লগারিদম

Md. Labu Miah

Senior Instructor, P2A

P2A

$4^2 = 16$

16 এর বর্গমূল কত? $\sqrt{16} =$

$\rightarrow 4^{\square} = 16$; $\square$ কত হলে? Ans: 2

$\rightarrow$ 4 এর সাপেক্ষে কত হলে 16 হবে? উত্তর: (2)

$$\log_4^{16} = 2$$

$$\log_2 8 = ?$$

$$2^{3} = 8$$

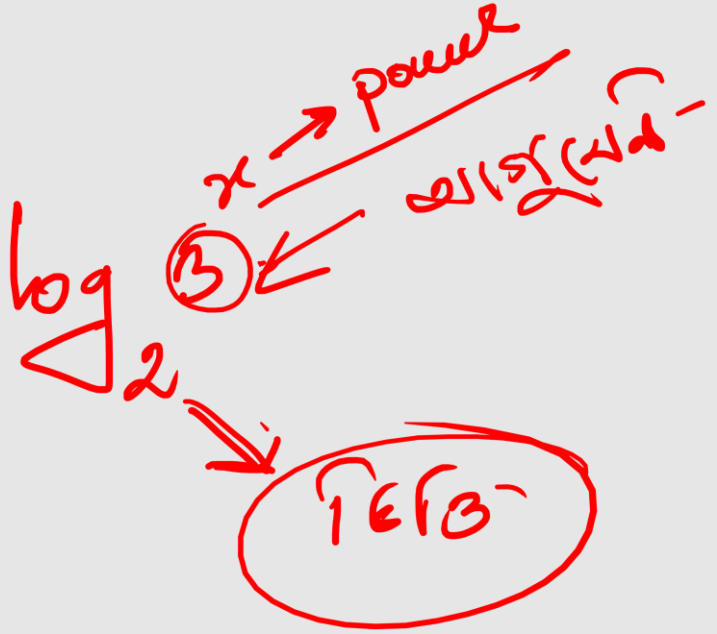
Ans: 3

$\Rightarrow \log_{1} 4 =$

Ans:

