CDS/CAPF

VIRAAT 2.0

2024

Algebra

Mathematics Lecture - 02

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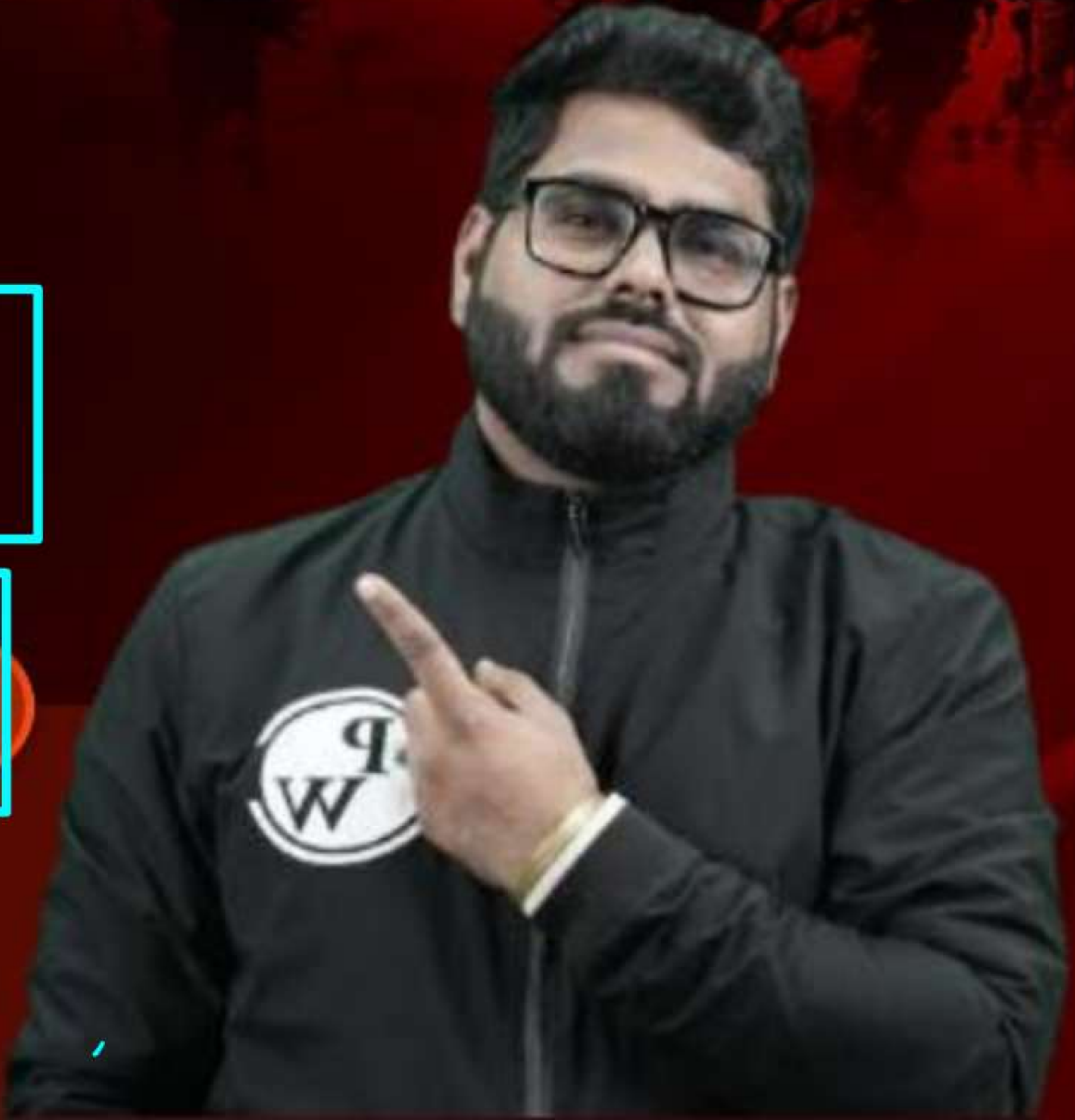

