⇒ $ab+bc+ca=0$ then $\frac{1}{a^2-bc}+\frac{1}{b^2-ac}+\frac{1}{c^2-ab}$ का मान

$ab+bc+ca=0$

$\Rightarrow ab+ca=-bc$

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

$$\frac{1}{a(a+b+c)}+\frac{1}{b(a+b+c)}+\frac{1}{c(a+b+c)}=\frac{ab+bc+ca}{abc(a+b+c)}=\underline{0}$$

or $ab+bc+ca=0$

$a=2, b=2, c=-1$

$\frac{1}{6}+\frac{1}{6}-\frac{1}{3}=0$

⇒ $ab+bc+ca=0$ then $\frac{a^2}{a^2-bc}+\frac{b^2}{b^2-ac}+\frac{c^2}{c^2-ac}$

$a=2, b=2, c=-1$ $\quad \frac{4}{6}+\frac{4}{6}-\frac{1}{3}=1$

or $\frac{a^2}{a(a+b+c)}=\frac{1}{a^2+ab+ac}$

$$\Rightarrow \frac{1}{a^2+ab+ac}=\frac{a}{a+b+c}$$

$$\frac{a}{a+b+c}+\frac{b}{a+b+c}+\frac{c}{a+b+c}=\frac{a+b+c}{a+b+c}=\underline{1}$$

$ab+bc+ca=0$, $a=2, b=2, c=-1$

$\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0 \Rightarrow \frac{ab+bc+ca}{abc}=0$

$a=2, b=2, c=-1$

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[1]
(122) $x = \sqrt{\frac{\sqrt{5}+1}{\sqrt{5}-1}}$ · then find the value of $5x^2-5x-1$

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

$$x = \frac{\sqrt{5}+1}{2}$$

$$2x = \sqrt{5}+1 \Rightarrow 2x-1 = \sqrt{5}$$

$$4x^2+1-4x = 5$$

$$4x^2-4x = 4$$

$$x^2-x = 1$$

$$5x^2-5x-1 = 5(x^2-x)-1 = 5\times 1-1 = 5-1 = 4$$

$$\left\{ \begin{array}{l} x = \frac{\sqrt{5}+1}{2} \Leftrightarrow x^2-x-1 = 0 \\ x = \frac{\sqrt{5}-1}{2} \Leftrightarrow x^2+x-1 = 0 \end{array} \right\}$$

[34]
(123) $x = (\sqrt{2}+1)^{-1/3}$ then $x^3 - \frac{1}{x^3}$

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

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

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

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

$$= \sqrt{2}-1-\sqrt{2}-1$$

$$= -2$$

[312]

(124) $P = 99$, $P(P^2+3P+3)$ का मान ज्ञात करें

$(P^3+3P^2+3P+1^3)-1$

$= (P+1)^3 - 1$

$= (100)^3 - 1$

$= 1000000 - 1$

$= 99999$

[300]

(125) $a+b+c = 4\sqrt{3}$, $a^2+b^2+c^2 = 16$ then $a:b:c$

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

$16\times 3 = 16 + 2(ab+bc+ca)$

$ab+bc+ca = 16$

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

$\frac{1}{2}\{(a-b)^2+(b-c)^2+(c-a)^2\} = 0$

$a=b$, $b=c$, $c=a$

$a=b=c$

$\Rightarrow a:b:c = 1:1:1$

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

(126) $\left(1+\frac{1}{x}\right)\left(1+\frac{1}{x+1}\right)\left(1+\frac{1}{x+2}\right)\left(1+\frac{1}{x+3}\right)\left(1+\frac{1}{x+4}\right)\left(1+\frac{1}{x+5}\right)$

$\left(\frac{x+1}{x}\right)\left(\frac{x+2}{x+1}\right)\left(\frac{x+3}{x+2}\right)\left(\frac{x+4}{x+3}\right)\left(\frac{x+5}{x+4}\right)\left(\frac{x+6}{x+5}\right)$

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

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

(127) $\frac{2x-3y+1}{2} = \frac{x+9y+8}{3} = \frac{4x+7y+12}{5}$ then $(x+y)$ का मान