$1^{\square} = 4$

$1^{\text{anni}} = 1$



$$\log_{10} 5 = x$$

$\log_3 9 = 2 \Rightarrow 3^2 = 9$

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

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

$x = \sqrt{-2}$

غير ممكن

$$\log_a N^K = x$$

$$[a > 0,\ a \neq 1]$$

$$[N > 0]$$

$$\log_2 1 = 0$$

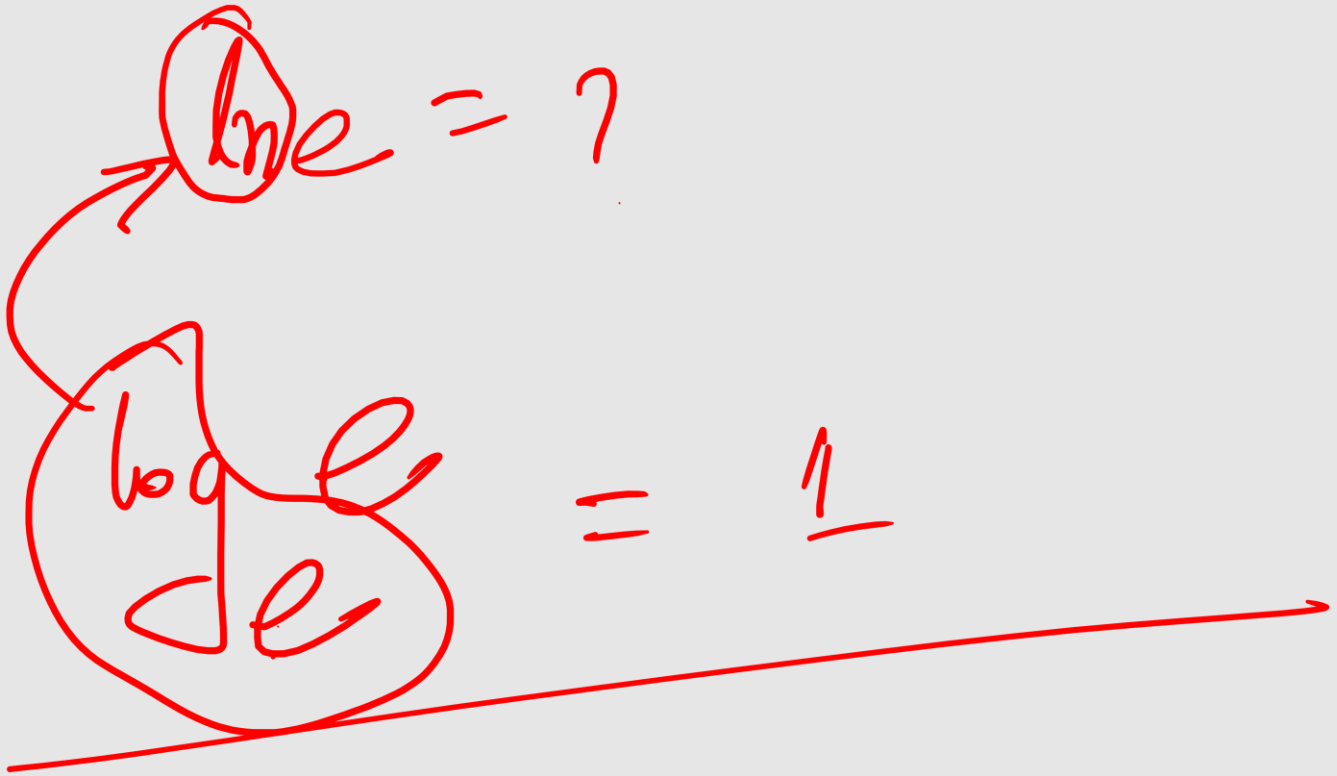
$$\log_2 2 = 1$$

$$2^1 = 2$$

$\log_e 5 = \ln 5$

$e = 2.71\ldots$

$\ln 10 \neq \log_e 10$


ln e = ?
log e = 1
e

$$\log_3 27 = 3 \rightarrow \text{উত্তর পাওয়া:}$$

$$3^3 = 27$$

$$\rightarrow \log_{10} 100 = 2$$

$$\log_{10} 1000 = 3$$

$$\log_{10} 10000 = 4$$

$$\log_{10} 1000000 = 5$$

$$\rightarrow \log_a^{M \times N} = \log_a^{M} + \log_a^{N}$$

$$\log_a^{(M)} + \log_a^{(N)} + \log_a^{(P)} = \log_a^{M \cdot N \cdot P}$$

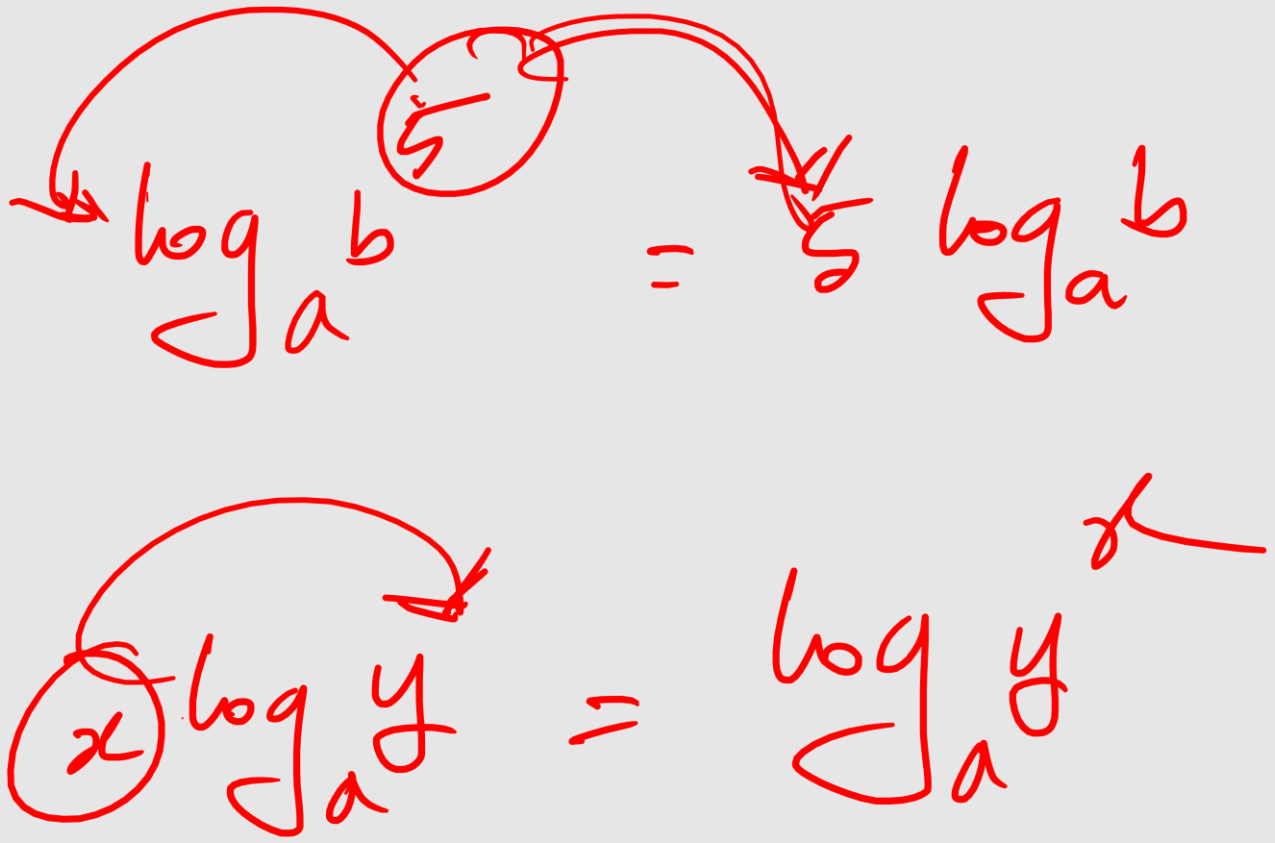
$$\log_a M/N = \log_a M - \log_a N$$

$b^3 = b \times b \times b$

$x \quad \log_a b^3$

$= \log_a b \times b \times b$ $= \log_a b + \log_a b + \log_a b$

$\log_a b^3 = 3 \log_a b$


$\log_a b$
$=$
$\xi \log_a b$
$x \log_a y$
$=$
$\log_a y^x$

$\log_{10} 100 = 2$