TOPICS to be covered

1. Questions
2. Different type of que
3.

If $x = \frac{\sqrt{5}+\sqrt{1}}{\sqrt{5}-\sqrt{1}}$ and $y = \frac{\sqrt{5}-\sqrt{1}}{\sqrt{5}+\sqrt{1}}$ then find the value of $\frac{x^2-xy+y^2}{x^2+xy+y^2}$?

$$x+y = \frac{2[5+1]}{5-1} = \frac{\cancel{2}\times \cancel{6}\,3}{4\,\cancel{2}}$$

$$x+y = 3$$

$$xy = 1$$

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

$$= \frac{9-3}{9-1} = \frac{\cancel{6}\,3}{\cancel{8}\,4} = 0.75$$

$$\frac{x^2+y^2-xy}{x^2+y^2+xy}$$

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

$$P = \frac{x+y}{x-y}$$

$$Q = \frac{x-y}{x+y}$$

$$P+Q = \frac{2[x^2+y^2]}{[x^2-y^2]}$$

If $a=\frac{\sqrt{3}+\sqrt{1}}{\sqrt{3}-\sqrt{1}}$ and b= $\frac{\sqrt{3}-\sqrt{1}}{\sqrt{3}+\sqrt{1}}$ then find the value of $\frac{a}{b} \cancel{\times} \frac{b}{a}$? $\Rightarrow \frac{a^2+b^2}{ab}$

$ab = 1$

$a+b = \frac{\cancel{2}[3+1]}{\cancel{[3-1]}} = 4$

$a+b = 4$

$\Rightarrow \frac{4^2-2\times1}{1}$

$\Rightarrow \frac{16-2}{1}$

$\Rightarrow \underline{\underline{14}}$

a^2+b^2 — $(a+b)$, ab

$a^2+b^2 = \underline{(a+b)^2 - 2ab}$

If $a = \frac{\sqrt{3}+\sqrt{1}}{\sqrt{3}-\sqrt{1}}$ and $b = \frac{\sqrt{3}-\sqrt{1}}{\sqrt{3}+\sqrt{1}}$ then find the value of $\frac{a^2}{b} + \frac{b^2}{a}$?

$$\frac{a^3+b^3}{ab} = \frac{64-3\times1\times4}{1}$$

$ab = 1$

$$a\times b = \frac{\cancel{\sqrt{3}+1}}{\cancel{\sqrt{3}-1}} \times \frac{\cancel{\sqrt{3}-1}}{\cancel{\sqrt{3}+1}}$$

1

$= 64-12$

$= 52$

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

$$a+b = \frac{\cancel{2}[3+1]}{[\cancel{2}-1]}$$

$a+b = 4$

If $a = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$ and b= $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ then find the value of $a^2 + b^2 - 3ab$?

$$ab = 1$$

$$a+b = \frac{2[3+2]}{3-2}$$

$$a+b = 2 \times 5 = \underline{10}$$

$$a^2+b^2+2ab-3ab-2ab$$

$$\underline{(a+b)^2-5ab}$$

$$\Rightarrow (10)^2 - 5\times 1$$

$$\Rightarrow 100-5 \Rightarrow \underline{95}$$

If $P=\frac{X+Y}{X-Y}$ and $Q=\frac{X-Y}{X+Y}$ than what is the value of $P-Q$

$$P-Q=\frac{(x+y)}{(x-y)}-\frac{(x-y)}{(x+y)}$$

$$(a+b)^2-(a-b)^2=\underline{\underline{4ab}}$$

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

$$\boxed{P-Q=\frac{4xy}{x^2-y^2}}$$

$$=\frac{4xy}{x^2-y^2}$$

If $\boxed{\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}-\frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}+\sqrt{3}}=2\sqrt{P}}$ then find the value of P ?