$2x-3y=1$

$x+9y=-5$

$4x+7y=-7$

$3x+6y=-4$

$4x+7y=-7$

$x+y=-3$

(128) x^2+ax+b एवं x^2+cx+d का common factor $(x+2)$ है तब a, b, c, d का मान

$x=-2$

$(-2)^2-2a+b=0$ $\Rightarrow b-2a=4$

$(-2)^2-2c+d=0$ $\Rightarrow d-2c=4$

$b-2a=d-2c$

$b-d=2(a-c)$

376

(129) $(x+3)(x-1)=1$ then $(x+3)^3-\frac{1}{(x+3)^3}$ → $(x+3)^3-(x-1)^3=?$

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

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

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

$\Rightarrow (x+3-x+1)^3+3\times1(4)$

$\rightarrow 64+12=76$

$4+(x-1)=\frac{1}{(x+3)}+4$

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

$t-\frac{1}{t}=4$

$t^3-\frac{1}{t^3}-3t\times\frac{1}{t}\left(t-\frac{1}{t}\right)=64$

$t^3-\frac{1}{t^3}=64+12$

$(x-3)^3+\frac{1}{(x-3)^3}=76$

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(130) $x(x+y+z) = 20,\ y(x+y+z) = 30,\ z(x+y+z) = 50$ then $2(x+y+z)$ का मान

$(x+y+z)(x+y+z) = 100$

$(x+y+z)^2 = 100$

$x+y+z = 10$

$2(x+y+z) = 10 \times 2 = 20$

[22]

(131) $\frac{x}{1} + \frac{y}{3} = \frac{2z}{2}$ then $\frac{x}{x-z} + \frac{z}{y-z}$ (a) 1 (b) 0 (c) 2 (d) 3

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

[52]

(132) $\underset{\frac{1}{4}}{a} + \underset{\frac{1}{4}}{b} + \underset{\frac{1}{4}}{c} + \underset{\frac{1}{4}}{d} = 1$ then maxima of $(a+1)(b+1)(c+1)(d+1)$

(a) 1 (b) $\left(\frac{1}{2}\right)^4$ (c) $\left(\frac{5}{4}\right)^4$ (d) $\left(\frac{1}{4}\right)^4$

$\left(\frac{5}{4}\right)\left(\frac{5}{4}\right)\left(\frac{5}{4}\right)\left(\frac{5}{4}\right) = \left(\frac{5}{4}\right)^4$

Or $\sqrt[4]{(a+1)(b+1)(c+1)(d+1)} \leq \frac{a+1+b+1+c+1+d+1}{4}$

$\leq \frac{a+b+c+d+4}{4} \leq \frac{5}{4}$

$(a+1)(b+1)(c+1)(d+1) \leq \left(\frac{5}{4}\right)^4$

(133) $\underset{1}{x} + \underset{1}{y} + \underset{-2}{z} = 0$ then $\frac{x^2}{yz} + \frac{y^2}{xz} + \frac{z^2}{xy}$

(a) 3 (b) 9 (c) $x^2+y^2+z^2$ (d) $(xyz)^2$

$\frac{1}{-2} + \frac{1}{-2} + \frac{4}{1} = -1+4 = 3$

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(134) $a+b+c=0$ then $\frac{a^2+b^2+c^2}{a^2-bc}$

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

$\frac{1+1+4}{1+2} = \frac{6}{3} = 2$

(135) $a+b+c=0$ then $\left(\frac{a+b}{c}+\frac{b+c}{a}+\frac{c+a}{b}\right)\left(\frac{a}{b+c}+\frac{b}{c+a}+\frac{c}{a+b}\right)$.

(a) 0 (b) 3 (c) 9 (d) 4

$(-1-1-1)(-1-1-1) = 3\times 3 = 9$

(136) $a+b+c=2s$ then $\frac{(s-a)^2+(s-b)^2+(s-c)^2+s^2}{a^2+b^2+c^2}$

(a) $a^2+b^2+c^2$ (b) 0 (c) 1 (d) 2

$\frac{0+1+1+0}{1+1} = 2$

[105]

(137) $a^2+b^2=5ab$ then $\frac{a^2}{b^2}+\frac{b^2}{a^2}$

$\frac{a^2}{ab}+\frac{b^2}{ab}=\frac{5ab}{ab}$

$\frac{a}{b}+\frac{b}{a}=5$

$\frac{a^2}{b^2}+\frac{b^2}{a^2}+2\frac{a}{b}\times\frac{b}{a}=25$

$\frac{a^2}{b^2}+\frac{b^2}{a^2}=23$

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120]

(138) $\frac{x-a^2}{b+c} + \frac{x-b^2}{a+c} + \frac{x-c^2}{a+b} = 4(a+b+c)$ then $x =$

