সূচক

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৪৬তম বিসিএস

- $\frac{1}{2} \times 2^{x-3} + 1 = 5$ হলে x এর মান কত?

৪৫তম বিসিএস

- $2^{x+7} = 4^{x+2}$ হলে x এর মান কত?

৪৪তম বিসিএস

- $\sqrt[4]{x^3} = 2$ হয় তবে, $x^{\frac{3}{2}} = ?$

৪৩তম বিসিএস

- $4^x + 4^{1-x} = 4$ হলে, x = কত?

৪১তম বিসিএস

- $\sqrt{-8} \times \sqrt{-2} = ?$

৪০তম বিসিএস

- $y^{y\sqrt{y}} = (y\sqrt{y})^{y}$ হলে y এর মান কত?

৩৯তম বিসিএস

- $125\ (\sqrt{5})^{2x} = 1$ হলে, x এর মান কত ?

৩৮তম বিসিএস

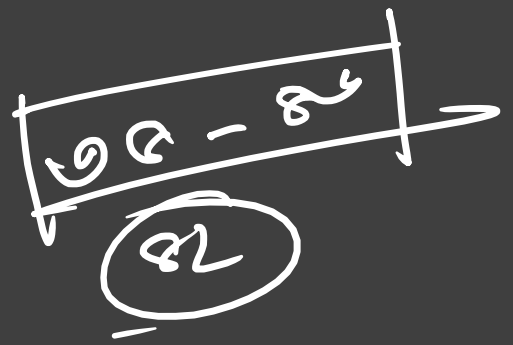
- $2^x + 2^{1-x} = 3$ হবে, x =?

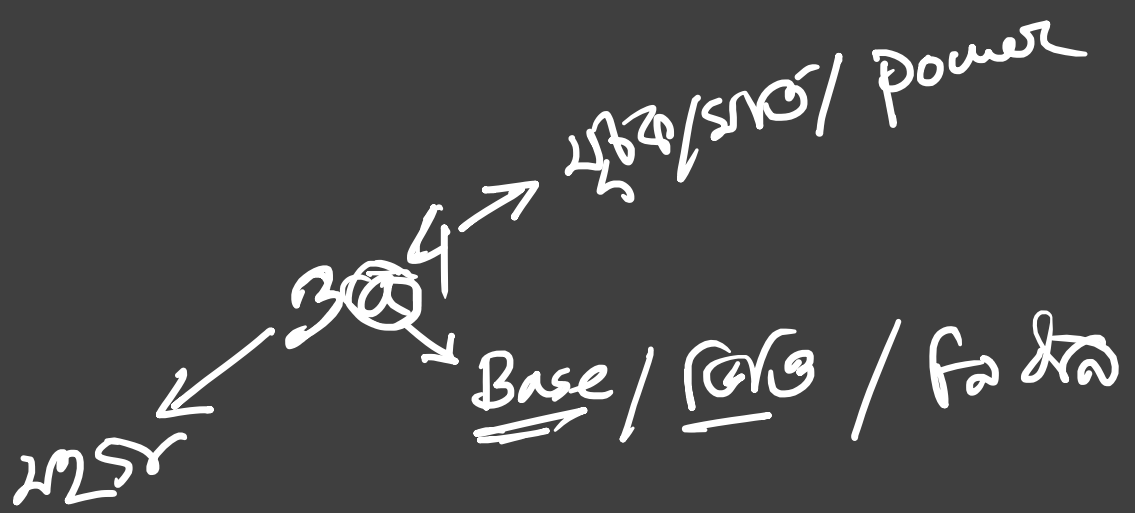
৩৬তম বিসিএস

- $(25)^{2x+3} = 5^{x+6}$ হয়, তবে $x =$?