$$\frac{4\times\sqrt{5}\times\sqrt{3}}{5-3}$$

$$\frac{\cancel{4}^{2}\sqrt{15}}{\cancel{2}}$$

$$\cancel{2}\sqrt{15}=\cancel{2}\sqrt{P}$$

$$\boxed{P=15}$$

If $\frac{7+\sqrt{5}}{7-\sqrt{5}}-\frac{7-\sqrt{5}}{7+\sqrt{5}}=\frac{7\sqrt{5}}{11}a+b$ then find the value of $\frac{a+b}{a-b}$? $\Rightarrow \frac{1+0}{1-0}=1$

$$\frac{4\times 7\times\sqrt{5}}{49-5} \qquad \frac{7\sqrt{5}}{11}=\frac{7\sqrt{5}}{11}a+b$$

$$\frac{\cancel{4}\times 7\times\sqrt{5}}{\cancel{44}\,11} \qquad \frac{7\sqrt{5}}{11}\times 1+0=\frac{7\sqrt{5}}{11}a+b$$

$a=1$

$b=0$

If $x = 2+\sqrt{3}$ *and* $y = 2-\sqrt{3}$, then find the value of $\frac{x^2+y^2}{x^3+y^3}$?

$x+y = 2+\cancel{\sqrt{3}}+2-\cancel{\sqrt{3}}$

$x+y = 4$

$xy = (2+\sqrt{3})(2-\sqrt{3}) = 1$

$= 4-3 = 1$

$\Rightarrow \frac{4^2 - 2\times 1}{4^3 - 3\times 1\times 4}$

$\Rightarrow \frac{16-2}{64-12}$

$= \cancel{\frac{14}{52}}\ \frac{7}{26}$

$= 7/26$

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

$x^3+y^3 = (x+y)^3 - 3xy(x+y)$

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

If $x = \left(\sqrt{3} - \frac{1}{\sqrt{3}}\right)$ *and* $y = \left(\sqrt{3} + \frac{1}{\sqrt{3}}\right)$, then find the value of $\frac{x^2}{y} + \frac{y^2}{x}$?

0

$x + y = \sqrt{3} - \cancel{\frac{1}{\sqrt{3}}} + \sqrt{3} + \cancel{\frac{1}{\sqrt{3}}} = 2\sqrt{3}$

$xy = (3) - \frac{1}{(3)}$

$xy = \frac{9-1}{3} = \frac{8}{3}$

$xy = \left(\sqrt{3} - \frac{1}{\sqrt{3}}\right)\left(\sqrt{3} + \frac{1}{\sqrt{3}}\right) \Rightarrow (\sqrt{3})^2 - \left(\frac{1}{\sqrt{3}}\right)^2$

$= 3 - \frac{1}{3} = 8/3$

$\frac{x^3 + y^3}{xy} \Rightarrow \frac{8\sqrt{3} \times 3}{8} = 3\sqrt{3}$

$x^3 + y^3 = (x+y)^3 - 3xy(x+y)$

$= (2\sqrt{3})^3 - \cancel{3} \times \frac{8}{\cancel{3}} \times 2\sqrt{3}$

$= 24\sqrt{3} - 16\sqrt{3}$

$= 8\sqrt{3}$

If $x+\frac{1}{x}=4$,find the value of $\frac{x^4+\frac{1}{x^2}}{x^2-2x+1}$?

$$\Rightarrow \frac{\cancel{x}\left[x^3+\frac{1}{x^3}\right]}{\cancel{x}\left[x-2+\frac{1}{x}\right]} \Rightarrow \frac{\left(x^3+\frac{1}{x^3}\right)}{\left(x+\frac{1}{x}-2\right)}$$

$$\Rightarrow 26$$

$$x^3+\frac{1}{x^3}=4^3-3\times 4$$

$$=64-12=52$$

$$=\frac{52}{4-2}$$

$$=\frac{\cancel{52}}{\cancel{2}}=26$$

If $x+\frac{1}{x}=6$,find the value of $\frac{x^4+\frac{1}{x^2}}{x^2-2x+1}$?

