Rare identities:

$$(a+b+c)^3 = a^3+b^3+c^3+3(a+b)(b+c)(c+a)$$

$$= a^3+b^3+c^3+3\left[a^2(b+c)+b^2(c+a)+c^2(a+b)\right]$$

$$+6abc$$

$$(a+1)(b+1) = ab + a + b + 1$$

$$(a-1)(b-1) = ab - a - b + 1$$

$a^3+b^3+c^3+3(a+b)(b+c)(c+a)$ a

$= (a+b+c)^3$

$= \left(\frac{1}{2}+\frac{3}{2}+6\right)^3 = 8^3$

$= 512$

508. Simplify the following expression b c

$\left(\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\right)+\left(\frac{3}{2}\times\frac{3}{2}\times\frac{3}{2}\right)+(6\times 6\times 6)+3\left(\frac{1}{2}+\frac{3}{2}\right)\left(\frac{1}{2}+6\right)\left(6+\frac{3}{2}\right)$

निम्नलिखित व्यजक को हल कीजिए |

$\left(\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}\right)+\left(\frac{3}{2}\times\frac{3}{2}\times\frac{3}{2}\right)+(6\times 6\times 6)+3\left(\frac{1}{2}+\frac{3}{2}\right)\left(\frac{1}{2}+6\right)\left(6+\frac{3}{2}\right)$

a) 64
b) 521
c) 256
d) 512 ✓

$$\underbrace{(x+y)^{\frac{1}{3}}}_{a}+\underbrace{(y+z)^{\frac{1}{3}}}_{b}+\underbrace{(z+x)^{\frac{1}{3}}}_{c}=0$$

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

$$(x+y)+(y+z)+(z+x)=3(x+y)^{\frac{1}{3}}\times(y+z)^{\frac{1}{3}}\times(z+x)^{\frac{1}{3}}$$

$$\Rightarrow 2(x+y+z)=$$

$$\Rightarrow 8(x+y+z)^3=27(x+y)(y+z)(z+x)$$

509. If $(x+y)^{\frac{1}{3}}+(y+z)^{\frac{1}{3}}=-(z+x)^{\frac{1}{3}}$, then $(x^3+y^3+z^3)$ can be expressed as:

अगर $(x+y)^{\frac{1}{3}}+(y+z)^{\frac{1}{3}}=-(z+x)^{\frac{1}{3}}$, तो $(x^3+y^3+z^3)$ को किस रूप में व्यक्त किया जा सकता है:

a) $(x+y)(y+z)(z+x)$

b) $\frac{1}{8}xyz$

c) $\frac{3}{8}(x+y)(y+z)(z+x)$

d) $3xyz$

$$x^3+y^3+z^3+3(x+y)(y+z)(z+x)=\frac{27}{8}(x+y)(y+z)(z+x)$$

$$=\left(\frac{27}{8}-3\right)\boxed{}$$

$$=\frac{3}{8}\boxed{}$$

510. If $A = \frac{(0.1)^3+(0.2)^3+(0.3)^3+3(0.005+0.016+0.027)+0.036}{(0.1)^2+(0.2)^2+(0.3)^2+0.04+0.06+0.12}$, Then the value of $60A$ is:

यदि $A = \frac{(0.1)^3+(0.2)^3+(0.3)^3+3(0.005+0.016+0.027)+0.036}{(0.1)^2+(0.2)^2+(0.3)^2+0.04+0.06+0.12}$ तो, $60A$ का मान है:

a) 20 b) 60 c) 36 d) 30

a b c $.1^2(.2+.3)$ $6x.1x.2x.3$ $6abc$

$$A = \frac{a^3+b^3+c^3+3\left[a^2(b+c)+b^2(c+a)+c^2(a+b)\right]+6abc}{a^2+b^2+c^2+2ab+2bc+2ca}$$

$$= \frac{(a+b+c)^3}{(a+b+c)^2} = a+b+c = .6$$

$60x.6 = 36$

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511. A and B are positive integers, If $A + B + AB = 65$, then what is the difference between A and B ($A, B < 15$)?