৩৫তম বিসিএস

- $x^{-3} - 0.001 = 0$ হলে x^2 এর মান কত ?





$$a^m \times a^n = a^{m+n}$$

$$3a + 4a = 7a$$

$$a^3 \times a^4 = a \times a \times a \times a \times a \times a \times a$$

$$= a^7 = a^{3+4}$$

w $a^m \times a^n = a^{m+n}$

$a^{m+n} = a^m \times a^n$

$a^3 \times a^4$

$= a^{3+4} = a^7$

$a^3 \times b^4 = a^3 b^4$

$a^3 \times b^4 =$ ~~① $(ab)^7$~~

② $a^3 b^4$

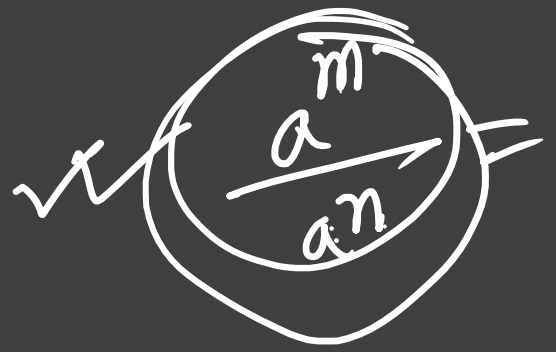
$(ab)^7$ $a^7 b^7$

$$S^5 \times S^{10} = S^{5+10} = S^{15}$$

$$S^5 \times M^{10} =$$

$$\frac{a^5}{a^3} = \frac{a \times a \times a \times a \times a}{a \times a \times a} = a^2 = a^{5-3}$$

$$\frac{a^5}{a^3} = a^{5-3} = a^2$$



$$a^{m-n}$$

$$\frac{a^3}{a^3} = 1$$

$$a^{3-3} = 1$$

$$a^0 = 1 \qquad [a \neq 0]$$

$$(a^2)^3 = a^2 \times a^2 \times a^2$$

$$= a^{2+2+2} = a^6 = a^{2\times 3}$$

$$(a^x)^3 = a^{2\times 3}$$

$2+2+2$

$\downarrow$

$3 \times 2 = 6$

$a^{2^3} =$

① a^6 ✗

② a^8 ✓

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

$(a^2)^3 = a^2 \times a^2 \times a^2$

$= a^{2 \times 3}$

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

$$2^3 = a^8$$

$$a^2 + a^2 + a^2 = 3a^2$$

$$2^3 = 2 \times 2 \times 2 = 8$$

$$(3 \times 4)^2 = 12^2 = 144$$

$$3^2 \times 4^2 = 9 \times 16 = 144$$

$$\therefore (a \times b)^m = a^m \times b^m$$

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

$$(a \times b)^2 = a^2 \times b^2$$

$$\text{ω} \boxed{2\pi/T} \times$$

$$(a \pm b)(a \pm b) = \boxed{a^2 + 2ab + b^2}$$

$$(ab)^2 = ab \times ab = a^2 b^2$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

