


$$(x^2 + y^2)^2 = x^4 + y^4 + 2x^2y^2$$

$$(x^2 + y^2)^2 - (xy)^2 = x^4 + y^4 + 2x^2y^2$$

$$(x^2 + y^2 + xy) \cdot (x^2 + y^2 - xy) = x^4 + y^4 + 2x^2y^2$$

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

CONCEPT

$$(x^2 + y^2)^2 = x^4 + y^4 + 2x^2y^2$$

$$(x^2 + y^2)^2 - (xy)^2 = x^4 + y^4 + x^2y^2$$

$$(x^2 + y^2 + xy) \cdot (x^2 + y^2 - xy) = x^4 + y^4 + x^2y^2$$

A (माना)

B (माना)

$$x^2 + y^2 \oplus xy = A$$

$$x^2 + y^2 \ominus xy = B$$

$$(x^2 + y^2) = \frac{A + B}{2} \checkmark$$

$$xy = \frac{A - B}{2} \checkmark$$

$$\text{१} (x^2 + y^2) = A + B$$

$$\text{२} xy = A - B$$

QUESTION

$$(x^2 + xy + y^2) \cdot (x^2 - xy + y^2) = x^4 + x^2y^2 + y^4$$

21 x ? 189

If, $x^4 + x^2y^2 + y^4 = 189$ & $x^2 + xy + y^2 = 21$

$$x^2 + xy + y^2 = 21 \quad \textcircled{A}$$

$$x^2 - xy + y^2 = \frac{189}{21} = 9 \quad \textcircled{B}$$

$$x^2 + y^2 = \frac{21+9}{2} = 15$$

$$xy = \frac{21-9}{2} = 6$$

$$\frac{x}{y} + \frac{y}{x} = \frac{x^2 + y^2}{xy} = \frac{15}{6} = \frac{5}{2}$$

$$\frac{x^2}{y^2} + \frac{y^2}{x^2} = \left(\frac{5}{2}\right)^2 - 2 = \frac{25}{4} - 2 = \frac{17}{4}$$

$$x + y = \sqrt{27} = 3\sqrt{3}$$

$$x^2 + xy + y^2 = 21 + 6$$
$$(x+y)^2 = 27$$

29. If $x^4 + x^2y^2 + y^4 = 273$ and $x^2 - xy + y^2 = 13$, then the value of xy is?

यदि $x^4 + x^2y^2 + y^4 = 273$ और $x^2 - xy + y^2 = 13$ तो xy का मान है?

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[A] 4 ✓

[B] 10

[C] 6

[D] 8

$$= \frac{273 - 13}{2} = 4$$

$$x^4 + x^2y^2 + y^4 = 273$$

$$x^2 - xy + y^2 = 13$$

30. If $x^2 - xy + y^2 = 7$ and $x^4 + x^2y^2 + y^4 = 105$, then the value of $\frac{x^3}{y^3} + \frac{y^3}{x^3}$ is?

यदि $x^2 - xy + y^2 = 7$ और $x^4 + x^2y^2 + y^4 = 105$ तो $\frac{x^3}{y^3} + \frac{y^3}{x^3}$ का मान क्या है?

[A] ~~$\frac{437}{32}$~~
[C] $\frac{713}{64}$

[B] ~~$\frac{317}{16}$~~
[D] $\frac{803}{64}$

$$\left(\frac{x}{y}\right)^3 + \left(\frac{y}{x}\right)^3 = k \cdot (k^3 - 3)$$

$$= \frac{11}{4} \cdot \left(\frac{121}{16} - 3\right)$$

$$= \frac{11}{4} \times \frac{73}{16}$$

$$x^2 + x^2y + y^2 = 15 \quad (A)$$

$$x^2 - x^2y + y^2 = 7 \quad (B)$$

$$\frac{x}{y} + \frac{y}{x} = \frac{x^2 + y^2}{xy} = \frac{11}{4}$$

31. If $x^4 + y^4 + x^2y^2 = 17\frac{1}{16}$ and $x^2 - xy + y^2 = 5\frac{1}{4}$, then one of the values of $(x - y)$ is:

यदि $x^4 + y^4 + x^2y^2 = 17\frac{1}{16}$ और $x^2 - xy + y^2 = 5\frac{1}{4}$ तो $(x - y)$ का मान है:

[A] $\frac{5}{2}$
[C] $\frac{5}{4}$

$= \frac{273}{16}$ [B] $\frac{3}{4}$
[D] $\frac{3}{2}$

$$x^2 - xy + y^2 = \frac{21}{4} \quad (-)$$

$$x^2 + xy + y^2 = \frac{13}{4} \quad (A)$$

$$x^2 - xy + y^2 = \frac{21}{4} \quad (B)$$

$$(x - y)^2 = \frac{25}{4}$$

$$x - y = \frac{5}{2}$$

$$xy = \frac{\frac{13}{4} - \frac{21}{4}}{2} = \frac{-\frac{8}{4}}{2} = -1$$

32. If $16a^4 + 36a^2b^2 + 81b^4 = 91$ and $4a^2 + 9b^2 - 6ab = 13$, then what is the value of $3ab$?

यदि $16a^4 + 36a^2b^2 + 81b^4 = 91$ और $4a^2 + 9b^2 - 6ab = 13$ है तो $3ab$ का मान क्या है?

