

লগ ও সূচক

ମାମ ଦେଖି ସ୍ପଷ୍ଟ ୨ରୁ ୩
ଲିଖିତ ଫଳ

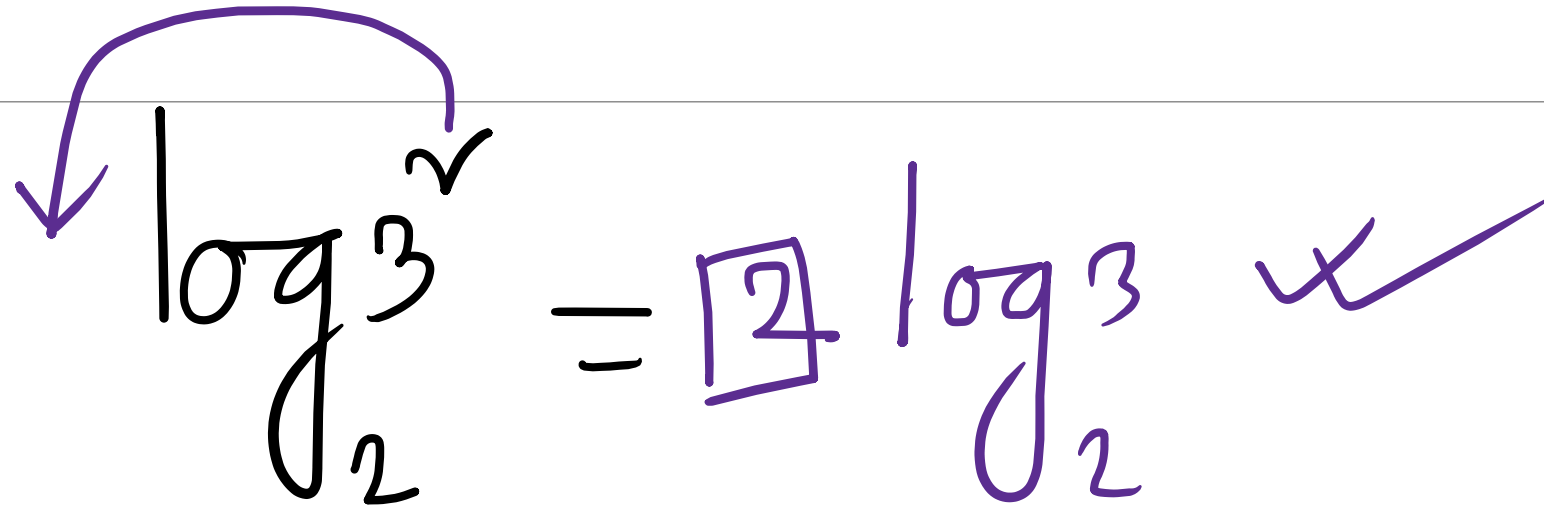
$$\underline{2 \times 2 \times 2 \times 2} = 2^{\textcircled{8}} = \textcircled{16}$$

$$\text{ସୂତ୍ର. } \log_a m^n = n \log_a m$$

$\log_a m \rightarrow$ a ବାସ୍ତବ ସଂଖ୍ୟା
 $a \rightarrow$ ଗୋଟିଏ

m ଗୋଟିଏ ଗୋଟିଏ ସଂଖ୍ୟା

$$1. \log_2 3^2 = ?$$



A handwritten solution in purple ink. A curved arrow points from the exponent '2' in the original problem to the '2' in the denominator of the log base in the first term of the solution. The solution is written as $\log_2 3^2 = 2 \log_2 3$ followed by a checkmark.

$$\log_2 3^2 = 2 \log_2 3 \quad \checkmark$$

$$2. \log_3 81 = ?$$

81 ko kaise/kyun karte hai

100% sure hai

$$\begin{array}{r} 3 \overline{) 81} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \end{array} \quad 81 = 3^4$$

$$\log_3 81 = \log_3 3^4$$

$$= 4 \log_3 3 = 4 \times 1 = 4$$

$$\log_a a = 1$$

$$3. \log_{\sqrt{3}} 81 = ?$$

$$= \log_{\sqrt{3}} 81$$

$$= \log_{\sqrt{3}} (\sqrt{3})^8$$

$$= 8 \log_{\sqrt{3}} \sqrt{3}$$

$$= 8 \times 1 = 8 \text{ ans}$$

$$3 \rightarrow \sqrt{3}$$

$$3 = \sqrt{3} \times \sqrt{3}$$

$$81 = \cancel{3} \times 3 \times 3 \times 3$$

$$= (\sqrt{3})^{\checkmark} \times (\sqrt{3})^{\checkmark} \times (\sqrt{3})^{\checkmark} \times (\sqrt{3})^{\checkmark}$$