$$(ab)^m = a^m b^m$$

$$\frac{1}{a^n} = \frac{a^0}{a^n} = a^{0-n} = a^{-n}$$

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

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

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

$$\frac{1}{a^{-n}} = \frac{a^0}{a^{-n}} = a^{0-(-n)} = a^n$$

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

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

$$\frac{1}{(\text{siddik})^{n}} = (\text{siddik})^{-n}$$

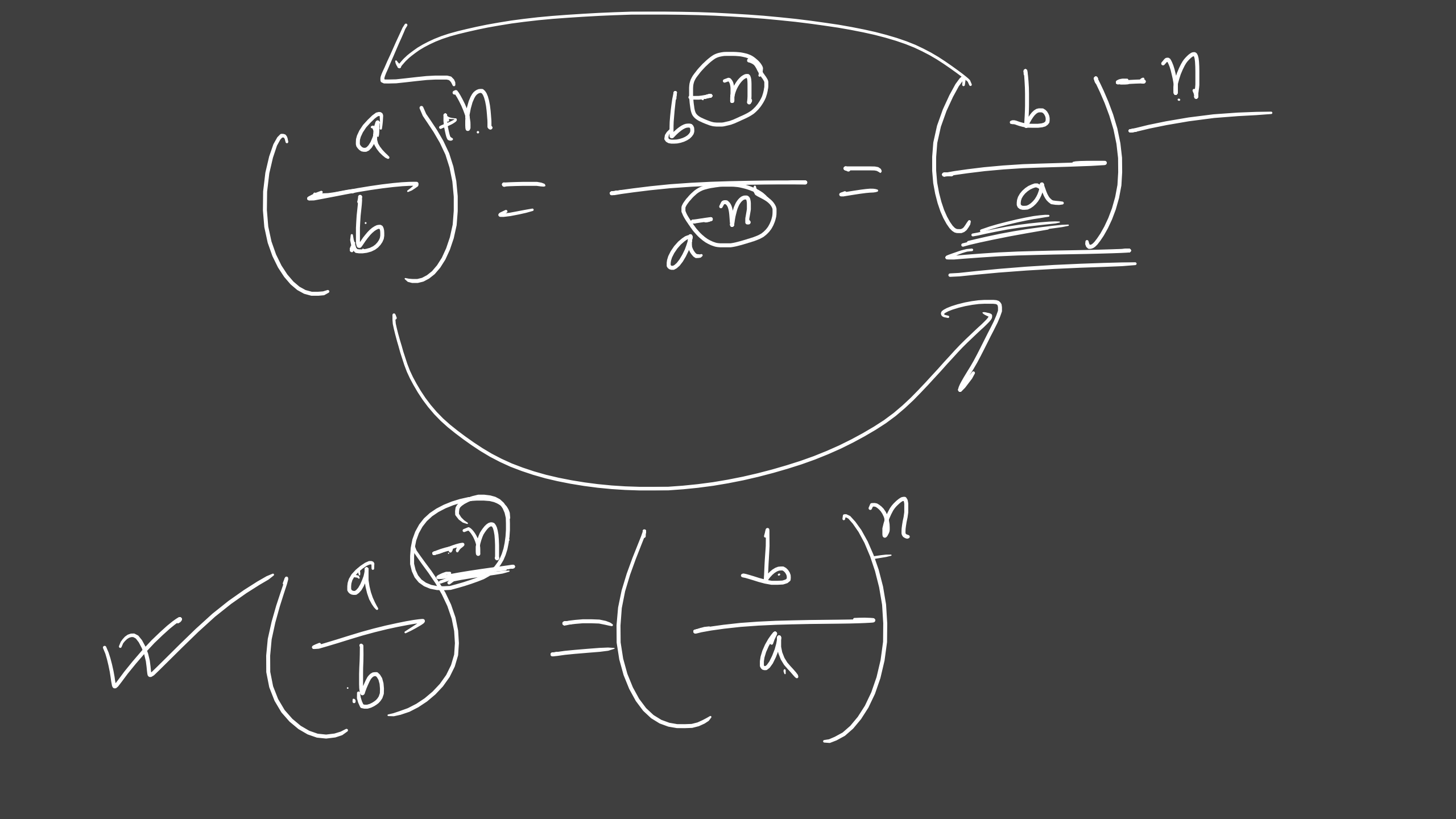
$$\frac{1}{(\text{siddik})^{-n}} = (\text{siddik})^{n}$$

$$a^n = \frac{1}{a^{-n}} \qquad b^n = \frac{1}{b^{-n}}$$

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n} = \frac{\frac{1}{a^{-n}}}{\frac{1}{b^{-n}}}$$

$$= \frac{1}{a^{-n}} \times \frac{b^{-n}}{1}$$

$$= \frac{b^{-n}}{a^{-n}}$$


$\left(\frac{a}{b}\right)^{-n} = \frac{b^{n}}{a^{n}} = \left(\frac{b}{a}\right)^{n}$
$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^{n}$

সূচকের সূত্রাবলী:

- $a^m \times a^n = a^m . a^n = a^{m+n}$
- $\frac{a^m}{a^n} = a^m \div a^n = a^{m-n}$
- $(ab)^n = a^n \times b^n = a^n b^n$
- $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

সূচকের সূত্রাবলী:

- $(a^n)^m = (a^m)^n = a^{mn}$
- $a^{n^m} \neq a^{m^n}$
- $a^0 = 1\ (a \neq 0)$
- $a^{-n} = \frac{1}{a^n}$
- $a^n = \frac{1}{a^{-n}}$

সূচকের সূত্রাবলী:

- $\left(\frac{a}{b}\right)^n = \left(\frac{b}{a}\right)^{-n}$
- $\sqrt{a} = a^{\frac{1}{2}}$
- $\sqrt[n]{a} = a^{\frac{1}{n}}$
- $\sqrt[n]{a^m} = a^{\frac{m}{n}}$
- $a^x = b^x$ হলে, $a = b$
- $a^x = a^y$ হলে, $x = y$

Type-1

সূচকের মান নির্ণয়

$(\sqrt{3} \times \sqrt{4})^4$ এর মান কত?

$\sqrt[n]{a^m}$ এর মান কত?