A तथा B धनात्मक पूर्णांक है| यदि $A + B + AB = 65$ है, तो A तथा B के मध्य अंतर क्या है? ($A, B < 15$)

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

$AB + A + B + 1$

$(A+1)(B+1)$

$(A+1)(B+1) = 66$

× 1 × 66

× 2 × 33

× 3 × 22

6 × 11

11 × 6

$A, B = 10, 5$

512. A and B are positive integers, If $A + B + AB = 23$, then how many values can $(A - B)$ have?

A तथा B धनात्मक पूर्णांक है| यदि $A + B + AB = 23$ है, तो $(A - B)$ के कितने मान हो सकते हैं?

a) 3 b) 6 c) 8 d) 4

+1 +1

$(A+1)(B+1) = 24$

A B

$0 - 23 = -23$

$A - B = (A+1) - (B+1)$

$1 \times 24 = -23$

2×12

3×8

$4 \times 6 = -2$

$6 \times 4 = 2$

4

4

$(a+b+c)(ab+bc+ca)-abc$

$=(a+b)(b+c)(c+a)$

formula

$c=0$

$(a+b)ab$

$b=0$

$(a+c)ac$

Q13. Solve the following $(a+b+c)(ab+bc+ca)-abc=?$

निम्नलिखित को हल करें $(a+b+c)(ab+bc+ca)-abc=?$

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

b) $(a-b)(b-c)(c-a)$

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

d) $(a+b)(b+c)(c+a)$

Misc:

Q14. If $a+b+c=0$ then the value of $(a+b)(b+c)(c+a)+abc$ is equal to:

यदि $a+b+c=0$ है, तो $(a+b)(b+c)(c+a)+abc$ का मान बराबर है :

a) -1 b) 1 c) 0 d) 18

$a+b=-c$

$b+c=-a$

$-c \times -a \times -b$

$-abc+abc=0$

515. If $a + b + c = 0$ then the value of $\frac{1}{(a+b)(b+c)} + \frac{1}{(b+c)(c+a)} + \frac{1}{(c+a)(a+b)}$ is

यदि $a + b + c = 0$ तो $\frac{1}{\underbrace{(a+b)}_{-c}\underbrace{(b+c)}_{-a}} + \frac{1}{\underbrace{(b+c)}_{-a}\underbrace{(c+a)}_{-b}} + \frac{1}{\underbrace{(c+a)}_{-b}\underbrace{(a+b)}_{-c}}$ का मान निकालें

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

$$\frac{1}{ac} + \frac{1}{ab} + \frac{1}{bc}$$

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

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

अगर $a+b+c=0$ है तो $\left(\frac{a+b}{c}+\frac{b+c}{a}+\frac{c+a}{b}\right)\left(\frac{a}{b+c}+\frac{b}{c+a}+\frac{c}{a+b}\right)$ का मान:

a) 8 b) -3 c) 9 d) 0

$(-1-1-1)(-1-1-1)$

$= -3 \times -3 = 9$

517. The coefficient of x^3y in $(x-2y)\times(5x+y)^3$ is:

$(x-2y)\times(5x+y)^3$ में x^3y का गुणांक (coefficient) ज्ञात करें|

a) 75 b) – 150 c) 250 d) – 175

$3\times25\times x^2y$

(i) $x \times x^2y$

$1 \times 75 = 75$ x^3y^3

(ii) $y \times x^3$

$-2\times125 = -250$ -175

$(2a-3b)(a^3+3a^2b)$

a^3b

$a\times a^2b$ a^3b

$2\times3 = 6a^3b$

$b\times a^3$

$-3\times1 = -3a^3b$

$3a^3b$

518. What should be added to $x^4 + 8x^3 + 26x^2 + 40x + 15$ to obtain a perfect square

$x^4 + 8x^3 + 26x^2 + 40x + 15$ में क्या जोड़े ताकि एक पूर्ण वर्ग मिले .

