



$$(1 + A) \times (1 + B) = 1 + A + B + AB$$



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

11. A and B are positive integers. If $A + B + AB = 186$, then what is the difference between A and B ($A, B \leq 20$)?

A और B धनात्मक पूर्णांक हैं। यदि $A + B + AB = 186$ है, तो A और B में क्या अंतर है? (जहां $A, B \leq 20$)?

(SSC CGL MAINS 2017)

[A] 7

[C] 5

[B] 8

[D] 6

$$1 + A + B + AB = 186 + 1$$

$$187 = 11 \times 17$$

$$(1 + A) \times (1 + B) = \frac{1 \times 187}{11 \times 17}$$

$$A = 10$$

$$B = 16$$

12. If $x + y + xy = 0$; $y + z + yz = 3$; $z + x + zx = 8$ then find $12xyz = ?$

यदि $x + y + xy = 0$ $y + z + yz = 3$ $z + x + zx = 8$ है, तो $12xyz$ का मान क्या है?

[A] -8

[B] -5

[C] -10

[D] -15

$\rightarrow 12 \times \frac{1}{2} \times -\frac{1}{3} \times 5 = -10$

$$[(1+x) \cdot (1+y) \cdot (1+z)]^2 = 1 \times 4 \times 9$$

$$(1+x) \cdot (1+y) \cdot (1+z) = 6$$

$$1+z=6 \Rightarrow z=5$$

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

$$1+y=\frac{6}{9} \Rightarrow y=-\frac{1}{3}$$

$$(1+x) \cdot (1+y) = 1$$

$$(1+y) \cdot (1+z) = 4$$

$$(1+z) \cdot (1+x) = 9$$

$$(1+a) \cdot (1+b) \cdot (1+c) = 1 + a + b + c + ab + bc + ca + abc$$



13. Find the value of $(69 + 79 \times 89 + 79 + 89 \times 69 + 89 + 69 \times 79 + 69 \times 79 \times 89)$.

$(69 + 79 \times 89 + 79 + 89 \times 69 + 89 + 69 \times 79 + 69 \times 79 \times 89)$ का मान ज्ञात करें।

[A] 512099

[B] 404599

[C] 305999

[D] 503999

$$70 \times 80 \times 90 - 1$$

$$= 504000 - 1$$

$$= 503999$$

14. If p, q and r are the positive integers such that, $p + q + r + pq + qr + pr + pqr = 1000$ then find $p^2 + q^2 + r^2$?

यदि p, q और r धनात्मक पूर्णांक इस प्रकार हैं कि $p + q + r + pq + qr + pr + pqr = 1000$ तब $p^2 + q^2 + r^2$? $36 + 100 + 144$

[A] 339

[B] 351

[C] 280

[D] 265

$$(1+p) \cdot (1+q) \cdot (1+r) = 7 \times 11 \times 13$$

$$1001 = 7 \times 11 \times 13$$

$$\begin{aligned} p &= 6 \\ q &= 10 \\ r &= 12 \end{aligned}$$



$$(ax + by)^2 + (ay - bx)^2 = (a^2 + b^2) \cdot (x^2 + y^2)$$

formula
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L.H.S

$$a^2x^2 + b^2y^2 + \cancel{2abxy} + a^2y^2 + b^2x^2 - \cancel{2abxy}$$

$$a^2(x^2 + y^2) + b^2(y^2 + x^2)$$

$$= (x^2 + y^2) \cdot (a^2 + b^2)$$

R.H.S

15. If $a^2 + b^2 = 25$, $x^2 + y^2 = 17$ and $ax + by = 8$, then $ay - bx = ?$

यदि $a^2 + b^2 = 25$, $x^2 + y^2 = 17$ और $ax + by = 8$ है, तो $ay - bx$ ज्ञात कीजिए?
 $= 19$

(SSC CHSL PRE 2020)

