

CDS 1 2025

LIVE

MATHS

LOGARITHMS

NAVJYOTI SIR

SSBCrack
CLAMS

Crack
EXAMS



18 Dec 2024 Live Classes Schedule

8:00AM	18 DEC 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	18 DEC 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM	COMPLETE PSYCH TESTS	ANURADHA MA'AM
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NDA 1 2025 LIVE CLASSES

✓ 1:00PM	PHYSICS - WORK ENERGY POWER - CLASS 2	NAVJYOTI SIR
✓ 4:30PM	ENGLISH - CORRELATING SENTENCES - CLASS 1	ANURADHA MA'AM
✓ 5:30PM	MATHS - INTEGRATION - CLASS 2	NAVJYOTI SIR

CDS 1 2025 LIVE CLASSES

✓ 1:00PM	PHYSICS - WORK ENERGY POWER - CLASS 2	NAVJYOTI SIR
✓ 4:30PM	ENGLISH - CORRELATING SENTENCES - CLASS 1	ANURADHA MA'AM
✓ 7:00PM	MATHS - LOGARITHMS	NAVJYOTI SIR



LOGARITHMS

$$3^x = 9$$

$$3^x = 3^2$$

$$\Rightarrow x = 2$$

$$\underline{3^x = 8}$$

To find x , logarithm is required,

$$\Rightarrow a^m = b$$

$$\log_a b = m$$

$$2^3 = 8 \quad \Rightarrow \quad \log_2 8 = 3$$

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

$$\log_4 64 = 3 \quad (4^3 = 64)$$

(base)

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

$$\frac{1}{10} = 0.1, \quad \frac{1}{100} = 0.01, \quad \frac{1}{1000} = 0.001$$

$$\log_{10}(0.1) = \log_{10}\left(\frac{1}{10}\right) = \log_{10}(10^{-1}) = -1$$

$$\log_{10}(0.01) = -2$$

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

PROPERTIES

log of zero and negative numbers is not defined.

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

$$\log_m a : (a > 0) \quad m > 0 ; m \neq 1$$

$\log_1 8 = \text{cannot be calculated}$

PROPERTIES

$$\textcircled{1} \log_m (a \times b) = \log_m a + \log_m b$$

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

$$\left\{ \begin{aligned} &\log_m a_1 + \log_m a_2 + \log_m a_3 + \dots + \log_m a_n \\ &= \log_m (a_1 \cdot a_2 \cdot a_3 \dots a_n) \end{aligned} \right.$$

PROPERTIES

$$\textcircled{3} \quad \log_m (a^b) = b \log_m a \quad \longrightarrow \quad \log_m \left(\frac{1}{a}\right) = \log_m (a)^{-1} = \underline{\underline{-\log_m a}}$$

$$\textcircled{4} \quad \log_b a = \frac{\log_m a}{\log_m b} \quad \Rightarrow \quad \log_b a \times \log_m b = \log_m a$$

$$\log_a b \times \log_b c \times \log_c d \times \log_d e \times \dots \times \log_y z = \underline{\underline{\log_a z}}$$

PROPERTIES

$$\textcircled{5} \quad \log_a b = \frac{1}{\log_b a} \Rightarrow \log_a b \times \log_b a = 1$$

$$\textcircled{6} \quad \log_a a = 1 \quad \log_a 1 = 0 \quad a^0 = 1$$

$$\log_{10}(1) = 0 \quad \log_5(1) = 0$$

log with any base on 1 is 0.

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

- A. $7/2$
- B. $19/6$
- C. 4
- D. 7

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

(Same) (Same)

$$\frac{3}{2} + \frac{5}{3} = \frac{9+10}{6} = \frac{19}{6}$$

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 ✗

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

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

B. 1

$$y = 10^3 = 1000$$

C. 2

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

D. 1, 2 ✓

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

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

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

$$x = 1, 2$$

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

B. 2

C. 0

D. abc

$$\begin{aligned}
 & \frac{1}{\log_a(abc)} + \frac{1}{\log_b(abc)} + \frac{1}{\log_c(abc)} \\
 &= \log_{abc} a + \log_{abc} b + \log_{abc} c = \log_{abc}(abc) = 1
 \end{aligned}$$

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

$$\log_y x = 8$$

$$x = y^8 \quad \text{--- (1)}$$

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

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

$$16(y^8) = 10000y^4$$

$$\frac{y^8}{y^4} = \frac{10000}{16} \Rightarrow y^4 = \left(\frac{10}{2}\right)^4$$

$$y = 5$$

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

If $(0.2)^x = 2$ and $\log_{10} 2 = 0.3010$, then what is the value of x to the nearest tenth ?

A. - 10.0

B. - 0.5

C. - 0.4 ✓

D. - 0.2

$$(0.2)^x = 2$$

$$x = \frac{0.3010}{\log_{10}\left(\frac{2}{10}\right)}$$

Taking \log_{10} both sides,

$$\log_{10}\left(\frac{2}{10}\right) = \log_{10}(2) - \log_{10}(10)$$

$$\log_{10}(0.2)^x = \log_{10} 2$$

$$x \log_{10}(0.2) = 0.3010$$

$$x = \frac{0.3010}{0.3010 - 1} = \frac{-0.3010}{0.6980}$$

$$x = \frac{0.3010}{\log_{10}(0.2)}$$

$$x = -0.3010 / 0.6980$$

$$x = -\frac{0.3010}{0.6980} \sim -\frac{0.3}{0.7} \sim -\frac{3}{7} = -0.4$$

If $(0.2)^x = 2$ and $\log_{10} 2 = 0.3010$, then what is the value of x to the nearest tenth ?

A. – 10.0

B. – 0.5

C. – 0.4

D. – 0.2

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SET THEORY

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