NDA 1 2025

LIVE

MATHS

LOGARITHMS

CLASS 1

NAVJYOTI SIR

Crack
EXAMS

30 Sep 2024 Live Classes Schedule

8:00AM	SEPTEMBER 2024 MONTHLY CURRENT AFFAIRS	RUBY MA'AM
10:00 AM	SEPTEMBER 2024 MONTHLY DEFENCE UPDATES	DIVYANSHU SIR

NDA 1 2025 LIVE CLASSES

11:30AM	GK - WORLD GEOGRAPHY	RUBY MA'AM
1:00PM	BIOLOGY - COMMON EPIDEMICS	SHIVANGI MA'AM
4:00PM	MATHS - LOGARITHMS - CLASS 1	NAVJYOTI SIR
5:30PM	ENGLISH - WORD CLASSES - CLASS 1	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	GK - WORLD GEOGRAPHY	RUBY MA'AM
1:00PM	BIOLOGY - COMMON EPIDEMICS	SHIVANGI MA'AM
2:30PM	MATHS - PROFIT & LOSS - CLASS 3	NAVJYOTI SIR
5:30PM	ENGLISH - WORD CLASSES - CLASS 1	ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

10:00AM	REASONING - FIGURE CLASSIFICATION	RUBY MA'AM
2:30PM	MATHS - PROFIT & LOSS - CLASS 3	NAVJYOTI SIR
4:00PM	STATIC GK - BOOKS & AUTHORS	DIVYANSHU SIR
5:30PM	NGLISH - WORD CLASSES - CLASS 1	ANURADHA MA'AM

LOGARITHMS

$2^x = 8$

$\Rightarrow x = 3$

$2^x = 5$

(finding x, requires here logarithm)

$a^b = c \Rightarrow \log_a c = b$

(a: base)

(what power of 'a' will give c)

$3^4 = 81$

$\log_3 81 = 4$

(3: base)

$125 = 5^3$, $625 = 5^4$

$\log_5 125 = 3$ $\log_5 625 = 4$

→ $\log_e$ natural base

$\log_{10}$ (base 10)

10 , 100 , 1000 , 10,000

10^1 10^2 10^3 10^4

$\log_{10}(10000) = \log_{10}(10^4) = 4$

$$\log_{10}\left(\frac{1}{1000}\right) = \log_{10}\left(\frac{1}{10^3}\right) = \log_{10}\left(10^{-3}\right) = -3$$

$$\log_a\left(a^m\right) = m$$

$$\log_{10}(0.001) = -3$$

PROPERTIES

✓log of zero and negative numbers is not defined.

✓Base of log is always positive but not equal to 1.

$\log_a b$ | $b > 0$

| $a > 0, a \neq 1$

$(\log_1 6)$ = not defined.

PROPERTIES

① $\log_m a + \log_m b = \log_m (a \times b)$ $\Rightarrow$ $\log_m a + \log_m b + \log_m c + \log_m d + \cdots$

$= \log_m (a \cdot b \cdot c \cdot d \cdots)$

② $\log_m a - \log_m b = \log_m \left(\frac{a}{b}\right)$

Eg

$\log_2 (64) = \log_2 (2 \times 32)$

LHS = 6 $= \log_2 2 + \log_2 32$

RHS $= 1 + 5 = 6$

$\log_3 81 - \log_3 9 = \log_3 \left(\frac{81}{9}\right)$

LHS $= 4 - 2 = 2$

RHS $= \log_3 (9) = 2$ ✓

$\log_m (a+b)$ — ?

$\log_m (a-b)$ — ?

$\log_m a \times \log_m b$ — ?

$\frac{\log_m a}{\log_m b}$ — ?