[A] 20

[B] 17

[C] 18

[D] 19

$$(ax + by)^2 + (ay - bx)^2 = (a^2 + b^2)(x^2 + y^2)$$

$$8^2 + ?^2 = 25 \times 17$$

$$?^2 = 425 - 64 = 361$$



If, $a \times b = 1$

तो $\frac{1}{1+a^n} + \frac{1}{1+b^n} = 1$



$$\Rightarrow b = \frac{1}{a}$$

$$= \frac{1}{1+a^n} + \frac{1}{1+\frac{1}{a^n}}$$

$$= \frac{1}{1+a^n} + \frac{a^n}{a^n+1}$$

$$= \frac{\cancel{1+a^n}}{\cancel{1+a^n}} = 1$$



if $a = .375 = \frac{3}{8}$

$$b = 2.666\ldots$$
$$= 2 + \frac{2}{3} = \frac{8}{3}$$

$$a \times b = 1$$

$$\frac{1}{8} = .125$$

$$\frac{3}{8} = .375$$

$$\begin{aligned} .3333\ldots &= \frac{1}{3} \\ .6666\ldots &= \frac{2}{3} \end{aligned}$$

तो $\frac{1}{1+a^{37}} + \frac{1}{1+b^{37}} = \textcircled{1}$

16. If $x = \frac{\sqrt{19} + \sqrt{13}}{\sqrt{19} - \sqrt{13}}$ and $y = \frac{\sqrt{19} - \sqrt{13}}{\sqrt{19} + \sqrt{13}}$ then $\frac{1}{x^3 + 1} + \frac{1}{y^3 + 1} = ?$

यदि $x = \frac{\sqrt{19} + \sqrt{13}}{\sqrt{19} - \sqrt{13}}$ और $y = \frac{\sqrt{19} - \sqrt{13}}{\sqrt{19} + \sqrt{13}}$ है, तो $\frac{1}{x^3 + 1} + \frac{1}{y^3 + 1} = ?$

[A] 8

[B] 4

[C] 1 ✓

[D] 2

$$xxy = 1$$

17. If $a(7 + 4\sqrt{3}) = b(7 - 4\sqrt{3}) = 1$ then the value of $\frac{1}{a^5+1} + \frac{1}{b^5+1}$ is?
यदि $a(7 + 4\sqrt{3}) = b(7 - 4\sqrt{3}) = 1$ है, तो $\frac{1}{a^5+1} + \frac{1}{b^5+1}$ का मान क्या होगा?

[A] 4

[B] 3

[C] 7

[D] 1

$$a = \frac{1}{7+4\sqrt{3}}$$

$$b = \frac{1}{7-4\sqrt{3}}$$

$$a \times b = \frac{1}{49-48} = 1$$

18. If $\sin \theta = \frac{5}{13}$, then $\frac{1}{1+\sin^3 \theta} + \frac{1}{1+\operatorname{cosec}^3 \theta} = ?$

यदि $\sin \theta = \frac{5}{13}$, तो $\frac{1}{1+\sin^3 \theta} + \frac{1}{1+\operatorname{cosec}^3 \theta} = ?$

[A] 0

[C] 4

[B] 1

[D] 2

$\sin \theta \times \operatorname{cosec} \theta = 1$

Basic #



19. If $p + \frac{1}{p} = 112$, then the value of $(p - 112)^{15} + \left(\frac{1}{p}\right)^{15}$ will be:

यदि $p + \frac{1}{p} = 112$ है, तो $(p - 112)^{15} + \left(\frac{1}{p}\right)^{15}$ का मान होगा:

[A] 0

[B] 1

[C] 112

[D] -1

$$p - 112 = -\frac{1}{p}$$

$$\cancel{\left(\frac{1}{p}\right)^{15}} + \cancel{\left(\frac{1}{p}\right)^{15}} = 0$$

$$(-1)^{\text{even}} = 1$$

$$(-1)^{\text{odd}} = -1$$

20. If $x + \frac{4\sqrt{3}}{x} = 5$, then $\frac{x^2 + 7x + 4\sqrt{3}}{x^2(5-x)} = ?$

यदि $x + \frac{4\sqrt{3}}{x} = 5$ है, तो $\frac{x^2 + 7x + 4\sqrt{3}}{x^2(5-x)} = ?$