$\sqrt{100} = 10$

$100^{\frac{1}{2}} = 10$

$\log_{100} 10 = \frac{1}{2} = \frac{1}{\log_{10} 100}$

$$\log_a b = \frac{1}{\log_b a}$$

$$\log_{\text{pori}} \text{shakib} = \frac{1}{\log_{\text{shakib}} \text{pori}}$$

$$\log_a b = \frac{1}{\log_b a}$$

$$\frac{1}{\log_x y} = \log_y x$$

$$\log_{\text{Hasan}}^{\text{porri}} = \log_{\text{Raj}}^{\text{porri}} \times \log_{\text{Hasan}}$$

Raj

$$\log_a b = \log_x b \times \log_a x$$

→ মনে রাখবে [illegible] ভুলবে না

$$\log_a m = \frac{1}{\log_m a}$$

$$\log_a b = \log_m b \times \log_a m$$

$$= \log_m b \times \frac{1}{\log_m a} = \frac{\log_m b}{\log_m a}$$

$$\Rightarrow \log_a b = \frac{\log b}{\log a}$$ ...✓

$$\log_{\text{posi}}^{\text{uzzal}} = \text{uzzal}$$

posi

$$5^{\log_5 10} = 10$$

লগারিদমের সূত্রাবলি

- যদি $a^x = \mathrm{N}\ (\mathrm{a} > 0, a \neq 1)$ হলে, $x = \log_a N$ [যেখানে $N > 0$]
- $\log_a(m \times n) = \log_a m + \log_a n$
- $\log_a\left(\frac{m}{n}\right) = \log_a m - \log_a n$
- $\log_a m^n = n \log_a m$
- $\log_a m = \log_b m \times \log_a b$
- $\log_a m = \frac{\log m}{\log a}$

