Algebra RH

Essential Question: How can we determine the average rate of change of an exponential function over a specific interval?

Do Now: Consider the exponential function, $\mathbf{f(x) = 8(2)^x}$.

a) Evaluate f(3).

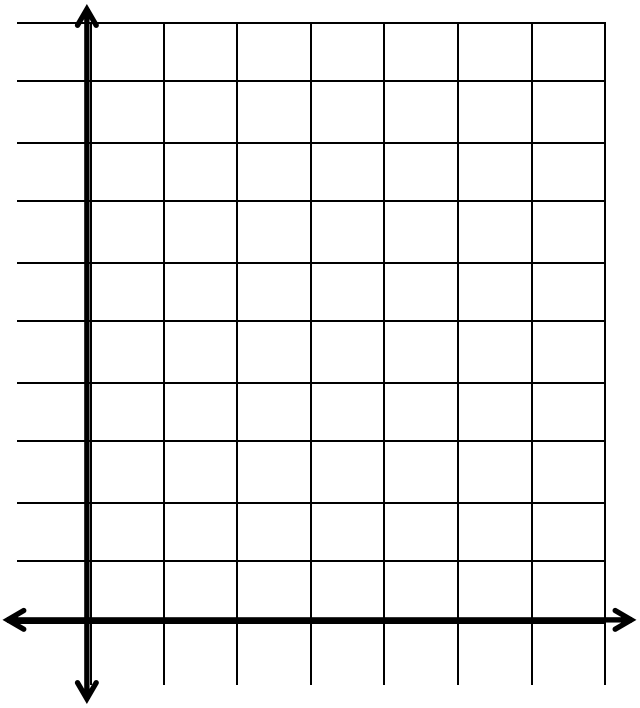
b) What ordered pair would lie on the graph of f(x) based on f(3)?

Let's take a closer look at exponential functions.

Make a table of values and graph the following exponential functions over the given interval.

1. Graph $f(x) = (2.5)^x$ over the interval $0 \leq x \leq 3$

x	f(x)



What is the average rate of change of the function over the interval?

Interval begins at: _____ Average Rate of Change:

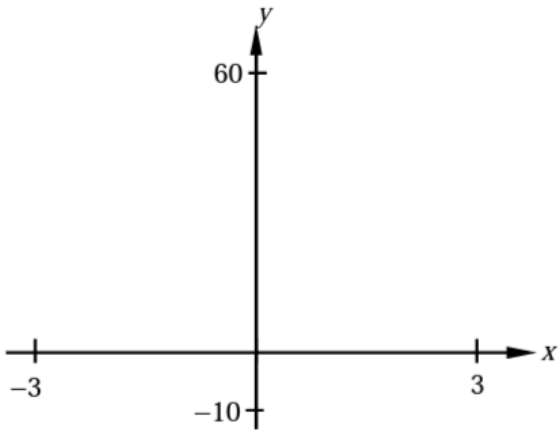
Interval ends at: _____

2. Consider the exponential function $f(x) = 10(2)^x$.

a) Find the value of f(0). What point does this represent on the graph?

b) Is this an increasing or decreasing exponential function? How do you know?

c) Using your calculator, sketch a graph of this function on the axes shown below. Use the window indicated. Mark the y-intercept.



d) What is the function's average rate of change over the interval $-1 \leq x \leq 2$?

e) Is this rate of change greater than or less than that of the linear function $g(x) = 10x + 7$? Explain.

Exponential functions are curves that either increase or decrease rapidly. We can determine an average _____ of a specific part of an exponential function by using two points that mark the beginning and end of the _____ by calculating $\frac{\Delta y}{\Delta x}$.

Algebra CC **HW # _____**

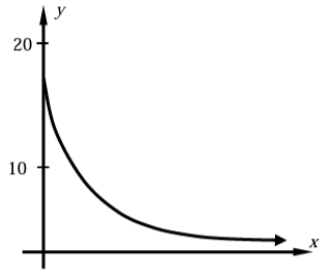
1. Classify each of the following exponential functions as either increasing or decreasing and give the value of their y-intercepts.

   a) $f(x) = 125(1.25)^x$ b) $f(x) = 22(0.75)^x$ c) $f(x) = 256\left(\frac{5}{2}\right)^x$

2. Which of the following could be the equation to the exponential function graphed below? Explain how you made your choice.

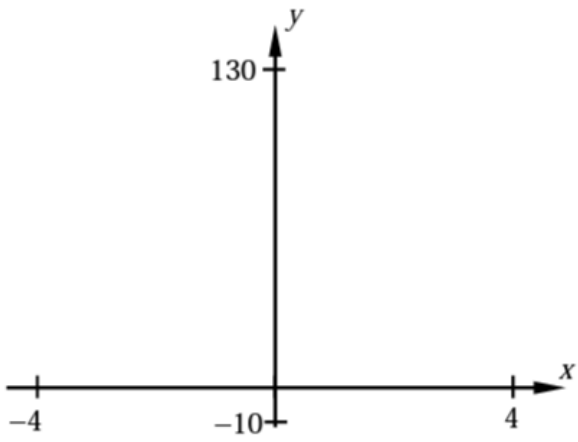
   (1) $y = 15(1.25)^x$ (2) $y = 50(1.04)^x$

   (3) $y = 18(0.75)^x$ (4) $y = 40(0.45)^x$



3. Using your graphing calculator, create a table of values and draw a sketch of the exponential function $y = 3(2.5)^x$ over the interval $-4 \leq x \leq 4$. Use the window indicated.

x	y



What is the average rate of change of the function over the given interval?

4. Which of the following is a decreasing exponential function whose y-intercept is 20?

   (1) $y = 20\left(\frac{4}{3}\right)^x$ (2) $y = -2x + 20$ (3) $y = 20\left(\frac{1}{3}\right)^x$ (4) $y = \left(\frac{1}{3}\right)^x + 20$

5. Which of the following functions would best describe the data in the table?

   (1) $y = 10x + 2$ (2) $y = 8x + 2$

   (3) $y = 5(2)^x$ (4) $y = 2(5)^x$

x	0	1	2	3	4
y	2	10	50	250	1250