$= \frac{\cancel{x}\left[x^3+\frac{1}{x^3}\right]}{\cancel{x}\left[x-2+\frac{1}{x}\right]}$

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

$x^3+\frac{1}{x^3} = 6^3 - 3\times 6$

$= 216-18$

$= 198$

$= \frac{198}{6-2}$

$= \frac{\cancel{198}\,99}{\cancel{4}\,2}$

$= \frac{99}{2} = 49.5$

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

If $a^4+\frac{1}{a^4}=1$, then find the value of $a^{49}+\frac{1}{a^{49}}$? $\Rightarrow \left(a+\frac{1}{a}\right)$

$a^4+\frac{1}{a^4}+2=1+2$

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

$a^2+\frac{1}{a^2}=\sqrt{3}$

$a^2+\frac{1}{a^2}+2=\sqrt{3}+2$

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

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

$$\boxed{\begin{gathered} x+\frac{1}{x}=1 \\ x^3=-1 \end{gathered}}$$

$a^4=x$

$\left[a^4\right]^3=-1$

$a^{12}=-1$

$\Rightarrow a\times a^{48}+\frac{1}{a\times a^{48}}$

$\Rightarrow a\times\left[a^{12}\right]^4+\frac{1}{a\times\left[a^{12}\right]^4}$

$\Rightarrow a\times 1+\frac{1}{a\times 1}=a+\frac{1}{a}$

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

$\left[x^3=-1\right]$

Maths by pramod yadav

If $(x \pm a)^2 + (y \pm b)^2 + (z \pm c)^2 = 0$

From the above equation we can say:

$$\Rightarrow x - a = 0 \Rightarrow x = a \text{ and} \Rightarrow x + a = 0 \Rightarrow x = -a$$

$$\Rightarrow y - b = 0 \Rightarrow y = b \text{ and} \Rightarrow y + b = 0 \Rightarrow y = -b$$

$$\Rightarrow z - c = 0 \Rightarrow z = c \text{ and} \Rightarrow z + c = 0 \Rightarrow z = -c$$

$2a-2b+2c$

If $a^2+b^2+c^2=2(a-b+c)-3$, find the value of $5a+2b+7c$?

$a^2+b^2+c^2=2a-2b+2c-3$

$a^2-2a+b^2+2b+c^2-2c+3=0$

$\underbrace{a^2-2a+1^2}+\underbrace{b^2+2b+1^2}+\underbrace{c^2-2c+1^2}=0$

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

$a-1=0$ $\quad$ $b+1=0$ $\quad$ $c-1=0$

$a=1$ $\quad$ $b=-1$ $\quad$ $c=1$

$a=\frac{\cancel{2}}{\cancel{2}}=1$

$b=-\frac{\cancel{2}}{\cancel{2}}=-1$

$c=\frac{\cancel{2}}{\cancel{2}}=1$

$5a+2b+7c$

$\Rightarrow 5\times1+2\times-1+7\times1$

$\Rightarrow 5-2+7$

$\Rightarrow 3+7=\underline{\underline{10}}$

If $a^2+b^2+c^2+9=\underline{\underline{4b}}-\underline{\underline{8a}}+\underline{\underline{6c}}-20$,find the value of $2a-4b+c$?

$a=\frac{-\cancel{8}}{\cancel{2}}=\ a=-4$

$c=\frac{\cancel{6}\,3}{\cancel{2}}$

$b=\frac{\cancel{4}}{\cancel{2}}=\ b=2$

$c=3$

$a^2+8a+b^2-4b+c^2-6c+9+20=0$

$a^2+8a+16+b^2-4b+4+c^2-6c+9=0$

$(a+4)^2+(b-2)^2+(c-3)^2=0$

$a=-4\quad b=2\quad c=3$

$\Rightarrow 2a-4b+c$

$\Rightarrow 2\times-4-4\times2+3$

$=-8-8+3$

$=-16+3$

$=\underline{\underline{-13}}$

If $a^2 + b^2 + c^2 = 4b - 8a + 4c - 20$,find the value of $a - b + c$?

$a = -\frac{8}{2} = -4$

$b = \frac{\cancel{4}}{\cancel{2}} = 2$

$c = \frac{\cancel{4}}{\cancel{2}} = 2$

$\Rightarrow -4 - \cancel{2} + \cancel{2}$

$\Rightarrow -4$

If $a^2 + b^2 + c^2 = 4(a - b + c) - 12$,find the value of $a + b + c$?