$(a^{-1})^{-1}$ এর মান কত?

$\left(\sqrt[3]{2^6}\right)^2$ এর মান কত?

$(\sqrt{3})^6$ এর মান কত?

$\left(\frac{125}{27}\right)^{-\frac{2}{3}}$ এর সহজ প্রকাশ কোনটি?

$\sqrt[3]{\sqrt[3]{a^3}} =$ কত?

$\left(\sqrt[3]{3} \times \sqrt[3]{4}\right)^{6} =$ কত?

$$3^x + 3^x + 3^x = ?$$

$4^x + 4^x + 4^x + 4^x$ = কত?

$\sqrt{41-\sqrt{21+\sqrt{19-\sqrt{9}}}}$ এর মান কত?

$\sqrt{10\sqrt{10\sqrt{10\sqrt{10\sqrt{10}}}}}$ ..... ∞ এর মান কত?

ধরি, $x = \sqrt{10\sqrt{10\sqrt{10\sqrt{10}}}} \ldots \ldots \infty$

$x^2 = \left(\sqrt{10\sqrt{10\sqrt{10\sqrt{10}}}} \ldots \ldots \infty\right)^2$

$x^2 = 10\sqrt{10\sqrt{10\sqrt{10\sqrt{10}}}} \ldots \ldots \infty$

$x^2 = 10x$

$x^2 = 10x$

$x \cdot x = 10x$

$x = 10$

$x^2 - 10x = 0$

$x(x - 10) = 0$

$x = 0$ or $x - 10 = 0$

$\therefore x = 10$

$$\frac{2^{x+4} - 4.2^{x+1}}{2^{x+2} \div 2} = \text{কত?}$$

$$2^{x+4} = 2^x \cdot 2^4$$

$$2^{x+1} = 2^x \cdot 2^1$$

$$= \frac{2^x \cdot 2^4 - 4 \cdot 2^x \cdot 2}{2^x \cdot 2^2 \div 2^1}$$

$$2^2 = 4$$

$$= \frac{2^x (16 - 8)}{2^x \cdot 2^{2-1}} = \frac{8}{2}$$

$$= 4$$

$$2^x \times \frac{1}{2} = \frac{2}{4 \times \frac{1}{2}}$$

$$= 2$$

$9.2^n - 2.2^{n-1}$ = কত?

$2^{n-1} = \frac{2^n}{2^1}$

$9.2^n - 2.\frac{2^n}{2}$

$\Rightarrow 9.2^n - 2^n$

$\Rightarrow 2^n(9-1) = 8.2^n$ Ans

$8^{\frac{3}{4}} \div 8^{\frac{1}{2}}$ = কত?

H.S

$$\frac{\sqrt[3]{7^2} \cdot \sqrt[3]{7}}{\sqrt{7}} = \text{কত?}$$

H.W

Type-2

সূচকের সমাধান

$a^m = a^n$

$m = n$

$a^m = b^m \Rightarrow a = b$

$x^3 = 27$ হলে $x = ?$

$\Rightarrow x^{3} = 3^{3}$

$x = 3$

$4^x = 8$ হলে $x = ?$

$\Rightarrow (2^2)^x = 2^3$

$\Rightarrow 2^{2x} = 2^3$

$\Rightarrow 2x = 3 \Rightarrow x = 3/2$

$4 = 2^2$

$8 \neq a^2$

$4 = 2^2$

$\sqrt[4]{x} = 0.1$ হলে $x = ?$

$(0.1)^4 \neq 0.4$

$\sqrt[4]{x} = x^{\frac{1}{4}}$

$x^{\frac{1}{4}} = 0.1$

$\frac{1}{4} \times 4 = 1$

$\Rightarrow \left(x^{\frac{1}{4}}\right)^4 = (0.1)^4$

$\Rightarrow x = (0.1)^4 = 0.1 \times 0.1 \times 0.1 \times 0.1$

$= 0.0001$ Ans

$2^{x+1} = 32$ হলে, $x = ?$

(ঃ.৩)

যদি $\sqrt[4]{x^3} = 2$ হয়, $x^{\frac{3}{2}} = ?$

$\sqrt[4]{x^3} = x^{\frac{3}{4}}$

$\left(x^{\frac{3}{4}}\right)^2 = (2)^2$

$x^{\frac{3\times 2}{4_2}} = x^{\frac{3}{2}}$

$\Rightarrow x^{\frac{3}{2}} = 4$ Ans.