a) 5 b) 10 c) 15 d) 21

$x = 0$ 15

$x = 1$ $1+8+26+40+15 = 90$

Q19. If $a+\frac{1}{b}=1$ and $b+\frac{1}{c}=1$ then $c+\frac{1}{a}$ is equal to

अगर $a+\frac{1}{b}=1$ और $b+\frac{1}{c}=1$ है तो $c+\frac{1}{a}$:

a) 0 b) $\frac{1}{2}$ c) 1 d) 2

$c=1$

$\times$

$b+1=1$

$b=0$

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

$b+2=1$

$b=-1$

$a-1=1$

$a=2$

$c+\frac{1}{a}=\frac{1}{2}+\frac{1}{2}=1$

SSC CGL T2, 12 Jan 2017

5 20. If a, b, c are non-zero, $a + \frac{1}{b} = 1$ and $b + \frac{1}{c} = 1$, then the value of abc is

अगर a, b, c गैर शून्य हैं, $a + \frac{1}{b} = 1$ और $b + \frac{1}{c} = 1$, तो abc का मूल्य:

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

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

$b + 2 = 1$

$b = -1$

$a - 1 = 1$

$a = 2$

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

$= -1$

521. If $a^2 + b^2 + c^2 = 16, x^2 + y^2 + z^2 = 25$ and $ax + by + cz = 20$, then the value of $\frac{a+b+c}{x+y+z}$ $= \frac{4+0+0}{5+0+0} = \frac{4}{5}$

यदि $a^2 + b^2 + c^2 = 16, x^2 + y^2 + z^2 = 25$ और $ax + by + cz = 20$ हो, तो $\frac{a+b+c}{x+y+z}$ का मान निकालें ? $y=0$

a) $\frac{3}{5}$ b) $\frac{5}{3}$ c) $\frac{4}{5}$ d) $\frac{5}{4}$

$ax = 20$

$c = 0$ $z = 0$ $a^2 = 16$ $x = 5$

$b = 0$ $a = 4$

S22. If $\frac{b-c}{a}+\frac{a+c}{b}+\frac{a-b}{c}=1$ and $a-b+c\neq 0$, then which one of the following relation is true ?

यदि $\frac{b-c}{a}+\frac{a+c}{b}+\frac{a-b}{c}=1$ और $a-b+c\neq 0$ है, तो तो निम्न में से कौन सा कथन सत्य है ?

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

$b=c=1$

$a+1+a-1=1$

$2a=1$

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

$1=2+1$

$1=2+1$

Q23. If $ax + by = 1$ and $bx + ay = \frac{2ab}{a^2+b^2}$ then $(x^2 + y^2)(a^2 + b^2)$ is equal to

यदि $ax + by = 1$ और $bx + ay = \frac{2ab}{a^2+b^2}$ हो तो $(x^2 + y^2)(a^2 + b^2)$ किसके बराबर है ?

a) 1 b) 2 c) 0.5 d) 0

$y = 0$

$b = 0$

$ax = 1$

$0 = 0$

$y = 0$

$a = 0$

$0 = 1$ ✗

$0 \quad 0$

$x^2 \times a^2 = (xa)^2$

$= (1)^2 = 1$

524. If $\sqrt{\frac{x}{y}} = \frac{10}{3} - \sqrt{\frac{y}{x}}$ and $x - y = 8$, then the value of xy is equal to

यदि $\sqrt{\frac{x}{y}} = \frac{10}{3} - \sqrt{\frac{y}{x}}$ और $x - y = 8$ है, तो xy का मान बराबर है :

a) 36 b) 24 c) 16 d) 9

$$\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = \frac{10}{3} = 3\frac{1}{3} = 3 + \frac{1}{3}$$