$= 4a - 4b + 4c$

$a = \frac{4}{2} = 2$

$b = -\frac{4}{2} = -2$

$c = \frac{4}{2} = 2$

$a + b + c$

$\cancel{2} - \cancel{2} + 2$

$= 2$

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

$$a^2+b^2+c^2-ab-bc-ca \Rightarrow \frac{1}{2}\left[2(a^2+b^2+c^2)-2(ab+bc+ca)\right]$$

$$\Rightarrow \frac{1}{2}\left[2a^2+2b^2+2c^2-2ab-2bc-2ca\right]$$

$$\Rightarrow \frac{1}{2}\left[\underbrace{a^2+b^2-2ab}+\underbrace{b^2+c^2-2bc}+\underbrace{c^2+a^2-2ca}\right]$$

$$\boxed{a^2+b^2+c^2-ab-bc-ca \Rightarrow \frac{1}{2}\left[(a-b)^2+(b-c)^2+(c-a)^2\right]}$$

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

On multiplying by 2 in numerator and denominator

$$= \frac{1}{2}[2a^2 + 2b^2 + 2c^2 - 2ab - 2bc - 2ca]$$

$$= \frac{1}{2}[a^2 + b^2 - 2ab + b^2 + c^2 - 2bc + c^2 + a^2 - 2ca]$$

$$\boxed{a^2 + b^2 + c^2 - ab - bc - ca = \frac{1}{2}[(a-b)^2 + (b-c)^2 + (c-a)^2]}$$

If $a = 876, b = 874$ and $c = 875$, Find the value of $a^2 + b^2 + c^2 - ab - bc - ca$?

2

$$a^2+b^2+c^2-ab-bc-ca = \frac{1}{2}\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$$

$$= \frac{1}{2}\left[2^2+(-1)^2+(-1)^2\right]$$

$$= \frac{1}{2}\left[4+1+1\right]$$

$$= \frac{\cancel{6}}{\cancel{2}} = 3$$

If $a = 91.5, b = 100$ and $c = 97.3$, Find the value of $a^2 + b^2 + c^2 - ab - bc - ca$?

$$= \frac{1}{2}\left[(a-b)^2 + (b-c)^2 + (c-a)^2\right]$$

$$= \frac{1}{2}\left[(-8.5)^2 + (2.7)^2 + (5.8)^2\right]$$

$$= \frac{1}{\cancel{2}} \times \cancel{113.18}\ 56.59$$

$$= \underline{\underline{56.59}}$$

$$\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 72.25 \\ 7.29 \\ 33.64 \\ \hline 113.18 \\ \hline \end{array}$$

$55^2 = 3025$

$56^2 = 3136$

$57^2 = 3249$

$58^2 = 3364$

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$$a^2+b^2+c^2-ab-bc-ca=\frac{1}{2}\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$$

Hence, $\boxed{a^3+b^3+c^3-3abc=\frac{1}{2}(a+b+c)\left[(a-b)^2+(b-c)^2+(c-a)^2\right]}$

Hence, $\boxed{a^3+b^3+c^3-3abc=(a+b+c)\left(a^2+b^2+c^2-ab-bc-ca\right)}$

$$= \quad \Rightarrow (a+b+c)\left[(a+b+c)^2-3(ab+bc+ca)\right]$$

If $a = 120, b = 125$ and $c = 129$, Find the value of $a^3 + b^3 + c^3 - 3abc$?

$= \frac{1}{2}(a+b+c)\left[(a-b)^2+(b-c)^2+(c-a)^2\right]$

$= 187\,[25+16+81]$

$\Rightarrow 187\,[122]$

$= 187 \times 122$

$\Rightarrow 187\,[100+20+2]$

$$\begin{array}{r} 120 \\ 125 \\ 129 \\ \hline \cancel{374} \\ \hline \end{array} \quad 187$$

$$\begin{array}{r} 18700 \\ 3740 \\ 374 \\ \hline 22814 \\ \hline \end{array}$$

If a + b + c = 28 and $ab + bc + ca = 42$, Find the value of $a^3 + b^3 + c^3 - 3abc$?

