Solving Logarithmic Equations

Note Title 4/13/2015

I can solve a logarithmic equation.

① log = log ② log = # →

More than 2 logs = TOO MANY! Use log Laws to combine!

Ex 1: $\log_8 \square = \frac{4}{3}$

$8^{\frac{4}{3}} = n$ (power, root)

$\left(\sqrt[3]{8}\right)^4 = n$

$2^4 = n = 16$

$\log_3 \square = 2$

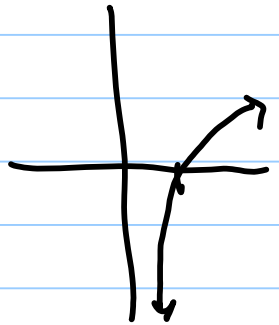
$3^2 = x - 5$

$9 = x - 5$

$+5 \quad +5$

$14 = x$

No making "−"!



LL#4

$\log_4 x^2 = \log_4 (4x-3)$

$x^2 = 4x - 3$

$x^2 - 4x + 3 = 0$

$(x-3)(x-1) = 0$

$x = 3$ ✓ $\quad x = 1$ ✓

$\log_2 (7x+1) = \log_2 (2-x)$

$7x + 1 = 2 - x$

$+x \quad -1 \quad = \quad -1 \quad +x$

$\frac{8x}{8} = \frac{1}{8}$

$x = \frac{1}{8}$ ✓

- Too many logs...
  log = log
- Use LogLaws
  #3
  #2

$$4\log_2 x - \log_2 5 = \log_2 125$$

$$\log_2 \frac{x^4}{5} = \log_2$$

$$5 \cdot \frac{x^4}{5} = 125 \cdot 5$$

$$\sqrt[4]{x^4} = \sqrt[4]{625}$$

$$x = \sqrt[4]{5 \cdot 5 \cdot 5 \cdot 5}$$

$$x = 5$$ ✓

*

LL#1

$$\log_8 (x) + \log_8 (x-12) = 2$$

$$\log_8 x(x-12) = 2$$

$$8^2 = x(x-12)$$

$$64 = x^2 - 12x$$

$$0 = x^2 - 12x - 64$$

$$0 = (x+4)(x-16)$$

$x+4=0$ $\quad$ $x-16=0$

~~$x = -4$~~	$x = 16$ ✓

-1	64
-2	32
-4	16
-8	8
1	-64
2	-32
4	**-16**
8	-8

log = log ☹

log = #

* must go EXPONENTIAL

LL#2

$$\log x - \log\left(\frac{x}{100}\right) = x$$

Remember log $= \log_{10}$ common log !

$$\log \frac{x}{\frac{x}{100}} = x$$

** $x \div \frac{x}{100} = \frac{x \cdot 100}{x}$

$$\log_{10} 100 = x$$

Go exponential !

$$10^x = 100$$

$$10^x = 10^2$$ * Like bases *

$$x = 2$$