Unit #2: Logarithms
Topic: Solving Exponential Equations with and without Logs
Objective: SWBAT solve an exponential equation by using a change of base or logarithms.

Warm Up #3:

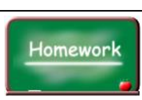
A student was asked to solve an exponential equation. The students' work is shown below.

Solve: $4^{x+3} = \frac{1}{128}$

$$(2^2)^{x+3} = 2^7$$
$$2x + 3 = 7$$
$$2x = 4$$
$$x = 2$$

Why is the problem considered an exponential equation?

Explain, in your own words, the mistake(s) the student made when solving the problem on the left. What should the actual answer be?



Assignment(s): Complete practice problems #1 – 16

Some exponential equations cannot be solved by simply just changing the bases. These equations need to be solved using logarithms.

Does it matter whether we use a common or natural log? Why/why not?

Example #1: Solve each of the following equations without a calculator.

a) $\left(\frac{1}{3}\right)^{2x} = 729$	b) $\left(\frac{1}{2}\right)^{3x} = 7$
c) $8 + 2e^{x/3} = 12$	

Problem Set #3: Solve each of the following exponential equations using an appropriate method.

1) $5^{4-x} = \frac{1}{625}$	2) $4^{x+2} - 2 = 12$
3) $150e^{0.05x} = 340$	4) $2^{3x-4} = 8^{x-1}$
5) $3^{2x+1} = 15$	6) $\left(\frac{1}{49}\right)^{4x+3} + 16 = 65$
7) $16^{x-7} + 5 = 24$	8) $3.4e^{2-2n} - 9 = -4$

9) $\pi^{1-x} = e^x$

10) $8^{-5a} - 5 = 53$

11) $4(2^{5x+7}) = \frac{1}{64}$

12) $-3e^{9x-1} + 6 = -58$

13) $4^{2x} = 16\sqrt[3]{4}$

14) $5(18^{6x}) = 26$

15) $9^{n+10} + 3 = 81$

16) $\left(\frac{3}{5}\right)^x = 7^{1-x}$