$= (a+b+c)\left((a+b+c)^2 - 3(ab+bc+ca)\right)$

$\Rightarrow 28\left[(28)^2 - 3 \times 42\right]$

$\Rightarrow 28\left[784 - 126\right]$

$\Rightarrow 28\left[658\right]$

$\Rightarrow 28 \times 658$

$\Rightarrow (30-2) \times 658$

$$\begin{array}{r} 19740 \\ -\ 1316 \\ \hline 18424 \end{array}$$

We know that:

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

If $a + b + c = 0$

$$a^3 + b^3 + c^3 - 3abc = \boxed{\frac{1}{2} \times 0 \times \left[(a - b)^2 + (b - c)^2 + (c - a)^2\right] = 0}$$

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

Hence, if $a + b + c = 0$, then $a^3 + b^3 + c^3 = 3abc$

or

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

If $\underbrace{(4x-1)}_{a}^3+\underbrace{(6x-3)}_{b}^3+\underbrace{(2x-4)}_{c}^3=18(4x-1)(x-2)(2x-1)$

Find the value of x?

$= 3\times 6(4x-1)(x-2)(2x-1)$

3×2

$= 3(4x-1)(2x-4)(6x-3)$

$4x-1+6x-3+2x-4=0$

$12x-8=0$

$12x=8$

$x=\cancel{\frac{8}{12}}\ \frac{2}{3}$

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

$a+b+c=0$

If $x^4 + y^4 = -z^4$, then find the value of $\frac{x^{12}+y^{12}+z^{12}}{x^4y^4z^4}$?

$$\Rightarrow \frac{3x^4 \cancel{y^4} \cancel{z^4}}{\cancel{x^4 y^4 z^4}}$$

$$\Rightarrow 3$$

$$= x^4+y^4+z^4=0$$

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

$$\underbrace{x^{12}+y^{12}+z^{12}} = \underbrace{3x^4y^4z^4}$$

$a+b+c=0$

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

If $(4x)^{\frac{1}{2}}+(9y)^{\frac{1}{2}}=-z^{\frac{1}{2}}$, Find the value of $\frac{(4x)^{\frac{3}{2}}+(9y)^{\frac{3}{2}}+z^{\frac{3}{2}}}{\sqrt{xyz}}$?

$\Rightarrow \frac{18\cancel{\sqrt{xyz}}}{\cancel{\sqrt{xyz}}} = 18$

$(4x)^{1/2}+(9y)^{1/2}+z^{1/2}=0$

$a + b + c = 0$

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

$[(4x)^{1/2}]^3 + ((9y)^{1/2})^3 + (z^{1/2})^3 = 3\times(4x)^{1/2}\times(9y)^{1/2} + z^{1/2}$

$(4x)^{3/2}+(9y)^{3/2}+z^{3/2} = 3\times 2\sqrt{x}\times 3\sqrt{y}\times\sqrt{z}$

$= 18\sqrt{xyz}$

If $x^{\frac{2}{3}} + y^{\frac{2}{3}} + z^{\frac{2}{3}} = 0$, then Find the value of $\frac{(x^2+y^2+z^2)^3}{\cancel{3y^2z^2}\; 3x^2y^2z^2}$?

$a+b+c=0$

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

$\left[x^{2/3}\right]^3 + \left[y^{2/3}\right]^3 + \left(z^{2/3}\right)^3 = 3\,x^{2/3}\,y^{2/3}\,z^{2/3}$

$x^2+y^2+z^2 = 3x^{2/3}y^{2/3}z^{2/3}$

$$= \frac{\left(3x^{2/3}y^{2/3}z^{2/3}\right)^3}{3x^2y^2z^2}$$

$$= \frac{\cancel{27} \times \cancel{x^2y^2z^2}}{\cancel{3}\cancel{x^2y^2z^2}}$$

$= 9$

$=$

If $x^a . x^b . x^c = \underline{\underline{1}}$, then find the value of $\frac{\underline{(a^3+b^3+c^3)^2}}{(abc)^2}$?

$$x^{a+b+c} = x^0$$

$$a+b+c = 0$$

$$a^3+b^3+c^3 = \underline{3abc}$$

$$\Rightarrow \frac{(3abc)^2}{(abc)^2}$$

$$= \frac{9 \times \cancel{(abc)^2}}{\cancel{(abc)^2}}$$

$$= \underline{\underline{9}}$$

Find the value of $\frac{(x-2y)^3+(2y-3z)^3+(3z-x)^3}{24(x-2y)(2y-3z)(3z-x)}$?

