Before we begin, are there any questions from last day's work?

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) solve simple exponential equations numerically and graphically, with technolog

b) connect algebraic and graphical representations of exponential equations.

Spring 2016: 1 Day only = all 4 "Mysteries"

Day 1: We will work through "Mystery 1" and "Mystery 2".

Day 2: We will work through "Mystery 3" and "Mystery 4".

$$y = a(b^x)$$

$$y = 32(1.07)^x$$

1.2.1: Frayer Model – Exponential *Functions* $y = 32(0.98)^x$ Date: __Feb. 8/17__

Examples Of Algebraic Representations	Characteristics
$y = 2^x, \; y = \left(\frac{1}{4}\right)^x, \; y = 4^{-x}$	the x variable is in the exponent.
Non-Examples Of Algebraic Representations	the base is $b > 1$
$y = 3x - 7 \; ; \; y = 5x^2$	or $0 < b < 1$ ∴ $b \neq 1$

Exponential *Functions*

Examples Of Graphical Representations	Non-Examples Of Graphical Representations

$y = 0$

1.2.2: Can You Solve This Mystery?   Date: _____

Recall:"To solve an equation" means to determine the value of the variable that makes the equation true.

MYSTERY #1 – How can you solve exponential equations?

1. Solve these exponential equations. Match the solution with the equation.

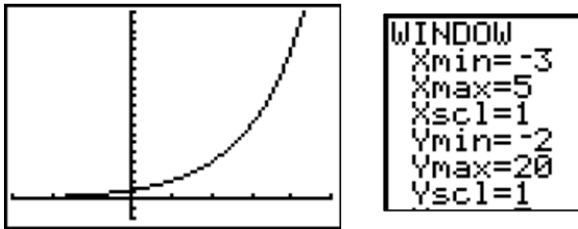|	Equation	Solution
__C__	1. $2^x = 8$	A. $x = -2$
__D__	2. $2^x = 16$	B. $x = 0$
__A__	3. $2^x = \dfrac{1}{4}$	C. $x = 3$
__B__	4. $2^x = 1$	D. $x = 4$

2. Describe the process that you used to solve the equations above.

☞ trial and error
☞ inspection
☞ substitution

3. Solve $2^x = 5$. Round your answer to the nearest hundredth.

☞ $x \doteq 2.32$

4. Use a graphing calculator and window settings to graph the function $y = 2^x$.


```
WINDOW
Xmin=-3
Xmax=5
Xscl=1
Ymin=-2
Ymax=20
Yscl=1
```

5. Complete the following statements.

a) The value of the function is 16 when $x =$ ___4___ ☞

b) The value of the function is $\dfrac{1}{4}$ when $x =$ ___-2___ ☞

c) The value of the function is 8 when $x =$ ___3___ ☞

d) The value of the function is 5 when $x =$ ___2.32___ ☞ (round your answer to two decimal places)

6. Explain how to use the graph of the function $y = 2^x$ to solve the equations in #1.

☞ trace, number [(x =) appears], enter

7. Explain why you **can not** use the graph of the function $y = 2^x$ to solve the equation $2^{2x-3} = 8$ but you **can** use $y = 2^x$ to solve the equation $2^x = 8$.

☞ As you "trace" along y=2^x, you are getting values of x, not 2x-3.
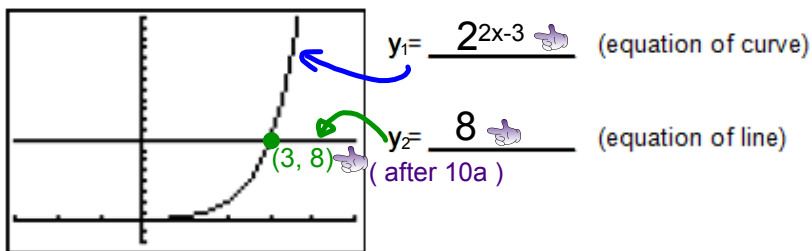☞ Also, y=2^x does not represent y=2^{2x-3}.

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MYSTERY #2 – How can you solve more difficult exponential equations?

8. Fear not! There is a way to solve the equation $2^{2x-3} = 8$.

   Enter the left side of the equation as one function and the right side of the equation as another function using the $\boxed{Y=}$ editor of your calculator as shown.

   ```
   Plot1  Plot2  Plot3
   \Y1■2^(2X-3)
   \Y2■8
   \Y3=
   \Y4=
   ```

9. Label the functions as $y = 2^{2x-3}$ and $y = 8$ on the screen shot below.

   $y_1 = $ ___2^{2x-3}___ ☞ (equation of curve)

   $y_2 = $ ___8___ ☞ (equation of line)

   (3, 8) ☞ (after 10a)

10. Use the intersect operation to find the point of intersection of the two functions and complete the following statements.   ☞(for all)

   a) The point of intersection occurs when $x = $ __3__ and $y = $ __8__.

   The solution to the equation is $x = $ __3__.

   When $x = $ __3__, both functions have a value of __8__.