

#2

ALGEBRAIC FORMULAS

बीजगणितीय सूत्र





$$\sqrt[n]{a} = a^{\frac{1}{n}}$$

$$\sqrt{3} = 3^{\frac{1}{2}}$$

$$\sqrt[3]{5} = 5^{\frac{1}{3}}$$



$$\begin{aligned} \text{If, } x^n &= a \\ \Rightarrow x &= a^{\frac{1}{n}} \\ &= \sqrt[n]{a} \end{aligned}$$

$$(a^m)^n = (a^n)^m = a^{m \times n}$$

$$(7^3)^4 = 7^{12}$$

If, $5^a = 7^b = 35^c = K$ (माना)

तो $c = \frac{ab}{a+b}$

$5^a = K \Rightarrow 5 = K^{\frac{1}{a}}$

$7^b = K \Rightarrow 7 = K^{\frac{1}{b}}$

$35^c = K \Rightarrow 35 = K^{\frac{1}{c}}$

$5 \times 7 = 35$

$K^{\frac{1}{a}} \times K^{\frac{1}{b}} = K^{\frac{1}{c}}$

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

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

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



Trick $\Rightarrow$

If, $5^a = 7^b = 35^c$

$5 \times 7 = 35$

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

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



1. If $7^a = 11^b = 77^c$, then find value of c ?

यदि $7^a = 11^b = 77^c$, तो c का मान ज्ञात कीजिए ?

☒ [A] $\frac{ab}{a+b} = c$

[B] $\frac{a+b}{ab}$

[C] $\frac{ab}{a-b}$

[D] $\frac{a+b}{a-b}$

$$7^{\textcircled{1}} \times 11^{\textcircled{1}} = 77^{\textcircled{1}}$$

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

2. If $2^x = 3^y = 72^z$, then $\frac{4xy}{2x+3y} = ?$

यदि $2^x = 3^y = 72^z$ है, तो $\frac{4xy}{2x+3y} = ?$

[A] $4z$

[B] $\frac{4}{3}z$

[C] $2z$

[D] $\frac{3}{2}z$

$$2^{\textcircled{3}} \times 3^{\textcircled{2}} = 72^{\textcircled{1}}$$

$$\frac{3}{x} + \frac{2}{y} = \frac{1}{z}$$

$$\frac{3y + 2x}{xy} = \frac{1}{z}$$

$$\frac{4xy}{2x+3y} = 4z$$

3. If $9^x = 5^y = 75^z$ & $z = \frac{2xy}{y+kx}$. Then find the value of $k^{1/k}$?

यदि $9^x = 5^y = 75^z$ & $z = \frac{2xy}{y+kx}$ है, तो $k^{1/k}$ का मान ज्ञात कीजिये?

[A] 4

[C] 2

[B] $\sqrt{2}$

[D] $(2)^{1/3}$

$$4^{\frac{1}{4}} = (2^2)^{\frac{1}{4}} = 2^{\frac{1}{2}} = \sqrt{2}$$

$$\frac{1}{2x}$$

$$9^{\frac{1}{2}} \times 5^2 = 75^1$$

$$\frac{1}{2x} + \frac{2}{y} = \frac{1}{z}$$

$$\frac{y+4x}{2xy} = \frac{1}{z}$$

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

$$k=4$$

4. If $5^a = 4^b = 100$, then find $\frac{2}{a} + \frac{1}{b} = ?$

यदि $5^a = 4^b = 100$ है, तो $\frac{2}{a} + \frac{1}{b}$ ज्ञात कीजिए ?

[A] -1

[C] 2

☒ [B] 1

[D] 0

$$5^2 \times 4^1 = 100^1$$

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

5. If a, b, c are non-zero numbers and $14^a = 36^b = 84^c$, then $6b \left(\frac{1}{c} - \frac{1}{a} \right)$ is equal to?

यदि a, b, c गैर-शून्यक संख्याये हैं और $14^a = 36^b = 84^c$ हैं, तो $6b \left(\frac{1}{c} - \frac{1}{a} \right)$ बराबर है?