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

$a=b=c=1$ $\quad (1+1+1)^2 = 9$

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

$\frac{x-1}{2} + \frac{x-1}{2} + \frac{x-1}{2} = 4 \times 3$

$3x - 3 = 24$

$x - 1 = 8 \Rightarrow x = 9$

128]

(139) $a+b=1$, $c+d=1$ & $\frac{a-b}{c} = \frac{a^{1/2}}{c^{1/2}}$ then c^2-d^2

1 0 $\quad$ 1/2 1/2 $\quad$ 1 0

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

$0-0=0$

145]

(140) $a+b+c+d = 4$ then $\frac{1}{(1-a)(1-b)(1-c)} + \frac{1}{(1-b)(1-c)(1-d)} + \frac{1}{(1-c)(1-a)(1-a)} + \frac{1}{(1-d)(1-a)(1-b)}$

0 0 0 4

(a) 0 (b) 1 (c) 4 (d) 5

$\frac{x}{1} - \frac{x}{3} - \frac{1}{3} - \frac{x}{3} = 0$

155]

(141) $x = a + \frac{1}{a}$, $y = a - \frac{1}{a}$ then $x^4 - 2x^2y^2 + y^4$

(a) 12 (b) 16 (c) 18 (d) 24

$x = 2, y = 0$ $\quad (2)^4 - 2 \times 2 \times 0 + 0$

$= 16$

[213]
(142) $(x+y+z)^3 - (y+z-x)^3 - (z+x-y)^3 - (x+y-z)^3$ का मान

(a) 12 xyz (b) 24 xyz (c) 36 xyz (d) 0

$27-1-1-1 = 24$

[247]
(143) $(a^2+4b^2+4b-4ab-2a-8)$ का गुणक (factor) होगा

(a) $(a^2-2b-4)(a-2b+2)$ $a=1, b=2$

(b) $(a-b-2)(a-4b-4)$ × $1+16+8-8-2-8 = 7$

(c) $(a+2b-4)(a+2b+2)$

(d) $(a+2b-1)(a-2b+1)$ ×

[248]
(144) $\frac{1}{a^2+ax+a^2} - \frac{1}{a^2-ax+x^2} + \frac{2ax}{a^4+a^2x^4+x^4}$ का मान

(a) 2 (b) 1 (c) −1 (d) 0

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

$\frac{1}{3} - 1 + \frac{2}{3} = 0$

[249]
(145) $a+b+c=0$, $(a+b-c)^2 + (b+c-a)^2 + (c+a-b)^2 =$
$1\ 1\ -2$ $16+4+4 = 24$

(a) 0 (b) 8abc (c) $4(a^2+b^2+c^2)$ (d) $4(ab+bc+ca)$
$4(1+1+4)$
4×6

[302]
(146) $\frac{x}{ax+by+cz} = \frac{y}{ay+bz+cx} = \frac{z}{az+bx+cy} = k$

(a) $\frac{1}{a+b+c}$ (b) $\frac{1}{a+b-c}$ (c) $\frac{1}{a-b+c}$ (d) $\frac{1}{a-b-c}$

$\frac{1}{a+b+c} = \frac{1}{a+b+c} = \frac{1}{a+b+c}$

[304]

(147) $x = \sqrt[3]{a+\sqrt{a^2+b^3}} + \sqrt[3]{a-\sqrt{a^2+b^3}}$ तो $x^3+3bx =$

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

$a=0, b=1$

$x = \sqrt[3]{1} + \sqrt[3]{-1} = 0$

$a=1, b=0$

$x = \sqrt[3]{2}+0 \Rightarrow x^3 = 2$

[321]

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

(a) a^2+b^2 (b) $a^2+b^2+c^2$ (c) $a^2-b^2-c^2$ (d) $a^2+b^2-c^2$

$a=b=c=1$

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

$m-1 = 2 \Rightarrow \boxed{m=3}$

(149) $x+y+z=19$, $x^2+y^2+z^2=133$ और $xy = y^2$ है तो z व x में अन्तर

$(x+y+z)^2 = x^2+y^2+z^2+2(xy+yz+zx)$

$361-133 = 2(xy+yz+zx)$

$\frac{228}{2} = xy+yz+y^2$

$114 = y(x+y+z) \Rightarrow y = \frac{114}{19} = 6$

$x+z = 19-y \Rightarrow x+z = 19-6 = 13$

$x-z = \sqrt{169-4xz} = \sqrt{169-4\times 36} = \sqrt{169-144}$

$x-z = \sqrt{25}$

$x-z = 5$