PROPERTIES

(3) $\log_m (a^b) = b \log_m a$

Eg - $\log_5 (5^3) = 3$

$\log_5 (5^3) = 3 \log_5 (5) = 3 \times 1 = 3$

(4) $\log_b a = \dfrac{\log_m a}{\log_m b} \Rightarrow \log_b a \times \log_m b = \log_m a$

$$\log_b a \times \log_c b \times \log_d c \times \log_e d \times \cdots \log_y z$$

$$= \log_y a$$

PROPERTIES

(5) $\log_a b = \dfrac{1}{\log_b a}$

$m^0 = 1$

(6) $\log_a a = 1$

(7) $\log_m (1) = 0$ ✓ | $\log_{10} 1 = 0$; $\log_e (1) = 0$; $\log_{20} (1) = 0$

m can be any positive number.

$2^x = 5$

Taking log, both sides

$\log_{10}(2^x) = \log_{10} 5$

$x \log_{10} 2 = \log_{10} 5$

$x \times \log_{10} 2 = \log_{10} 5$

$x = \dfrac{\log_{10} 5}{\log_{10} 2} \neq \log_{10}\left(\dfrac{5}{2}\right)$

What is the value of $\log_9 27 + \log_8 32$?

A. 7/2

B. 19/6

C. 4

D. 7

$$\frac{\log_3 27}{\log_3 9} + \frac{\log_2 32}{\log_2 8}$$

$$\frac{3}{2} + \frac{5}{3}$$

$$= \frac{9+10}{6} = \frac{19}{6}$$

What is the value of $\log_9 27 + \log_8 32$?

A. 7/2

B. 19/6

C. 4

D. 7

For what value(s) of x is $\log_{10}\{999 + \sqrt{x^2 - 3x + 3}\} = 3$?

A. 0 , 1 ✗

B. 1

C. 2

D. 1 , 2 ✓

$\log_a (a^m) = m$ ✓

$a = 10$

$m = 3$

$a^m = 10^3$ ✓

$999 + \sqrt{x^2 - 3x + 3} = 10^3$

$999 + \sqrt{x^2 - 3x + 3} = 1000$

$\sqrt{x^2 - 3x + 3} = 1000 - 999$

$\sqrt{x^2 - 3x + 3} = 1$

Squaring, $x^2 - 3x + 3 = 1$

$x^2 - 3x + 2 = 0$

$(x-1)(x-2) = 0$

$x = 1, 2$

For what value(s) of x is $\log_{10}\{999 + \sqrt{x^2 - 3x + 3}\} = 3$?

A. 0 , 1

B. 1

C. 2

D. 1 , 2

$$\frac{1}{(\log_a bc)+1}+\frac{1}{(\log_b ac)+1}+\frac{1}{(\log_c ab)+1}$$ is equal to

A. 1 ✓

B. 2

C. 0

D. abc

$$\frac{1}{\log_a bc+\log_a a}+\frac{1}{\log_b ac+\log_b b}+\frac{1}{\log_c(ab)+\log_c(c)}$$

$$\frac{1}{\log_a(abc)}+\frac{1}{\log_b(abc)}+\frac{1}{\log_c(abc)}$$

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

$$=\log_{abc} a+\log_{abc} b+\log_{abc} c$$

$$=\log_{abc}(abc)=1$$

$$\frac{1}{(\log_a bc)+1}+\frac{1}{(\log_b ac)+1}+\frac{1}{(\log_c ab)+1}$$ **is equal to**

A. 1

B. 2

C. 0

D. abc

If $\log_y x = 8$ and $\log_{10y} 16x = 4$, then find the value of y.

(a) 1 (b) 2 (c) 3 (d) 5

$\log_y x = 8$

$x = y^8$

$\log_{10y} 16x = 4$

$16x = (10y)^4$

$16x = 10^4 y^4$

$16(y^8) = 10^4 y^4$

$\frac{y^8}{y^4} = \frac{10^4}{2^4}$

$y^{8-4} = \left(\frac{10}{2}\right)^4$

$y^4 = 5^4$

$\Rightarrow y = 5$

If $\log_y x = 8$ and $\log_{10y} 16x = 4$, then find the value of y.

(a) 1 (b) 2 (c) 3 (d) 5

ANSWER : D

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MATHS

LOGARITHMS

CLASS 2

NAVJYOTI SIR

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