$$= (\sqrt{3})^8$$

$$4. \log_{2\sqrt{3}} 144 = ?$$

H.W

H.W

5. $\log_2 \log_{\sqrt{e}} e^2 =$ কত? [৪১ তম বিসিএস প্রিলি]

a. -2

b. -1

c. 1

☒ d. 2

$$= \log_2 \left[\log_{\sqrt{e}} e^2 \right]$$

$$= \log_2 \log_{\sqrt{e}}^{(e^2)} = \log_2 4$$

$$= 4 \log_2^{\sqrt{e}} = 2 \log_2^{\sqrt{e}} = 2$$

$$\log_{\sqrt{e}} e^2 = \log_{\sqrt{e}}^{(e^2)}$$

$$= 4 \log_{\sqrt{e}}^{\sqrt{e}} = 4 \times 1 = 4$$

সূত্র. $\log_a a = 1$ [অর্থ হলো, যার লগ তার মান এবং ভিত্তির মান সমান হলে সমান সমান ১ হবে।]

$$\log_a a = 1$$

5. $\log_2 2 =$ কত?

$$\log_2^r = 1$$

a. -2

b. -1

☒ c. 1

d. 2

প্রশ্ন. $\log_2 4 =$ কত?

$$4 = 2^2$$

- a. -2
- b. -1
- c. 1
- d. 2

$$\log_2 4 = \log_2 2^2 = 2 \log_2 2 = 2$$

5. $\log_2 4 =$ কত?

a. -2

b. -1

c. 1

d. 2

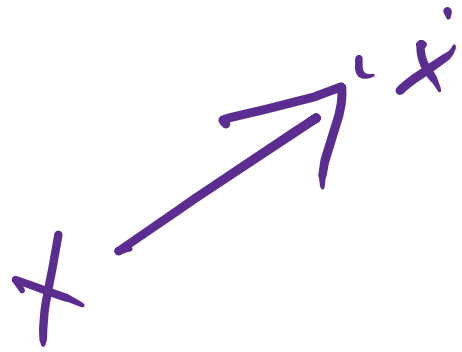
$$* \log \int_3^{\frac{1}{9}}$$

[35th Bus]

સૂત્ર. $\text{Log } (\underline{MN}) = \underline{\text{LogM}} + \underline{\text{LogN}}$

$\log(ab) = \log a + \log b$

નીચેનામાં
 ✕ ગુણન + ૧૫
 ÷ ભાગ - ૧



প্রশ্নঃ ~~Log~~(5*3)=?

$$= \log 5 + \log 3$$

$$\square \log (6a) = \log 6 + \log a$$

* $\log(3) + \log(6) = \log(3 \times 6) = \log 18$

$\times$ 

প্রশ্নঃ $3\log_{10}2 \oplus \log_{10}5 = ?$

ক. $\log_{10}50$

✓ খ. $\log_{10}40$

গ. $\log_{10}30$

ঘ. None

$$= \log_{10}2^3 + \log_{10}5$$

$$= \log_{10}8 \oplus \log_{10}5 = \log_{10}(8 \times 5) \\ = \log_{10}40$$

$\times \longrightarrow +$
 $\div \longrightarrow -$

সূত্র. $\text{Log } (M/N) = \text{Log}M - \text{Log}N$

$$\log \frac{M}{N} = \log M - \log N$$

প্রশ্নঃ $\text{Log}_{\textcolor{violet}{3}}^{\textcolor{violet}{8}} = ?$

$$= \log 8 - \log 3 \quad \checkmark$$

প্রশ্নঃ $\text{Log } b - \log 5 = ?$

$$= \log \frac{b}{5}$$

A

প্রশ্নঃ $\text{Log}5 + \log 3 - \log 7 = ?$

H.W

প্রশ্নঃ $2\log_{10}5 + \log_{10}36 - \log_{10}9 = ?$

সূত্র: লগের ভিত্তি পরিবর্তন:

$$\log_a m = \frac{\log_b m}{\log_b a}$$

[উভয় পাশে প্রয়োজনমত ভিত্তি নেয়া যাবে।]