$\sqrt{\frac{x}{y}} = 3, \frac{1}{3}$

$\frac{x}{y} = 9, \frac{1}{9}$

$x = 9$

$y = 1$

CDS 14 Feb 2016

$$\sqrt{\frac{x}{y}} + \sqrt{\frac{y}{x}} = \frac{10}{3}$$

$a = \sqrt{\frac{x}{y}}$

$$\Rightarrow a + \frac{1}{a} = \frac{10}{3}$$

$\sqrt{\frac{x}{y}} = 3, \frac{1}{3}$

$(3a)\times \Rightarrow 3a^2 - 10a + 3 = 0$

$$a = \frac{10 \pm 8}{6} = 3, \frac{1}{3}$$

$\sqrt{100-3x}$

525. If $\sqrt{\frac{x}{y}} = \frac{24}{5} + \sqrt{\frac{y}{x}}$ and $x + y = 26$, then what is the value of xy?

यदि $\sqrt{\frac{x}{y}} = \frac{24}{5} + \sqrt{\frac{y}{x}}$ और $x + y = 26$ है, तो xy का मान क्या होगा ?

a) 5 b) 15 c) 25 d) 30

$$\sqrt{\frac{x}{y}} - \sqrt{\frac{y}{x}} = \frac{24}{5} = 5 - \frac{1}{5}$$

$$\Rightarrow \sqrt{\frac{x}{y}} = 5$$

$$\Rightarrow \frac{x}{y} = \frac{25}{1}$$

$x = 25$

$y = 1$

Q26. If $3\sqrt{\frac{1-a}{a}} + 9 = 19 - 3\sqrt{\frac{a}{1-a}}$, then what is the value of a?

यदि $3\sqrt{\frac{1-a}{a}} + 9 = 19 - 3\sqrt{\frac{a}{1-a}}$ है, तो a का मान क्या है?

a) $\frac{3}{10}, \frac{7}{10}$ b) $\frac{1}{10}, \frac{9}{10}$ c) $\frac{2}{5}, \frac{3}{5}$ d) $\frac{1}{5}, \frac{4}{5}$

$$3\sqrt{\frac{1-a}{a}} + 3\sqrt{\frac{a}{1-a}} = \frac{10}{3} = 3\frac{1}{3} = 3 + \frac{1}{3}$$

$$\sqrt{\frac{1-a}{a}} = 3, \frac{1}{3} \Rightarrow \frac{1-a}{a} = 9, \frac{1}{9}$$

$\frac{1-a}{a} = 9$

$\Rightarrow 1-a = 9a \Rightarrow a = \frac{1}{10}$

$\frac{1-a}{a} = \frac{1}{9} \Rightarrow 9 - 9a = a$

$\frac{9}{10} = a$

SSC CGL T2, 20 Feb 2018

527. The value of expression $x^4 - 17x^3 + 17x^2 - 17x + 17$ at $x = 16$ is

अगर $x = 16$ है तो $x^4 - 17x^3 + 17x^2 - 17x + 17 = ?$

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

$= x^4 - 16x^3 - x^3 + 16x^2 + x^2 - 16x - x + 17$

$= 16^4 - 16 \times 16^3$

$-16 + 17 = 1$

528. If $x = 11$, then the value of $x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1 = ?$

अगर $x = 11$ है तो $x^5 - 12x^4 + 12x^3 - 12x^2 + 12x - 1 = ?$

a) 5 b) 10 c) 15 d) 20

$= x^5 - 11x^4 - x^4 + 11x^3 + x^3 - 11x^2 - x^2 + 11x + x - 1$

$11 - 1 = 10$

529. Expand $x^2 + 2x + 3$ about $x = -2$.

$x = -2$ के संदर्भ में $x^2 + 2x + 3$ का प्रसार करें|

~~(a)~~ $(x-2)^2 - 2(x+2) + 3$

~~(b)~~ $(x+2)^2 + 2(x+2) + 3$ $\quad 4+4+3$

~~(c)~~ $(x+2)^2 - 2(x+2) + 3$ $\quad 4-4+3$

~~(d)~~ $(x-2)^2 - 2(x-2) - 3$

$x=-2$

$\Rightarrow (x+2) = 0$

x term

$x=0 \qquad 0+0+3=3$

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