[A] $\sqrt{3}$

[B] $2\sqrt{3}$

[C] $3\sqrt{3}$

[D] 2

$$4\sqrt{3} = 5x - x^2$$

$$= \frac{12x}{x^2(5-x)}$$

$$= \frac{12}{5x - x^2}$$

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

21. If $\frac{a+1}{a} = k$, then find the value of $\frac{a^2-1}{a^2}$.
 यदि $\frac{a+1}{a} = k$ है, तो $\frac{a^2-1}{a^2}$ का मान ज्ञात कीजिए।

RRB Group D-2022

[A] $k - 2k^2$

[C] $k + 2$

[B] $k^2 + 2$

[D] $2k - k^2$

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

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

$$1 - \frac{1}{a^2}$$

$$= 1 - (k-1)^2$$

$$= 1 - (k^2 - 2k + 1)$$



22. If $(3x + 4y)(5x - 6y) = ax^2 + 2hxy + by^2$, then what is the value of $(4a - h + 2b)$?

यदि $(3x + 4y)(5x - 6y) = ax^2 + 2hxy + by^2$ है, तो $(4a - h + 2b)$ का मान कितना होगा?

[A] 13

[B] 107

[C] 108

[D] 11

$$60 - 1 - 48 = 11$$

$$a = 15$$

$$b = -24$$

$$h = 1$$

23. If $(2x + 3y + 4)(2x + 3y - 5)$ is equivalent to $(ax^2 + by^2 + 2hxy + 2gx + 2fy + c)$, then what is the value of $\{(g + f - c)/abh\}$?

यदि $(2x + 3y + 4)(2x + 3y - 5)$, $(ax^2 + by^2 + 2hxy + 2gx + 2fy + c)$ के समतुल्य है, तो $\{(g + f - c)/abh\}$ का मान ज्ञात कीजिए।

[A] $\frac{37}{216}$
[C] $\frac{19}{108}$

[B] $\frac{19}{216}$
[D] $\frac{35}{432}$

(SSC CPO 20/9)

$$\begin{aligned} a &= 4 \\ b &= 9 \\ h &= 6 \\ g &= -1 \\ f &= -\frac{3}{2} \\ c &= -20 \end{aligned}$$

$$\begin{aligned} & \frac{-1 - \frac{3}{2} + 20}{9/6} \\ &= \frac{\frac{35}{2}}{3/2} \end{aligned}$$



24. If $\frac{11-13x}{x} + \frac{11-13y}{y} + \frac{11-13z}{z} = 5$, then what is the value of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$?

यदि $\frac{11-13x}{x} + \frac{11-13y}{y} + \frac{11-13z}{z} = 5$, तो $\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$ का मान क्या है?

[A] 5

[B] 13/11

[C] 13/5

[D] 4

$$\frac{11}{x} + \frac{11}{y} + \frac{11}{z} = 44$$

☆ ☆

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if, $x + \frac{1}{x} = c + \frac{1}{c}$

तो $x = c, \frac{1}{c}$

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

$x + \frac{1}{x} = \left(\frac{1}{c}\right) + \frac{1}{\left(\frac{1}{c}\right)}$


$$\text{if, } x + \frac{1}{x} = 7 + \frac{1}{7}$$

$$\text{तो } x = 7, \frac{1}{7}$$




25. If $x + \frac{1}{x} = c + \frac{1}{c}$ then the value of x ?

यदि $x + \frac{1}{x} = c + \frac{1}{c}$ तो x का मान बताइए?

(Mains 2016)

☒ **[A] $c, \frac{1}{c}$**
[C] $c, 2c$

[B] c, c^2
[D] $0, 1$

26. If $x^3 + \frac{1}{x^3} = \frac{65}{8}$ & $y^3 + \frac{1}{y^3} = \frac{730}{27}$, then which of the following is a value of xy ?

यदि $x^3 + \frac{1}{x^3} = \frac{65}{8}$ और $y^3 + \frac{1}{y^3} = \frac{730}{27}$ तो निम्नलिखित में से कौन सा xy का मान है?

(UPSC CDS-2, 2024)

[A] 3

[C] 8

☒ [B] 6

[D] 9

$$x^3 + \frac{1}{x^3} = 8 + \frac{1}{8} \Rightarrow x^3 = 8$$

$$y^3 + \frac{1}{y^3} = 27 + \frac{1}{27} \Rightarrow y^3 = 27$$