{9} = \frac{4}{3}$$

$$y = -1$$

$$z = \frac{1}{4}$$



4. If $8x^2 + y^2 - 12x - 4xy + 9 = 0$, then the value of $(14x - 5y)$ is:

यदि $8x^2 + y^2 - 12x - 4xy + 9 = 0$, तो $(14x - 5y)$ का मान है:

[A] 9

[C] 5

[B] 6

[D] 3

$21 - 15 = 6$

$$(4x^2 - 12x + 9) + (4x^2 + y^2 - 4xy) = 0$$

$$(2x - 3)^2 + (x - y)^2 = 0$$

$2x = 3$

$x = y$
 $3 = y$



5. If $(a + b - 6)^2 + a^2 + b^2 + 1 + 2b = 2ab + 2a$, then $a = ?$

यदि $(a + b - 6)^2 + a^2 + b^2 + 1 + 2b = 2ab + 2a$, तो $a = ?$

[A] 7

[C] 6

[B] 3.5

[D] 2.5

$$(a+b-6)^2 + \cancel{a^2} + \cancel{b^2} + 1 + \cancel{2b} - \cancel{2ab} - \cancel{2a} = 0$$

$$(a+b-6)^2 + (-a+b+1)^2 = 0$$

$$a+b=6$$

$$-a+b=-1$$

$$2a=7$$

$$a = \frac{7}{2}$$



6. If $a^8 + 9 = \frac{a^4}{b^2} [10b^2 - b^4 - 4]$, then $a^{12} + b^{10} = ?$

यदि $a^8 + 9 = \frac{a^4}{b^2} [10b^2 - b^4 - 4]$, तो $a^{12} + b^{10} = ?$
 $= 27 + 32 = 59$

[A] 59

[B] 63

[C] 48

[D] 77

$$\frac{a^8 + 9}{a^4} = 10 - b^2 - \frac{4}{b^2}$$
$$\left(a^4 + \frac{9}{a^4} - 6\right) + \left(b^2 + \frac{4}{b^2} - 4\right) = 0$$

$$\left(a^2 - \frac{3}{a^2}\right)^2 + \left(b - \frac{2}{b}\right)^2 = 0$$
$$a^2 = \frac{3}{a^2}$$
$$a^4 = 3$$
$$a^2 = \sqrt{3}$$
$$b = \frac{2}{b}$$
$$b^2 = 2$$

7. If $9x^2 + 41y^2 + 4z^2 = 24xy + 20yz$, then find $x:y:z = ?$

यदि $9x^2 + 41y^2 + 4z^2 = 24xy + 20yz$ है, तो ज्ञात कीजिए कि $x:y:z = ?$

[A] ~~3 : 2 : 5~~

[B] 8 : 6 : 15

[C] ~~16 : 12 : 25~~

[D] ~~6 : 8 : 15~~

$$9x^2 + 41y^2 + 4z^2 = 24xy + 20yz$$

$$x = \frac{12y}{9} \Rightarrow \frac{x}{y} = \frac{4}{3}$$

$$z = \frac{10y}{4} \Rightarrow \frac{z}{y} = \frac{5}{2}$$



8. If $(x - y + 5)^2 + (x^2 + xy + y^2 - 8)^2 = 0$, then find $x^3 - y^3$?

यदि $(x - y + 5)^2 + (x^2 + xy + y^2 - 8)^2 = 0$ है, तो $x^3 - y^3$ ज्ञात कीजिये?

[A] -56

[C] 35

[B] 40

[D] -40

$$\begin{aligned} x - y &= -5 \\ x^2 + xy + y^2 &= 8 \end{aligned}$$



9. If $(a^2 + 1)(b^2 + 1) + 36 = 12(a + b)$, then $a^3 + b^3 = ?$

यदि $(a^2 + 1)(b^2 + 1) + 36 = 12(a + b)$, तो $a^3 + b^3 = ?$

[A] 198

[B] 202

[C] 140

[D] 322

$$= 6 \times (6^2 - 3 \times 1) \\ = 198$$

$$a^2b^2 + a^2 + b^2 + 1 + 36 - 12a - 12b = 0$$

$$[a^2 + b^2 + 6 - 12a - 12b + 6ab] + [a^2b^2 + 1 - 2ab] = 0$$

$$a + b = 6 \\ ab = 1$$

$$(a+b-6)^2 + (ab-1)^2 = 0$$

$\downarrow \quad \quad \downarrow$
0 0

