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

a+b+c ની whole Square = $a^2+b^2+c^2$ + 2 × $ab+bc+ca$

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

$a+b+c$	$a^2+b^2+c^2$	$ab+bc+ca$
$\sqrt{5+14}=\sqrt{19}$	5	7
5	4	$\frac{25-4}{2}$
7	$49-6=43$	3

Mental Practice:

$a+b+c$	$a^2+b^2+c^2$	$ab+bc+ca$
6	20	$\frac{36-20}{2}=8$
15	83	71
19	$361-228=133$	114
11	$121+12=133$	-6

$225-83=142$, $\frac{142}{2}=71$

All are the same identity:

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

$b \to -b$

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

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

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

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

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

$ab-bc-ca = \frac{144-110}{2}$

$= \frac{34}{2} = 17$

337. If $a+b-c=12$ and $a^2+b^2+c^2=110$, then which among the following relations is true?

(p) $ab+bc+ca=34$

(q) $ab+bc-ca=17$

(r) $ab-bc+ca=17$

(s) $ab-bc-ca=17$ ✓

यदि $a+b-c=12$ और $a^2+b^2+c^2=110$, तो निम्नलिखित में से कौन सा संबंध सत्य है?

(p) $ab+bc+ca=34$

(q) $ab+bc-ca=17$

(r) $ab-bc+ca=17$

(s) $ab-bc-ca=17$

a) r b) q

c) p d) s ✓✓

338. If $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = (Ax + y + Bz)^2$, then the value of $(A^2 + B^2 - AB)$ is:

यदि $2x^2 + y^2 + 8z^2 - 2\sqrt{2}xy + 4\sqrt{2}yz - 8zx = (Ax + y + Bz)^2$, तो $(A^2 + B^2 - AB)$ का मान है:

a) 16 b) 14

c) 6 d) 18

$(\sqrt{2}x)^2 + (y)^2 + (2\sqrt{2}z)^2$

$-2\cdot\sqrt{2}xy + 2\cdot y\,2\sqrt{2}z - 2\cdot\sqrt{2}x \times 2\sqrt{2}z$

$(-\sqrt{2}x + y + 2\sqrt{2}z)^2$

$2 + 8 + 4$

$-\sqrt{2}$ $2\sqrt{2}$

339. If $x + y + z = 19$, $x^2 + y^2 + z^2 = 133$ and $xz = y^2$, then the difference between z and x is:

यदि $x + y + z = 19$, $x^2 + y^2 + z^2 = 133$ और $xz = y^2$ है, तो x और z के बीच अंतर है:

a) 6 b) 5 c) 3 d) 4

$xy + yz + zx = \frac{361 - 133}{2} = 114$

228

$+y^2$

$y(x+z+y) = 114$

$19 \quad 6$

$y = 6$

$xz = 6^2 = 36$

9×4

$x + z = 13$

340. If $x^2(x+y+z)=36$, $y^2(x+y+z)=81$, $z^2(x+y+z)=144$, $xy(x+y+z)=54$, $yz(x+y+z)=108$, $zx(x+y+z)=72$, then $x=$?

यदि $x^2(x+y+z)=36$, $y^2(x+y+z)=81$, $z^2(x+y+z)=144$, $xy(x+y+z)=54$, $yz(x+y+z)=108$, $zx(x+y+z)=72$ है, तो x का मान ज्ञात करो |

a) 6 b) 7 c) 2 d) 4

$(x+y+z)(x^2+y^2+z^2)=261$

$+\ 2(x+y+z)(xy+yz+zx)=468$

$(x+y+z)(x+y+z)^2=729$

$(x+y+z)^3=729$

341. If $a+b+c=2$ and $ab+bc+ca=-1$, then $(a+b)^2+(b+c)^2+(c+a)^2=?$

यदि $a+b+c=2$ और $ab+bc+ca=-1$ है, तो $(a+b)^2+(b+c)^2+(c+a)^2$ ज्ञात करो |

a) 5 b) 10 c) 6 d) 25

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

$$4-(-2)$$

$$=6$$

$$=10$$

342. If $x = 2 + \sqrt{3}$, $y = 2 - \sqrt{3}$ and $z = 1$, then what is the value of $\frac{x}{yz} + \frac{y}{xz} + \frac{z}{xy} + 2\left[\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right] = ?$

यदि $x = 2 + \sqrt{3}$, $y = 2 - \sqrt{3}$ तथा $z = 1$ है, तो $\frac{x}{yz} + \frac{y}{xz} + \frac{z}{xy} + 2\left[\frac{1}{x} + \frac{1}{y} + \frac{1}{z}\right] = ?$ का मान क्या है?

a) 25 b) 22 c) 17 d) 43

$$\frac{x^2+y^2+z^2+2yz+2xz+2xy}{xyz}$$

$$\frac{(x+y+z)^2}{xyz} = \frac{25}{1}$$

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343. $a+b+c=3, \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=2, a^2+b^2+c^2=6,$ find $abc=$?

