Friday, 11/11, 2016

Opener - Finish Properties of Logs Activity from yesterday

3.5 Solving Log and Exponential Equations

Have a great weekend!

log·a·rithm

Origin

GREEK
logos
reckoning, ratio

GREEK
arithmos
number

MODERN LATIN
logarithmus → logarithm
early 17th century

early 17th century: from modern Latin *logarithmus*, from Greek *logos* 'reckoning, ratio' + *arithmos* 'number.'

3.5 Solving Exponential and Logarithmic Equations

No Calc
Get the same Base.
Go small or Go Home!

① $8^x = 2^{x+1}$

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

Bases = So $3x = x+1$

$2x = 1$

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

② $\frac{20}{20}\left(\frac{1}{2}\right)^{\frac{x}{3}} = \frac{5}{20}$

$\left(\frac{1}{2}\right)^{\frac{x}{3}} = \frac{1}{4}$ ← rewrite (still $= \frac{1}{4}$)

$\left(\frac{1}{2}\right)^{\frac{x}{3}} = \left(\frac{1}{2}\right)^2$

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

$x = 6$

③ $5^{2x} = \left(\frac{1}{25}\right)^{x+1}$

$5^{2x} = (5)^{-2(x+1)}$

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

$2x = -2x - 2$

$4x = -2$

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

④ $81^{3x} = \left(\frac{1}{27}\right)^{x-1}$

$(3^4)^{3x} = (3^{-3})^{(x-1)}$

$12x = -3x + 3$

$15x = 3$

$x = \frac{1}{5}$

Calc OK! Use Logs - Change of Base

① $3^x = 11$

$\log_3 11 = x$

$x = \frac{\log 11}{\log 3} \approx 2.183$

② $3^{2x} = 18$

$\log_3 18 = 2x$

$2x = \frac{\log 18}{\log 3}$

$x = \frac{\log 18}{\log 3} \div 2 \approx 1.315$

Log Equations - No Calc

Log Equations – No Calc

* Change to Exponential Form

① $\log_6(4x+12)=2$

exp. form: $6^2=4x+12$

$36=4x+12$

$24=4x$

$6=x$

② $\log_2(4x-4)=5$

$2^5=4x-4$

$32=4x-4$

$36=4x$

$9=x$