যদি $(25)^{2x+3} = 5^{3x+6}$ হয়, তবে x = কত?

$$(5^2)^{2x+3} = 5^{3x+6}$$

$$\Rightarrow 5^{4x+6} = 5^{3x+6}$$

$$4x+6 = 3x+6$$

$$4x - 3x = 6 - 6 \Rightarrow x = 0$$

$125(\sqrt{5})^{2x} = 1$ হলে, x এর মান কত?

$5^3 \cdot 5^{\frac{2x}{2}} = 1$

$5^3 \cdot 5^x = 1$

$5^{3+x} = 5^0$

$3+x = 0 \Rightarrow x = -3$

$125 = 5^3$

$(\sqrt{5})^{2x} = (5^{\frac{1}{2}})^{2x}$

$= 5^{\frac{1}{2} \times 2x}$

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

$= 5$

$5^x + (8 \times 5^x) + (16 \times 5^x) = 1$ হলে, x এর মান কত?

$\Rightarrow 5^x (1 + 8 + 16) = 1$

$\Rightarrow 5^x . 25 = 1$

$\Rightarrow 5^x . 5^2 = 1$

$5^{x+2} = 5^0$

$\Rightarrow x + 2 = 0$

$x = -2$

$x^{x\sqrt{x}} = (x\sqrt{x})^x$ হলে, x এর মান কত?

$\Rightarrow x^{x\sqrt{x}} = \left(x^{\frac{3}{2}}\right)^x$

$\Rightarrow x^{x\sqrt{x}} = x^{\frac{3x}{2}}$

$\Rightarrow x\sqrt{x} = \frac{3x}{2}$

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

$= x^1 \cdot x^{\frac{1}{2}}$

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

$= x^{\frac{3}{2}}$

$x = 0$

$$x\sqrt{x} = \frac{3x}{2}$$

$$\Rightarrow x\sqrt{x} - \frac{3x}{2} = 0$$

$$\Rightarrow x\left(\sqrt{x} - \frac{3}{2}\right) = 0$$

$x = 0$ or $\sqrt{x} = 3/2$

$x = 9/4$

$(\sqrt{3})^{x+1} = (\sqrt[3]{3})^{2x-1}$ হলে x এর মান কত?

H.w

$27^{x+1} = 81$ হলে, $x = ?$

$(3^3)^{x+1} = 3^4$

$=$

$=$

$36.2^{3x-8} = 3^2$ হলে x এর মান কত?

(4) $\frac{36 \cdot 2^{3x-8}}{9} = \frac{9}{9}$

$4 \cdot 2^{3x-8} = 1$

$2^2 \cdot 2^{3x-8} = 1$

$2^{2+3x-8} = 1$

$2^{3x-6} = 2^0$

$3x - 6 = 0$

$x = 2$

$$\left(\frac{a}{b}\right)^{x-3} = \left(\frac{b}{a}\right)^{x-5}$$ হলে $x =$ কত ?

$$\left(\frac{a}{b}\right)^{x-3} = \left(\frac{a}{b}\right)^{-(x-5)}$$

$2^x + 2^{1-x} = 3$ হলে x = কত?

$2^{1-x} = \frac{2^1}{2^x}$

$2^x = m$

$2^x + \frac{2}{2^x} = 3$

$\Rightarrow m + \frac{2}{m} = 3$

$\Rightarrow m^2 + 2 = 3m$

$\Rightarrow m^2 - 3m + 2 = 0$

$\Rightarrow m^2 - 2m - m + 2 = 0$

$\Rightarrow m(m-2) - 1(m-2) = 0$

$\Rightarrow (m-2)(m-1) = 0$

$m-2=0$ அல்லது $m-1=0$

$m=2$

$m=1$

$2^x = 2^1$

$2^x = 2^0$

$x=1$

$x=0$

$3^{x+2} = 81$ হলে, 3^{x-2} এর মান কত?