Handwritten diagram illustrating the derivation of the logarithm base change formula:

$$\log m = \frac{\log m}{a} = \frac{\log m}{\log a}$$

সেই ভিত্তি
সেই

$$\log_3 2 = \frac{\log_{10} 2}{\log_{10} 3}$$

2-1 10-8
 10-1 2-1



সূত্র: $\log_a b \times \log_b c \times \log_c d = \log_a d$

$\Rightarrow \log_a b \times \log_b c = \log_a c$

$\log_a b$ $\times$ $\log_b c$ $=$ $\log_a c$

log

Ans:

$$\log_{\sqrt{2}} 3 \times \log_{\sqrt{3}} 4 = \log \rightarrow \text{(no 2nd \checkmark)}$$

$\rightarrow$ 2nd for

$$\log_{\sqrt{2}} 4 = \log_{\sqrt{2}} 2^2 = 2 \log_{\sqrt{2}} 2 = 2$$

$\checkmark$

प्रश्न: $\log_3 d \times \log_4 c \times \log_d 4 =$

H.W

ultimate 2nd

সূত্রঃ $\log_a x = b$ হলে $x = a^b$

$\log_a x = b$ হলে $x = a^b$

যদি $\log_a x = b$ হয় তবে $x = a^b$

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$$\log_2 2 = 3 \quad \begin{matrix} \nearrow \text{2nd row} \nearrow \text{3rd row} \\ \searrow \text{1st row} \end{matrix}$$

$\log_2 2 \rightarrow \text{1st row}$
 $\log_2 2 \rightarrow \text{2nd row}$
 $\log_2 2 \rightarrow \text{3rd row}$

$$2 = y^3$$

প্রশ্নঃ $\log_x 2 = 1$ হলে $X = ?$

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

H.W

প্রশ্নঃ $\log_x\left(\frac{1}{8}\right) = -2$ হলে $X = ?$

ক. 2

খ. $\sqrt{2}$

গ. $2\sqrt{2}$

ঘ. 4

H.W

প্রশ্নঃ $\log_x\left(\frac{3}{2}\right) = -\frac{1}{2}$ হলে $X=?$ (37th BCS)

ক. 2

খ. $\sqrt{2}$

গ. $2\sqrt{2}$

ঘ. 4

সূচক

$$\underline{5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5} = 5^7$$

সূত্র. $\underline{\underline{a^m \times a^n}} = a^{m+n}$

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

$$\underline{\underline{b^6 \times b^7}} = b^{6+7} = b^{13}$$

* প্রশ্নঃ $7^2 \times 7^7$

সমা: $c^2 \times d^2 \times c^3$
 $= c^{2+3} \times d^2$
 $= c^5 \times d^2$ (Ans)

প্রশ্নঃ $5^4 \times 5^6 = ?$

$4^2 \times 4^3 = ?$

সূত্র. $\underline{a}^m \div \underline{a}^n = \underline{a}^{m-n}$

କିଛି ଏବଂ କି ନା ?

ପ୍ରଶ୍ନ: $\frac{7^7}{7^2} = ?$

$$= 7^{7-2} = 7^5$$

প্রশ্নঃ $\frac{5^8}{5^7} = ?$

✓ $5^3 \times 5^4 \div 5^2 = 5^{3+4-2} = 5^{7-2}$
 $= 5^5 =$

÷ ପାଞ୍ଜିର କାର୍ଯ୍ୟ — 24

ପ୍ରଶ୍ନ: $2^{\frac{3}{4}} \div 2^{\frac{2}{2}}$

$$2^{\frac{3}{4}} - \frac{21}{x}$$

$$= 2^{\frac{3}{4} - 1} = \frac{3-4}{4} = -\frac{1}{4}$$
$$= \frac{1}{2^{\frac{1}{4}}}$$

$$a^{-m} = \frac{1}{a^m}; \quad 2^{-\frac{1}{4}} = \frac{1}{2^{\frac{1}{4}}}$$

$$5^{-6} = \frac{1}{5^6}$$

সূত্র. $(\underline{a^m})^{\underline{n}} = a^{\underline{mn}}$

$$(2^{\underline{3}})^{\underline{6}} = 2^{3 \times 6} = 2^{18}$$

প্রশ্নঃ $(a^3)^5$ = $a^{\underline{3*5}}$ = $a^{\underline{15}}$

প্রশ্নঃ $(2^2)^3 = ?$

প্রশ্নঃ $(7^3)^4 = ?$

প্রশ্নঃ $(8^{\frac{3}{4}})^{\frac{8}{3}} = ?$

$\swarrow$ ২য় ব্যুৎ (সুখী)

$= 8^{\frac{3}{4} \times \frac{8}{3}}$

$= 8^2 = 64 \text{ Ans}$

$$\text{সূত্র. } (\underline{ab})^n = a^n b^n$$

$$(6x)^7 = 6^7 \times x^7$$

৫৫.

