Lesson 7.5 Warm Up (Clickers)

1. Write the following as a single logarithm:

   $\log_3 15xy$

2. Expand: $\log_4(3x)^2$

3. You invested $2000 into an account that has an interest rate of 3.2%. How much money will you have in the account after 5 years?

Lesson 7.5 Exponential & Logarithmic Equations

Essential Understanding: You can use logarithms to solve exponential equations. you can use exponents to solve logarithmic equations.

Ex. What is the solution of $16^{3x} = 8$?

Ex. What is the solution of $27^{3x} = 81$?

1 What is the solution of the following equation?

$4^{3x} = 64$

When bases are not the same, you can solve an exponential equation by taking the logarithm of each side of the equation. If m and n are positive and m = n, then log m = log n.

Ex. What is the solution of $15^{3x} = 285$?

Ex. What is the solution of $5^{2x} = 130$?

2 What is the solution of the following equation? Round to four decimal places.

$6^{4x} = 512$

You could also solve using a graphing calculator.

Ex. What is the solution of $4^{3x} = 6000$?

Ex. Wood is sustainable, renewable, natural resource when you manage forests properly. Your lumber company has 1,200,000 trees. You plan to harvest 7% of the trees each year. How many years will it take to harvest half of the trees?

A logarithmic equation is an equation that includes one or more logarithms involving a variable.

Ex. What is the solution of log(4x - 3) = 2?

*Check your solution with a graphing calculator.

Ex. Solve log(3 - 2x) = -1

3 Solve: (round to 3 decimal places)

$$\log(3x+1) = 2$$

Ex. What is the solution of $\log(x - 3) + \log x = 1$?

4 Solve: $\log 6 - \log 3x = -2$