$a+b+c=3, \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=2, a^2+b^2+c^2=6$ है, abc ज्ञात करो |

a) $\frac{4}{3}$ b) $\frac{1}{4}$ c) $\frac{3}{4}$ d) Can't say

$$\frac{ab+bc+ca}{abc}=2$$

$$\frac{9-6}{2}=\frac{3}{2}$$

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

$x = \frac{p}{a}$

$y = \frac{q}{b}$

$z = \frac{r}{c}$

344. If $\frac{p}{a}+\frac{q}{b}+\frac{r}{c}=1$ & $\frac{a}{p}+\frac{b}{q}+\frac{c}{r}=0$, where p, q, r and a, b, c are non zero, then the value of $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}=?$

अगर $\frac{p}{a}+\frac{q}{b}+\frac{r}{c}=1$ & $\frac{a}{p}+\frac{b}{q}+\frac{c}{r}=0$, जहाँ p, q, r और a, b, c गैर शून्य हैं, तो $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}=?$

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

$x+y+z=1$

$\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$

$\frac{xy+yz+zx}{xyz}=0$

$\Rightarrow xy+yz+zx=0$

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

$1-2\times 0=1$

345. If $\frac{p}{a}+\frac{q}{b}+\frac{r}{c}=1, \frac{a}{p}+\frac{b}{q}+\frac{c}{r}=1, pqr=-1$ and $abc=1$ and p, q, r & a, b, c are non-zero, then find $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}$.

यदि $\frac{p}{a}+\frac{q}{b}+\frac{r}{c}=1, \frac{a}{p}+\frac{b}{q}+\frac{c}{r}=1, pqr=-1$ और $abc=1$ है, और p, q, r व a, b, c गैर शून्य संख्याएँ हैं, तो $\frac{p^2}{a^2}+\frac{q^2}{b^2}+\frac{r^2}{c^2}$ ज्ञात करो |

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

$x=\frac{p}{a}$ $y=\frac{q}{b}$ $z=\frac{r}{c}$

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

$\frac{xy+yz+zx}{xyz}=1$

$xyz=\frac{pqr}{abc}=\frac{-1}{1}=-1$

$xy+yz+zx=-1$

$x^2+y^2+z^2$

$=1-(-2)=3$

346. If $a-\frac{1}{a}=b$, $b-\frac{1}{b}=c$ and $c-\frac{1}{c}=a$, then $\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca}=?$

यदि $a-\frac{1}{a}=b, b-\frac{1}{b}=c$ तथा $c-\frac{1}{c}=a$ है, तो $\frac{1}{ab}+\frac{1}{bc}+\frac{1}{ca}=?$

a)-3 b)-6 c)-1 d)-9

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

$\frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0$

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

$\frac{1}{a^2}+\frac{1}{b^2}+\frac{1}{c^2}=6$

$x=\frac{1}{a}$ $y=\frac{1}{b}$ $z=\frac{1}{c}$

$xy+yz+zx=\frac{0^2-12}{2}=-6$

Concept:

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

diff का Square

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

a = 2019
b = 2020
C = 2022
3
1
2

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

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

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

347. If $a = 7, b = 5, c = 3$, then the value of $a^2 + b^2 + c^2 - ab - bc - ca$ is

अगर $a = 7, b = 5, c = 3$ है तो $a^2 + b^2 + c^2 - ab - bc - ca$ का मान:

a) 12 b) -12 c) 0 d) 8

$$\frac{1}{2}[4+4+16] = 12$$

348. If $x = 2019, y = 2020, z = 2021$ then the value of $x^2 + y^2 + z^2 - xy - yz - zx = ?$

अगर $x = 2019, y = 2020, z = 2021$ **है तो** $x^2 + y^2 + z^2 - xy - yz - zx = ?$

a) 3 b) 4 c) 6 d) 2

$$\frac{1}{2}[1+1+4] = 3$$

349. If $x = 997, y = 998, z = 999$ then the value of $x^2 + y^2 + z^2 - xy - yz - zx = ?$

अगर $x = 997, y = 998, z = 999$ **है तो** $x^2 + y^2 + z^2 - xy - yz - zx = ?$

a) 0 b) 1 c) -1 d) 3

$\frac{1}{2}[1+1+4]$

350. If $x + y + z = 22$ and $xy + yz + zx = 35$, then what is the value of $(x - y)^2 + (y - z)^2 + (z - x)^2$?

यदि $x + y + z = 22$ तथा $xy + yz + zx = 35$ है, तो $(x - y)^2 + (y - z)^2 + (z - x)^2$ का मान क्या है?