$\cancel{x}-\cancel{2y}+\cancel{2y}-\cancel{3z}+\cancel{3z}-\cancel{x}$

$=0$

$$\Rightarrow \frac{\cancel{3}\cancel{(x-2y)(2y-3z)(3z-x)}}{\cancel{24}\cancel{(x-2y)(2y-3z)(3z-x)}} = \frac{1}{8}$$

If $x = (2a - 3b)(c - 2d)$, $y = (c - 2a)(3b - 2d)$, $z = (3b - c)(2a - 2d)$, then find the value of $\frac{2(x^3+y^3+z^3)}{3xyz}$?

$x = \cancel{2ac} - \cancel{4ad} - \cancel{3bc} + \cancel{6bd}$

$y = \cancel{3bc} - \cancel{2dc} - \cancel{6ab} + \cancel{4ad}$

$z = \cancel{6ab} - \cancel{6bd} - \cancel{2ac} + \cancel{2dc}$

$x + y + z = 0$

$x^3 + y^3 + z^3 = 3xyz$

$= \frac{2 \times 3\cancel{xyz}}{3\cancel{xyz}}$

$= 2$

If $\dfrac{1}{\sqrt[3]{36}-\sqrt[3]{6}+1} = A\sqrt[3]{36} + B\sqrt[3]{6} + C$, find the value of $A + B + C$?

$$\frac{1}{[6^2]^{1/3} - (6)^{1/3} + 1}$$

$$\frac{(6^{1/3}+1)}{\{(6^{1/3})^2 - 1\times(6^{1/3}) + (1)^2\}(6^{1/3}+1)}$$

$$\frac{6^{1/3}+1}{(6^{1/3})^3 + (1)^3} \Rightarrow \frac{6^{1/3}+1}{6+1}$$

$$\Rightarrow \frac{\sqrt[3]{6}+1}{7}$$

$$0\times\sqrt[3]{36} + \frac{\sqrt[3]{6}}{7} + \frac{1}{7} = A\sqrt[3]{36} + B\sqrt[3]{6} + C$$

$A = 0$

$B = \frac{1}{7}$

$C = \frac{1}{7}$

$$a^3+b^3 = \underline{(a+b)(a^2-ab+b^2)}$$

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

$$A+B+C = 0 + \frac{1}{7} + \frac{1}{7}$$

$$A+B+C = \frac{2}{7}$$

If $\frac{p}{q}+\frac{q}{p}=-1(p,q\neq 0)$then find the value of$\frac{7}{8}(p^3-q^3)$?

$$\frac{p^2+q^2}{pq}=-1$$

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

$$(p-q)(p^2+q^2+pq)=0$$

$$(p^3-q^3)=0$$

$$=\frac{7}{8}\underline{(p^3-q^3)}$$

$$=\frac{7}{8}\times 0 \Rightarrow 0$$

If $x = 1 + \sqrt{2} + \sqrt{3}$ then find the value of $x + \frac{1}{x-1}$?

$x - 1 = \sqrt{2} + \sqrt{3}$

$\frac{1}{x-1} = \frac{1}{\sqrt{3}+\sqrt{2}} \times \frac{(\sqrt{3}-\sqrt{2})}{(\sqrt{3}-\sqrt{2})}$

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

$\Rightarrow 1 + \cancel{\sqrt{2}} + \sqrt{3} + \sqrt{3} - \cancel{\sqrt{2}}$

$= (1 + 2\sqrt{3})$

If $x=\sqrt[4]{1+\sqrt{2}+\sqrt{3}}$ then find the value of $x^4+\frac{1}{x^4-1}$?