লগারিদমের সূত্রাবলি

- $a^{\log_a b} = b$
- $\log_a a = 1$
- $\log_a 1 = 0$
- $\log_a b = x$ হলে, $a^x = b$
- $x^{\log_a y} = y^{\log_a x}$
- $\log_{a^n} b^m = \frac{m}{n} \log_a b$

Type-1

মান নির্ণয়

$\log_3 81 =$ কত? ∴ 4

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

$3^4 = 81$

$(\sqrt{3} \times \sqrt{3})^4 = 81$

$(\sqrt{3})^8 = 81$

$\{(\sqrt{3})^2\}^4 = 81 \Rightarrow (\sqrt{3})^8 = 81$

$2^{4} = 16$

$(\sqrt{2})^{8} = 16$

$3^{3} = 27$

$(\sqrt{3})^{6} = 27$

$5^{2} = 25$

$(\sqrt{5})^{4} = 25$

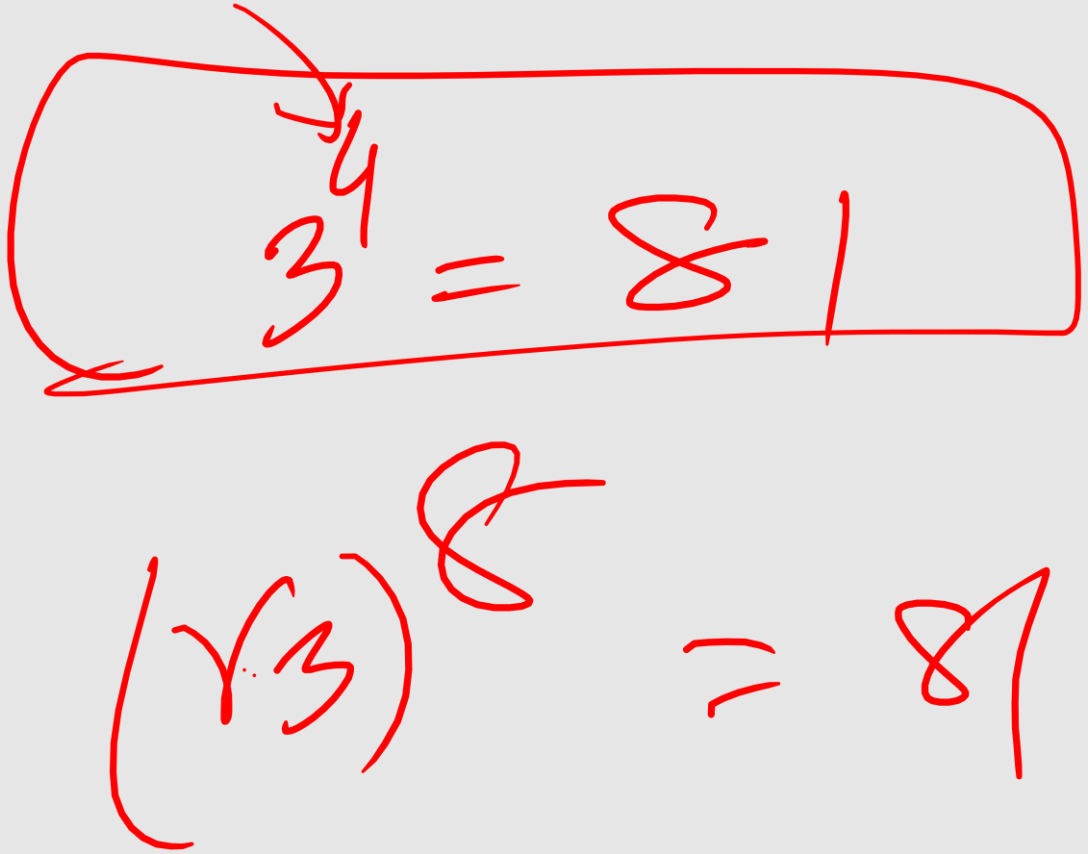
$\log_5 25 = 2$

$\log_{\sqrt{5}} 25 = 4$

$\log_3 27 = 3$

$\log_{\sqrt{3}} 27 = 6$

$\log_{\sqrt{3}} 81 =$ কত?



