
I WAS THERE
4/4/16
3/3/09
5/5/25
2/2/04
THE 4TH √DAY
6/6/36
4/4/16
1/1/01
7/7/49
OF THE CENTURY
8/8/64
9/9/81

Think of a number, any number:

1) Choose your favorite number b/w 1 & 20.
2) Double it.
3) Add 10.
4) Divide by 2.
5) Subtract your starting number.

Write your result on your desk and cover it up.

Today's learning objective:

By the end of class, I will be able to solve logarithmic problems utilizing the full suite of log properties.

Today's language objective:

Division ~ subtraction
Multiplication ~ addition
Base
Input vs Output

all questions are non-calc

[Maximum mark: 13]

Solve the following equations.

(a) $\log_x 49 = 2$ *[3 marks]*

$x^2 = 49 \quad x = \pm 7$

(b) $\log_2 8 = x$ *[2 marks]*

$x = 3 \quad 2^x = 8$

(c) $\log_{25} x = -\frac{1}{2}$ *[3 marks]*

$25^{-1/2} = x \quad \frac{1}{25^{1/2}} = \frac{1}{\sqrt{25}} = \frac{1}{\pm 5} = x$

(d) $\log_2 x + \log_2 (x-7) = 3$ *[5 marks]*

$\log_2 (x(x-7)) = 3$

$\log_2 (x^2 - 7x) = 3$

$2^3 = x^2 - 7x$

$8 = x^2 - 7x - 8$

$-8 \quad -8$

$0 = x^2 - 7x - 8$

$x = 8$

$x = -1$

$x \quad -8$

$x \quad +1$

17.) Solve $\log_2 x + \log_2(x-2) = 3$, for $x > 2$.

$$\log_2(x^2-2x) = 3$$

$$2^3 = x^2 - 2x$$

$$0 = x^2 - 2x - 8$$

$$x \quad -4$$
$$x \quad +2$$

$x = 4$

74.) Let $f(x) = \log_a x, x > 0$.

(a) Write down the value of

(i) $1 = f(a)$; $\log_a a = ?$ $a^? = a$

(ii) $0 = f(1)$; $\log_a 1 = ?$ $a^? = 1$

(iii) $4 = f(a^4)$. $\log_a a^4 = ?$

$a^? = a^4$

88.) Find the **exact** value of x in each of the following equations.

(a) $5^{x+1} = 625$ $5 \cdot 5 \cdot 5 \cdot 5 = 625$

(b) $\log_a (3x + 5) = 2$

(Tota

$a^2 = 3x + 5$

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

126.) Solve the equation $\log_{27} x = 1 - \log_{27}(x - 0.4)$.

$x = \frac{27}{5}$ $x = -5$

$\log_{27} x + \log_{27}(x-0.4) = 1$

$\log_{27}(x^2 - 0.4x) = 1$

$27^1 = x^2 - 0.4x$

$x^2 - 0.4x - 27 = 0$ ×5

$5x^2 - 2x - 135 = 0$

$5x^2 - 2x - 135 = 0$

$5x \quad -27$

$5x \quad +5$

x

Napster

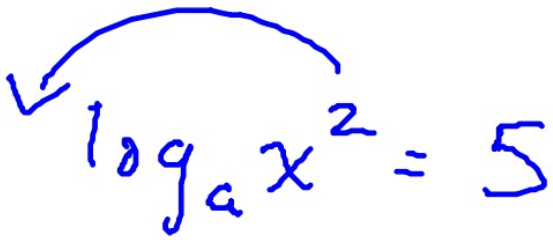
145.) Solve the equation $\log_9 81 + \log_9 \frac{1}{9} + \log_9 3 = \log_9 x$.

$\log_9\left(81 \cdot \frac{1}{9} \cdot 3\right) = \log_9 x$

$x = 27$

$\log_9 27 = \log_9 x$

$$\log_a x^2 = 2\log_a x$$



$$\log_a x^2 = 5$$

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

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

$$\log_a b = \frac{\log_x b}{\log_x a} = \frac{\ln b}{\ln a}$$

$$\log_7 13 = 1.32$$

$$\frac{\ln 13}{\ln 7}$$

$$\frac{\log_{10} 13}{\log_{10} 7}$$

$$f(x) = 2 - \frac{3x}{(x^2-1)^1} \qquad f = 2 - 3x(x^2-1)^{-1}$$

$$f'(x) = -3 \cdot (x^2-1)^{-1} + -3x \cdot 2x \cdot -1 \cdot (x^2-1)^{-2}$$

$$f'(x) = \frac{-3}{(x^2-1)} + \frac{6x^2}{(x^2-1)^2}$$

$$= \frac{-3(x^2-1)}{(x^2-1)(x^2-1)} + \frac{6x^2}{(x^2-1)^2}$$

$$= \frac{3x^2+3}{(x^2-1)^2} = \frac{3(x^2+1)}{(x^2-1)^2}$$