$x^4 = 1+\sqrt{2}+\sqrt{3}$

$x^4-1 = \sqrt{3}+\sqrt{2}$

$\frac{1}{x^4-1} = \sqrt{3}-\sqrt{2}$

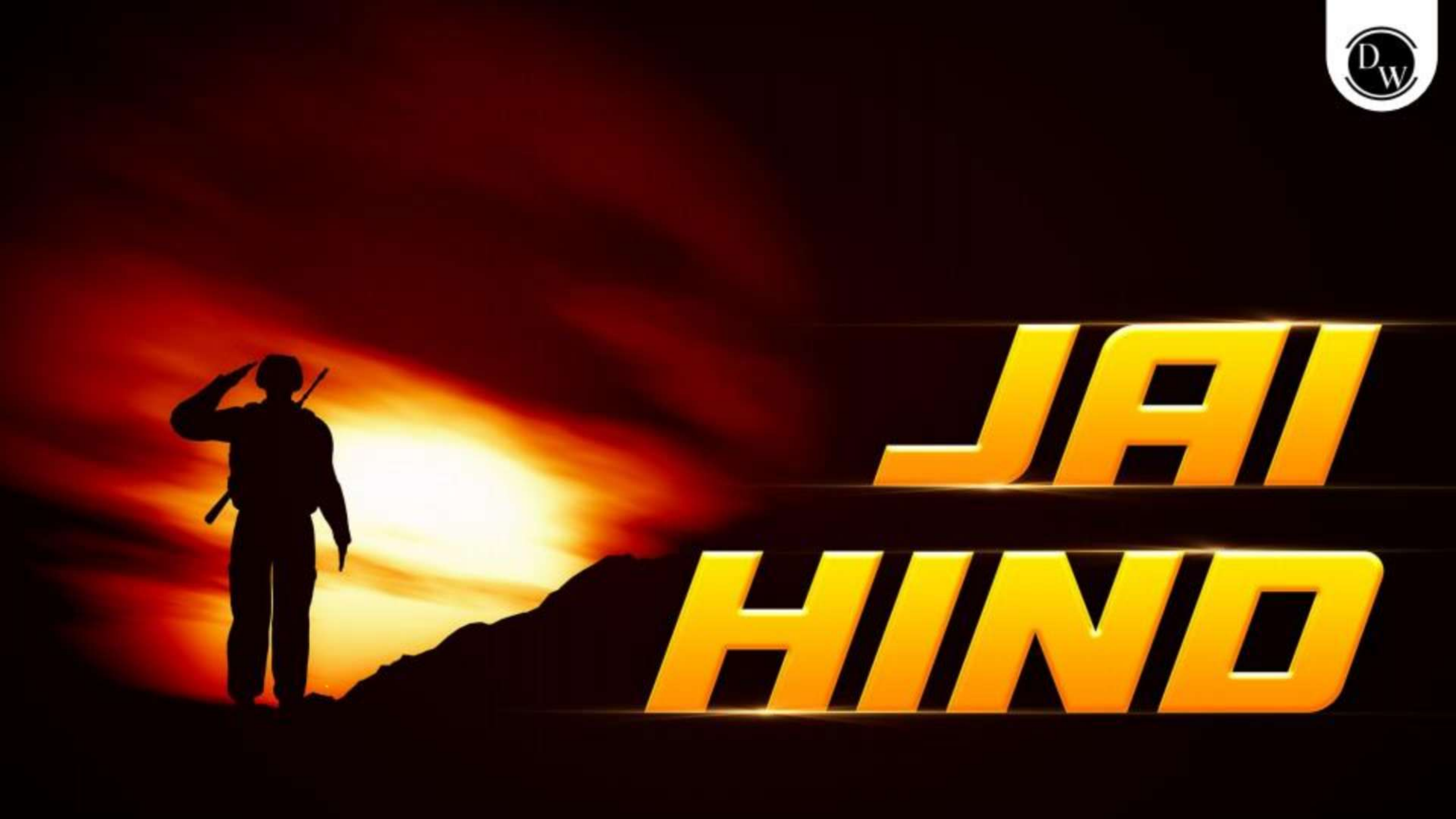
$= 1+\cancel{\sqrt{2}}+\sqrt{3}+\sqrt{3}-\cancel{\sqrt{2}}$

$= 1+2\sqrt{3}$

Homework

Maximum and minimum value – Algebraic expression

Condition of linear equation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