32 এর 2 ভিত্তিক লগ কত?

$$\log_2 32 = 5$$

$$\log_2 2^5 = 5 \log_2 2 = 5$$

$3\sqrt{3}$ এর 3 ভিত্তিক লগ কত?

$\log_3 3\sqrt{3}$

$3\sqrt{3}$

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

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

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

$\log_3 3^{3/2} = 3/2$

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

$\log_8 2 = ?$

$$\log_8 2 = \frac{1}{\log_2 8} = \frac{1}{3}$$

$$\log_2 8 = 3$$

$$\log_5 \sqrt{5} = ?$$

H.W

$\frac{1}{2}$

$\log_{10} 0.001 = ?$

$0.001 = \frac{1}{1000}$

$\log_{10} 10^{-3} = -3$

$= \frac{1}{10^3}$

$= 10^{-3}$

$2^{\log_2 3 + \log_2 5}$ এর মান কত? [43 BCS]

$2^{\log_2 3} \times 2^{\log_2 5}$

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

$3 \times 5 = 15$

$\log_a b = x$

$\Rightarrow a^x = b$

$\log_x y = z$

$\Rightarrow x^z = y$

Type-2

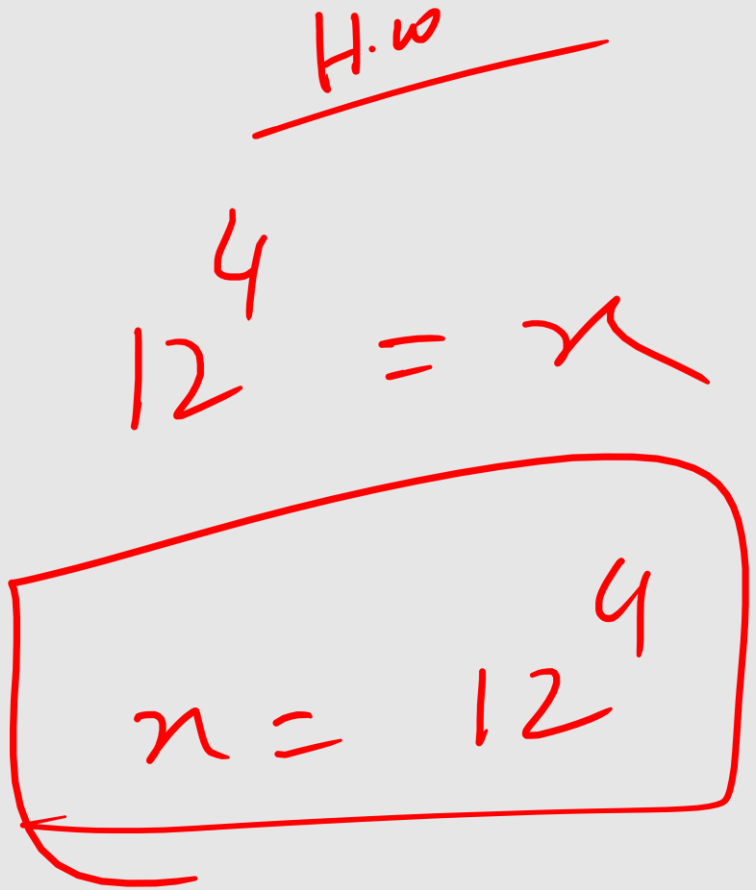
log এর সমাধান

$\log_{10} x = 3$ হলে, x এর মান কত?