[A] 6

[B] 3

[C] 4

[D] 1.5

$$= 6b \times \frac{1}{2b} = 3$$

$$14^1 \times 36^{\frac{1}{2}} = 84^1$$

$$\sqrt{36} = 6$$

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

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

6. If $2^x = 3^y = 18^{-z}$, then which option is correct?

यदि $2^x = 3^y = 18^{-z}$ है, तो कौन सा विकल्प सही है?

[A] $\frac{1}{x} + \frac{2}{y} + \frac{1}{z} = 0$

[B] $\frac{2}{x} + \frac{1}{y} + \frac{1}{z} = 0$

[C] $\frac{1}{x} + \frac{2}{y} - \frac{1}{z} = 0$

[D] $\frac{1}{x} - \frac{2}{y} + \frac{1}{z} = 0$

$2^{\textcircled{1}} \times 3^{\textcircled{2}} = 18^{\textcircled{1}}$

$\frac{1}{x} + \frac{2}{y} = \frac{1}{z}$

$\frac{1}{x} + \frac{2}{y} - \frac{1}{z} = 0$

7. If $169^a = 403^{-2b} = 961^c$, then find $\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)^{2021}$?

यदि $169^a = 403^{-2b} = 961^c$ है, तो $\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right)^{2021}$ ज्ञात कीजिये?

[A] 0 ✓

[B] 1

[C] 2

[D] -1

(GIL वीडियो Pro)

$$13^a = 403^{-b} = 31^c$$

$$13 \times 13 = 403$$

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

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

8. If $x^{2a} = y^{2b} = z^{2c} \neq 0$ and $x^2 = yz$, then the value of $\frac{ab+bc+ca}{bc}$ is:-

यदि $x^{2a} = y^{2b} = z^{2c} \neq 0$ और $x^2 = yz$ है, तो $\frac{ab+bc+ca}{bc}$ का मान ज्ञात कीजिए।

(SSC CGL PRE 2019)

[A] $3ac$

[C] $3ab$

[B] 3 ✓

[D] $3bc$

$$\begin{aligned} &= \frac{3bc}{bc} \\ &= 3 \end{aligned}$$

$$\frac{2}{a} \neq \frac{c+b}{bc}$$

$$x^{2a} = y^{2b} = z^{2c}$$

$$x^2 = y \times z$$

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

$$ac + ab = 2bc$$

9. If $(5.55)^x = (0.555)^y = 1000$, then the value of $\frac{1}{x} - \frac{1}{y}$ is

यदि $(5.55)^x = (0.555)^y = 1000$, फिर $\frac{1}{x} - \frac{1}{y}$ का मान है

[A] 3

[B] 1

✓ [C] $\frac{1}{3}$

[D] $\frac{2}{3}$

$$5.55^x = .555^y = 10^3$$

$$\begin{aligned} 5.55 &= 10^{\frac{3}{x}} \\ .555 &= 10^{\frac{3}{y}} \end{aligned}$$

$$1 = 10^{\frac{3}{x} - \frac{3}{y}}$$

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

9. If $(5.55)^x = (0.555)^y = 1000$, then the value of $\frac{1}{x} - \frac{1}{y}$ is

यदि $(5.55)^x = (0.555)^y = 1000$, फिर $\frac{1}{x} - \frac{1}{y}$ का मान है

[A] 3

[B] 1

☒ [C] $\frac{1}{3}$

[D] $\frac{2}{3}$

$$5.55^{\cancel{x}} = .555^{\cancel{y}} = 10^{\textcircled{3}}$$

$$\frac{5.55^{\textcircled{1}}}{.555^{\textcircled{1}}} = 10^{\textcircled{1}}$$

$$\Rightarrow \frac{1}{\cancel{x}} - \frac{1}{\cancel{y}} = \frac{1}{3}$$

10. If $27^x = 343^y = 1331^z = 231$, then find $\frac{123xyz}{xy+yz+zx}$?

यदि $27^x = 343^y = 1331^z = 231$ है, तो $\frac{123xyz}{xy+yz+zx}$ ज्ञात कीजिये?

[A] 31

[C] 51

☒ [B] 41

[D] 61.5

$$3^x = 7^y = 11^z = 231$$

$$\frac{4 \times 3xy}{xy+yz+zx} = 41$$

$$3 \times 7 \times 11 = 231$$

$$\frac{1}{3x} + \frac{1}{7y} + \frac{1}{11z} = \frac{1}{1}$$