(H.S)

$$10^{-15} \div 10^{-4} = ?$$

10^{-11}

Type-3

সূচকের সরলীকরণ

$\sqrt{x^{-1}.y}.\sqrt{y^{-1}.z}.\sqrt{z^{-1}.x}$ এর মান কত? যখন $(x > 0, y > 0, z > 0)$

$$\sqrt{\frac{1}{x}\cdot y\cdot\frac{1}{y}\cdot z\cdot\frac{1}{z}\cdot x}$$

$$= \sqrt{1} = 1$$

$(2a^{-1} + 3b^{-1})^{-1}$ এর মান কত?

$$\left(2 \cdot \frac{1}{a} + 3 \cdot \frac{1}{b}\right)^{-1}$$

$$\Rightarrow \left(\frac{2}{a} + \frac{3}{b}\right)^{-1}$$

$$\left(\frac{2b + 3a}{ab}\right)^{-1}$$

$$\Rightarrow \frac{ab}{2b + 3a}$$

$\frac{3^{m+1}}{(3^m)^{m-1}} \div \frac{9^{m+1}}{(3^{m-1})^{m+1}}$ এর মান কত?

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

$9^{m+1} = (3^2)^{m+1} = 3^{2m+2}$

$\frac{3^{m+1}}{3^{m^2-m}} \div \frac{3^{2m+2}}{3^{m^2-1}}$

$\Rightarrow 3^{m+1-m^2+m} \div 3^{2m+2-m^2+1}$

$\Rightarrow 3^{2m-m^2+1-2m-2+m^2-1}$

$= 3^{-2}$

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

$= \frac{1}{9}$

$\frac{3^{x+4}-9\times3^{x+1}}{3^{x+2}}$ এর মান কত?

$$\frac{5^{n+2}+35\times5^{n-1}}{4\times5^{n}}$$ এর মান কত?

$$\left(\frac{a^m}{a^n}\right)^l \times \left(\frac{a^n}{a^l}\right)^m \times \left(\frac{a^l}{a^m}\right)^n = ?$$

$$\Rightarrow \frac{a^{ml}}{a^{nl}} \times \frac{a^{mn}}{a^{ml}} \times \frac{a^{nl}}{a^{mn}} = 1$$

$$\sqrt[mn]{\left(\frac{x^m}{x^n}\right)} \times \sqrt[nl]{\left(\frac{x^n}{x^l}\right)} \times \sqrt[lm]{\left(\frac{x^l}{x^m}\right)} = ?$$

μ ω

$$\left(\frac{x^{p+q}}{x^{2r}}\right)\left(\frac{x^{q+r}}{x^{2p}}\right)\left(\frac{x^{p+r}}{x^{2q}}\right) = ?$$

H.W

Type-4

বিবিধ

$a^x = b,\ b^y = c,\ c^z = a$ হয় তবে xyz = কত?

$a^x = b$

$(c^z)^x = b$

$c^{zx} = b$

$(b^y)^{zx} = b$

$b^{xyz} = b^1$

$xyz = 1$

$8^{x^2} = 2^{3x}$ হলে x এর মান কত?

$(2^3)^{x^2} = 2^{3x}$

$\Rightarrow 2^{3x^2} = 2^{3x}$

$3x^2 = 3x$

$x^2 - x = 0$

$x(x-1) = 0$

$x = 0, 1$

$\sqrt[3]{y^5} = 2\sqrt[3]{y^2}$ হলে y = কত?

$\Rightarrow y^{\frac{5}{3}} = 2 \cdot y^{\frac{2}{3}}$

$\Rightarrow \frac{y^{5/3}}{y^{2/3}} = 2$

$y^{\frac{5}{3}-\frac{2}{3}} = 2$

$\therefore \boxed{y = 2}$

$a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ এবং $abc = 1$ হলে $x + y + z$ = কত?

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

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

$a = m^x$

$b = m^y$

$c = m^z$

$\Rightarrow abc = 1$

$\Rightarrow m^x \cdot m^y \cdot m^z = 1$

$\Rightarrow m^{x+y+z} = m^0$

$x+y+z = 0$

$a^b = b^a, a = 2b$ এবং $a \neq 0, b \neq 0$ হলে a ও b এর মান কত?

$a = 2 \cdot 2 = 4$

$a^b = b^a$

$(2b)^b = b^{2b}$

$2^b \cdot b^b = b^b \cdot b^b$

$b^{2b} = (b^b)^2$

$= b^b \cdot b^b$

$\Rightarrow 2^b = b^b$

$\Rightarrow b = 2$

$a^x = p, a^y = q$ এবং $a^2 = (p^y q^x)^z$ হয় তবে, $xyz = ?$

H.W

$9^x = 27^y$ হলে, $\frac{x}{y}$ এর মান কত?