প্রশ্নঃ $(ab)^4 = a^4 b^4$

$$\text{প্রশ্নঃ} (3 * b)^4 = 3^4 \times b^4$$

$$\text{প্রশ্নঃ } (2*3)^3 =$$

$$\text{সূত্র. } a^0 = 1 \quad \bigg| \quad (a^0)^0 = 1$$

$$\text{প্রশ্নঃ } 0.5^0 = ?$$

প্রশ্নঃ $10000000^0 = ?$

$= 1$

সূত্র. a^x = a^y হলে x=y

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

১ = ১
সুত্রটি ইতিমধ্যে প্রমাণিত

∴ $\Rightarrow C =$ যেকোনো
সংখ্যা

$$\underline{x}^{\sim} = \underline{x}^e \Rightarrow C = 2$$

প্রশ্নঃ a^x = a³ হলে x=? 3

প্রশ্নঃ $2^x = 2^5$ হলে $x=?$

প্রশ্নঃ $2^x = (\sqrt{2})^2$ হলে $x=?$

$$\Rightarrow \underline{2^x = 2^1}$$

$$x = 1 \text{ Ans.}$$

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

$$= \frac{a^m}{b^m}$$

ପ୍ରଶ୍ନ: $\binom{2}{7}^3 = ?$

ମାତ୍ର ୨ଟି ସଂଖ୍ୟା
ମାତ୍ର ୩ଟି ସଂଖ୍ୟା

$$\frac{2^3}{7^3}$$

Ans.

প্রশ্নঃ $\left(\frac{b}{5}\right)^5 = ?$

$$= \frac{b^5}{5^5}$$

উঃ
~~২৫~~

$$\begin{aligned} 5^5 &= \underline{5 \times 5} \times \underline{5 \times 5} \times \underline{5} \\ &= 25 \times 25 \times 5 \\ &= 25 \times 125 \\ &= \bigcirc \end{aligned}$$

সূত্র. $\sqrt[m]{a^n} = a^{\frac{n}{m}}$

$$= \frac{n}{m}$$

* $\sqrt[3]{b^3} =$

$$\underline{b^{\frac{3}{3}}}$$

$$\sqrt[5]{\quad}$$

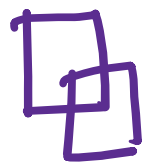
প্রশ্ন. $\sqrt[5]{a^1} = ?$

$$a^{\frac{1}{5}}$$

A

প্রশ্ন. $\sqrt[3]{x^5} = ?$

$$x^{\frac{5}{3}}$$



$$x^{x\sqrt{x}} = (x\sqrt{x})^x \quad 2(2) x = ? \quad \begin{matrix} 40\% \\ BCS \end{matrix}$$

$$a) \frac{3}{2}$$

$$\checkmark b) \frac{9}{4}$$

$$c) \frac{5}{4}$$

$$\underline{x}^{x\sqrt{x}} = (\underline{x\sqrt{x}})^x$$

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

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

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

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

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

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

$$x = \left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

প্রশ্ন. 4^{2x} = 2^{x+1} হলে $x=?$

$$4 = 2^2$$

$$\Rightarrow (2^2)^{2x} = 2^{x+1}$$

$$\Rightarrow \underline{2^{4x}} = \underline{2^{x+1}}$$

যেহেতু ভিত্তি সমান

$$\therefore 4x = x+1$$

$$\Rightarrow 4x - x = 1$$

$$\Rightarrow 3x = 1$$

$$\Rightarrow x = \frac{1}{3} \quad \star$$

practice
practice
practice

practice

Three decorative wavy lines drawn in red ink, positioned below the word 'practice'.

প্রশ্ন. $x^{-3} - 1000 = 0$ হলে $x = ?$

প্রশ্ন. $3^{2+x} = 81$ হলে $x=?$