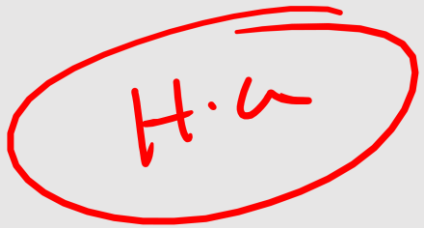
$10^3 = x$

$x = 10^3 = 1000$

$\log_{12} x = 4$ হলে, x এর মান কত?



$\log_5 x = 3$ হলে, x এর মান কত?



$\log_x\left(\frac{1}{27}\right) = 3$ হলে, x এর মান কত?

$\left(\frac{1}{3}\right)^3 = \frac{1^3}{3^3} = \frac{1}{27}$

$x^3 = \frac{1}{27}$

$x^3 = \left(\frac{1}{3}\right)^3$

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

$\log_x \frac{1}{81} = -4$ হলে, x এর মান কত?

$x^{-4} = \frac{1}{81}$

$\frac{1}{x^4} = \frac{1}{81}$

$x^4 = 81$

$x^4 = 81$

$x^4 = 3^4$

$x = 3$

$\log_x \frac{1}{9} = -2$ হলে, x এর মান কতো?

$x^{-2} = \frac{1}{9}$

$\frac{1}{x^2} = \frac{1}{9}$

$x^2 = 9$

$x = +3$

+3

$x^2 = 9 \Rightarrow x = +3$

Type-3

Log এর সরলীকরণ

$3 \log 2 + \log 5 = ?$

$\log 2^3 + \log 5$

$\log 8 + \log 5$

$\log 8 \times 5 = \log 40$

$\log_2 64 + \log_2 8 = ?$

$6 + 3 = 9$

$\log_2 64 + \log_2 8$

$\log_2 64 \times 8 = \log_2 512 = 9$

$$\log_{\sqrt{2}} 4 \times \log_{\sqrt{3}} 3 = ?$$

$4 \times 2 = 8$

$2^2 = 4$

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

$3^1 = 3$

$(\sqrt{3})^2 = 9$

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

$\log_{10} 5^2 + \log_{10} \frac{36}{9}$

$\log_{10} 25 + \log_{10} 4$

$\log_{10} 25 \times 4 = \log_{10} 100$

$= 2$

$$\log_2 \sqrt{6} + \log_2 \sqrt{\frac{2}{3}} = ?$$

$$\sqrt{6} = \sqrt{3 \times 2}$$

$$= \sqrt{3} \times \sqrt{2}$$

$$\log_2 \sqrt{6} \times \sqrt{\frac{2}{3}}$$

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

$$= \log_2 \frac{\sqrt{3} \times \sqrt{2} \times \sqrt{2}}{\sqrt{3}}$$

$$= \log_2 2 = 1$$

$$\frac{\log 36}{\log 6} = \text{কত?}$$

$$= \frac{\log 6^2}{\log 6}$$

$$= \frac{2\log 6}{\log 6} = 2$$

$$2 \times 3 \times \frac{3}{2}$$

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

$\log_2 \log_2 \log_2 16 =$ কতো?

1

$\log_2 16 = 4$

$\log_2 4 = 2$

$\log \log \log_2 16$

$\log \log_2 2$

2

$\log_2 4$

$\log_2 2 = 1$

$$\log\frac{a^3b^3}{c^3}+\log\frac{b^3c^3}{d^3}+\log\frac{c^3d^3}{a^3}-3\log b^2c=?$$

$$\log\frac{a^3b^3}{c^3}\times\frac{b^3c^3}{d^3}\times\frac{c^3d^3}{a^3}-\log(b^2c)^3$$

$$=\log b^6c^3-\log b^6c^3=0$$

$\log_a b \times \log_b c \times \log_c d$ = কতো?

$$\frac{\log b}{\log a} \times \frac{\log c}{\log b} \times \frac{\log d}{\log c}$$

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

$$= \log_a d$$

$$\log_a b = \frac{\log b}{\log a}$$

$$\frac{\log b}{\log a} = \log_a b$$

Thank You