$(3^2)^x = (3^3)^y$

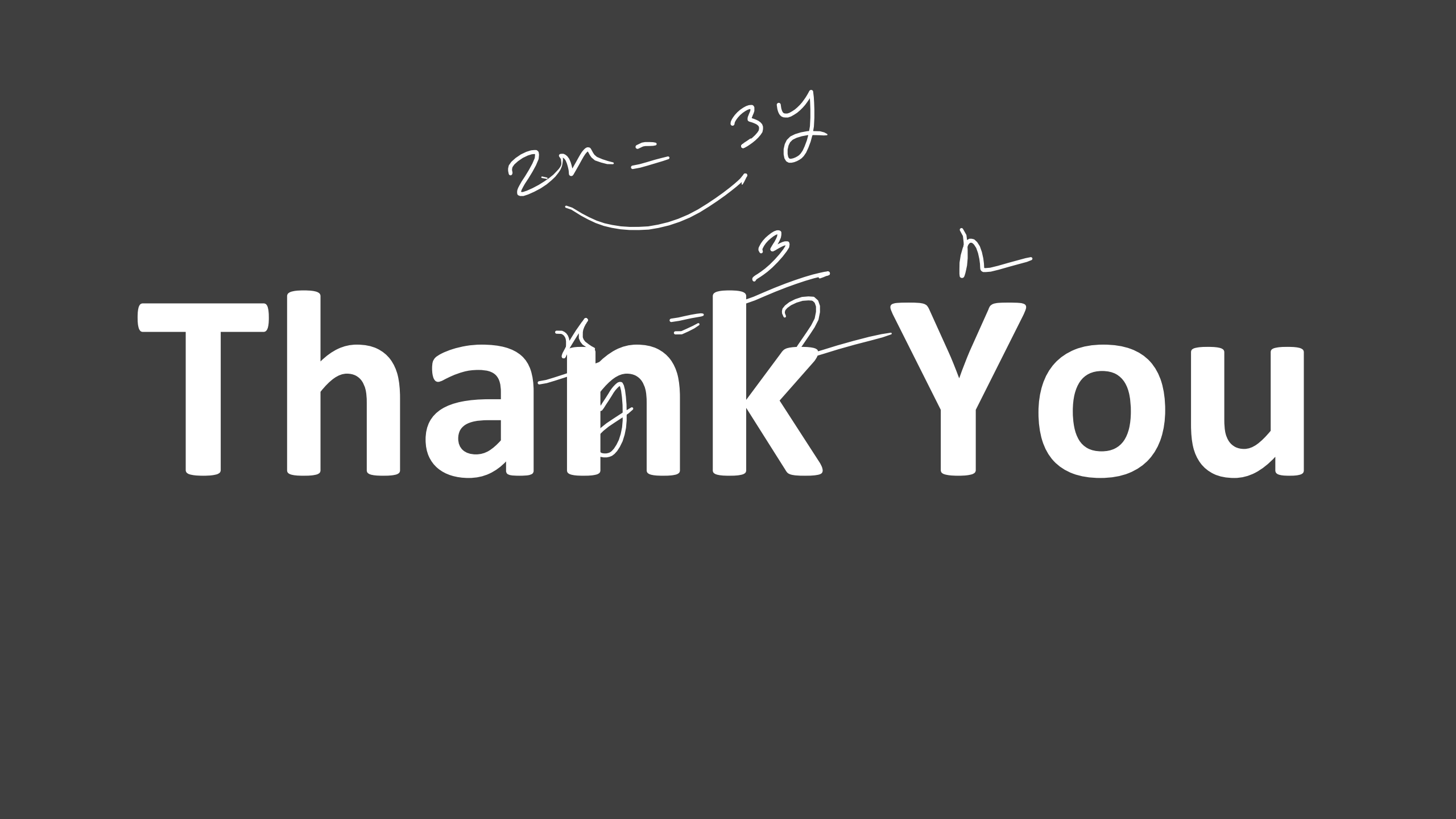
$\Rightarrow 3^{2x} = 3^{3y}$

$\Rightarrow 2x = 3y$

$\frac{2x}{y} = \frac{3y}{y}$

$2 \cdot \frac{x}{y} = 3$

$\frac{x}{y} = 3/2$


Thank You