[A] -3

[B] 5

[C] $3/2$

[D] $-3/2$

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

$x \rightarrow 2a$
 $y \rightarrow 3b$

$$\begin{array}{r} 4a^2 + 9b^2 + 6ab = 7 \\ - \quad 4a^2 + 9b^2 - 6ab = 13 \\ \hline \end{array}$$

$$12ab = -6$$

$$ab = -\frac{1}{2}$$

33. The value of $\frac{(4.6)^4 + (5.4)^4 + (24.84)^2}{(4.6)^2 + (5.4)^2 + 24.84}$ is:

$\frac{(4.6)^4 + (5.4)^4 + (24.84)^2}{(4.6)^2 + (5.4)^2 + 24.84}$ का मान क्या है?

[A] 24.42

[B] 25.48

[C] 24.24

[D] 25.42

$$4.6 \times 5.4 = 24.84$$

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

$$= 4.6^2 + 5.4^2 - 24.84$$

$$= 6 + 6 + 4$$

$$x^4 + x^2y^2 + y^4 = (x^2 + xy + y^2) \cdot (x^2 - xy + y^2)$$

put $x \rightarrow x$
 $y \rightarrow 1$

$$x^4 + x^2 + 1 = (x^2 + x + 1)(x^2 - x + 1)$$



34. Using algebraic identities, simplify the following expression.

बीजगणितीय सर्वसमिका (algebraic identities) का उपयोग करते हुए, निम्न व्यंजक को सरल करें। $\frac{(x^4 + x^2 + 1)}{(x^2 + x + 1)}$

[A] $(x^2 - 2x + 1)$

[B] $(x^2 + x + 1)$

[C] $(x^2 + 2x + 1)$

~~**[D]**~~ $(x^2 - x + 1)$

35. If $1 + x^2 + x^4 = 585$ and $1 - x + x^2 = 65$, then find the value of $1 + x + x^2$.
यदि $1 + x^2 + x^4 = 585$ और $1 - x + x^2 = 65$ है, तो $1 + x + x^2$ का मान ज्ञात करें।

[A] 8

[B] 7

[C] 6

[D] 9

$$\downarrow$$

$$\frac{585}{65} = 9$$

+ Repeated
Misc.

36. If $a + b = 10$ and $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$, then what is the value of $3ab + 4a^2 + 5b^2$?

यदि $\frac{a}{5} + \frac{b}{5} = 10$ और $\sqrt{\frac{a}{b}} - 13 = -\sqrt{\frac{b}{a}} - 11$ है, तो $3ab + 4a^2 + 5b^2$ का मान क्या है?

[A] 450

[C] 600

[B] 300

[D] 750

$$= 12 \times 5^2$$

$$= 300$$

$$\text{If, } x + \frac{1}{x} = 2$$

$$\Rightarrow x = 1$$

$$\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}} = 2$$

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

$$a = b$$

37. 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] ~~3/10, 7/10~~

[B] ~~1/10, 9/10~~

[C] ~~2/5, 3/5~~

[D] 1/5, 4/5

$$x + \frac{1}{x} = 3 + \frac{1}{3}$$

$$\Rightarrow x = 3, \frac{1}{3}$$

$$3\sqrt{\frac{1-a}{a}} + 3\sqrt{\frac{a}{1-a}} = 19 - 9$$

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

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

$$1 = 10a$$

$$\frac{1}{10} = a$$

वैकल्पिक

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

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

38. Find the possible value of x in equation $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{25}{12}$?

समीकरण $\sqrt{\frac{x}{1-x}} + \sqrt{\frac{1-x}{x}} = \frac{25}{12}$ में x का संभावित मान ज्ञात कीजिए?

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[A] ~~12/25 or 13/25~~

[B] ~~19/25 or 6/25~~

[C] ~~8/25 or 17/25~~

[D] ~~9/25 or 16/25~~
or

$$\sqrt{\frac{9}{25} + \frac{16}{25}}$$

$$\frac{3}{4} + \frac{4}{3} = \frac{25}{12}$$

39. If $\sqrt{\frac{a}{b}} = \frac{8}{3} + \sqrt{\frac{b}{a}}$ & $(a + b) = 30$, then what is the value of ab ?

यदि $\sqrt{\frac{a}{b}} = \frac{8}{3} + \sqrt{\frac{b}{a}}$ & $(a + b) = 30$, तो ab का मान क्या है?

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[A] 64

[B] 28

[C] 81

[D] 26

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

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

$$\Rightarrow \sqrt{\frac{a}{b}} = 3$$

$$\frac{a}{b} = \frac{9}{1} \rightarrow \begin{matrix} 27 \\ 3 \end{matrix}$$

$$\frac{9-1}{3}$$

40. If $\frac{ab}{a+b} = \frac{1}{3}$, $\frac{bc}{b+c} = \frac{1}{4}$, $\frac{ca}{c+a} = \frac{1}{5}$, then find the value of $\frac{abc}{ab+bc+ca}$?

यदि $\frac{ab}{a+b} = \frac{1}{3}$, $\frac{bc}{b+c} = \frac{1}{4}$, $\frac{ca}{c+a} = \frac{1}{5}$ है, तो $\frac{abc}{ab+bc+ca}$ का मान ज्ञात कीजिये?

[A] $\frac{1}{6}$

[B] $\frac{1}{12}$

[C] 6

[D] $\frac{1}{4}$

$$\cancel{2} \cdot \left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c} \right) = \cancel{12}^6$$

$$\frac{ab}{a+b} = \frac{1}{3}$$

$$\Rightarrow \frac{a+b}{ab} = 3$$

$$\frac{1}{b} + \frac{1}{a} = 3$$

$$\frac{1}{b} + \frac{1}{c} = 4$$

$$\cancel{all} \frac{1}{c} + \frac{1}{a} = 5$$

$$\frac{bc+ca+ab}{abc} = 6$$



end