a) 379 b) 681 c) 758 d) 715

$$x^2+y^2+z^2-(xy+yz+zx) = (x+y+z)^2 - 3(xy+yz+zx)$$

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

$$\frac{1}{2}\square = 484 + 105$$

$$\square = 379$$

351. If $xy + yz + zx = 6$ and $x^2 + y^2 + z^2 = 13$ then $\frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2] = ?$

अगर $xy + yz + zx = 6$ और $x^2 + y^2 + z^2 = 13$ है, तो $\frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2] = ?$

a) 35 b) 30 c) 25 d) 24

$\sqrt{13+12} = 5$

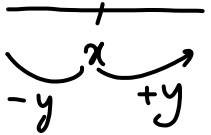
$\times 5 \times [25 - 18] =$

$(13-6) \times 5 = 35$

352. If $a = x + y, b = x - y, c = x + 2y$ then $a^2 + b^2 + c^2 - ab - bc - ca = ?$

अगर $a = x + y, b = x - y, c = x + 2y$ है तो $a^2 + b^2 + c^2 - ab - bc - ca = ?$

a) $4y^2$ b) $5y^2$ c) $6y^2$ d) $7y^2$



$$\frac{1}{2}\left[4y^2 + 9y^2 + y^2\right]$$

$$= \frac{14y^2}{2}$$

$$= 7y^2$$

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

$a = b = c$

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

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

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

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

353. If $a^2 + b^2 + c^2 - ab - bc - ca = 0$ then $a : b : c$ is :

अगर $a^2 + b^2 + c^2 - ab - bc - ca = 0$ है तो $a : b : c$ है:

a) $1 : 2 : 1$ b) $2 : 1 : 1$ c) $1 : 1 : 2$ d) $1 : 1 : 1$

354. If $x^2 + y^2 + z^2 = xy + yz + xz$ then the value of $\frac{3x^4+7y^4+5z^4}{5x^2y^2+7y^2z^2+3z^2x^2}$ is

अगर $x^2 + y^2 + z^2 = xy + yz + xz$ है तो $\frac{3x^4+7y^4+5z^4}{5x^2y^2+7y^2z^2+3z^2x^2}$ = ?

a) 2 b) 1 c) 0 d) – 1

$x=y=z$

x

$= 1$

$\frac{15x^4}{15x^4} = 1$

355. If $x^2 + y^2 + z^2 = xy + yz + xz$ then the value of $\frac{3x^4+7y^4+5z^4}{x^2y+y^2z+z^2x}$ is

अगर $x^2 + y^2 + z^2 = xy + yz + xz$ है तो $\frac{3x^4+7y^4+5z^4}{x^2y+y^2z+z^2x} = ?$

a) 2 b) 5 c) 0 d) Can't say

$x = y = z$

x

$\frac{5 + 5x^4}{3x^3} = 5x$

356. For real a, b, c if $a^2 + b^2 + c^2 = ab + bc + ca$, the value of $\frac{a+c}{b}$ is :

वास्तविक संख्याएं a, b, c के लिए अगर $a^2 + b^2 + c^2 = ab + bc + ca$ है तो $\frac{a+c}{b}$ का मान:

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

$a = b = c$

357. If $x \neq 0, y \neq 0, z \neq 0$ and $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{xy}+\frac{1}{yz}+\frac{1}{zx}$ then the relation among x, y, z is

अगर $x \neq 0, y \neq 0, z \neq 0$ और $\frac{1}{x^2}+\frac{1}{y^2}+\frac{1}{z^2}=\frac{1}{xy}+\frac{1}{yz}+\frac{1}{zx}$ है तो x, y, z का क्या रिश्ता है?

a) $x+y+z=0$

b) $x+y=z$

c) $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$

d) $x=y=z$

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

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

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

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

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

$\Rightarrow x=y=z$

358. If $3\left(a^2+b^2+c^2\right)=(a+b+c)^2$, then the relation between a, b and c is

अगर $3\left(a^2+b^2+c^2\right)=(a+b+c)^2$ है तो a,b और c में क्या सम्बन्ध है?

a) $a \neq b \neq c$ b) $a=b \neq c$

c) $a \neq b=c$ d) $a=b=c$

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

$$\Rightarrow 2\left(a^2+b^2+c^2-ab-bc-ca\right)=2\times 0$$

$$a=b=c$$