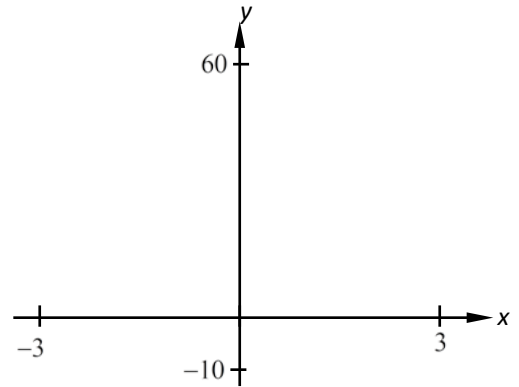


Algebra 1 CC
Assignment #56
Introduction to Exponential Functions
*** Optional**

1. Consider the exponential function $f(x) = 10(2)^x$.
- (a) Find the value of $f(0)$. What point does this represent on the graph of $y = f(x)$?
- (b) Is this an increasing or decreasing exponential function? How can you tell based on its equation?
- (c) Is this function's average rate of change over the interval $-1 \leq x \leq 2$ greater or less than that of the linear function $g(x) = 10x + 7$? Justify.
- (d) Using your calculator, sketch a graph of this function on the axes shown below. Use the window indicated. Mark the y-intercept.



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

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

3. Graphing a basic exponential can be challenging because of how quickly they grow (or decay). In this exercise, we will graph one of the most basic.

$$f(x) = 2^x$$

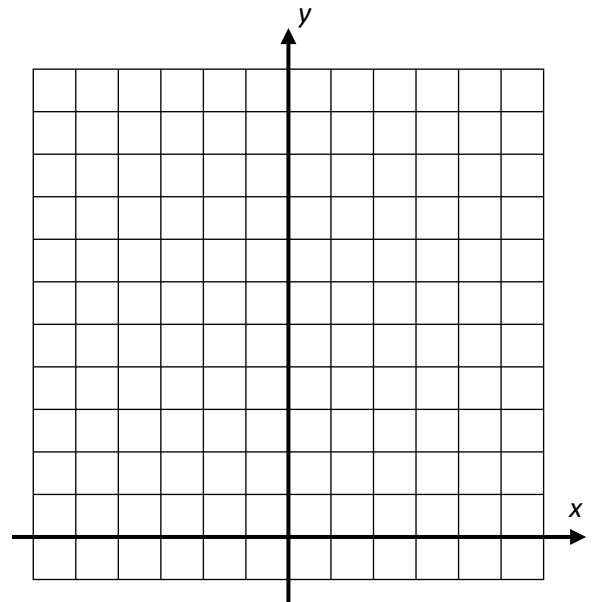
- (a) Evaluate each of the following and state the coordinate point that occurs on the graph of $f(x)$ based on the calculation.

$f(0) =$ $f(1) =$

$f(2) =$ $f(3) =$

- (b) Evaluate each of the following. Remember your facts about negative exponents and give the point on the graph of $f(x)$.

$f(-1) =$ $f(-2) =$ $f(-3) =$



- (c) Using the points you found in (a) and (b), graph this function for the domain interval $-3 \leq x \leq 3$.

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

(a) $y = 125(1.25)^x$

(b) $y = 22\left(\frac{3}{4}\right)^x$

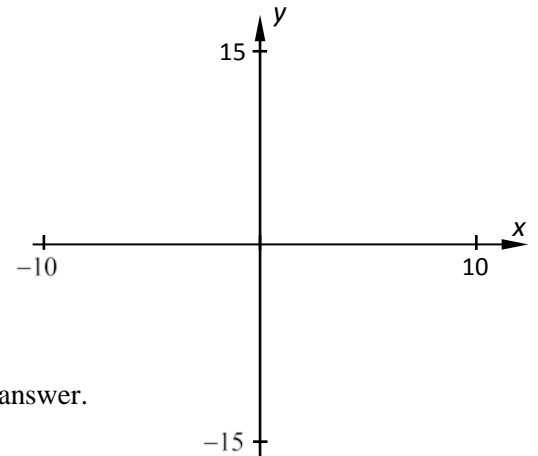
(c) $y = 256\left(\frac{5}{2}\right)^x$

*R1.a. Graph the following functions: $f(x) = x^2 - 8$ and $g(x) = |2x|$. Set your window according to the axes below.

b. What are the solutions for the equation $x^2 - 8 = 0$?

c. What are the solutions for the equation $|2x| = 4$?

d. What are the solutions for the equation $x^2 - 8 = |2x|$?

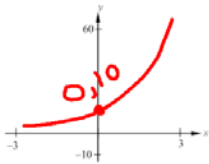


R2. Decide whether each of the following relations is a function. Explain your answer.

Input	Outputs
(a) States	Capitals
(b) States	Cities
(c) Families	Pets
(d) Families	Last names

R3. If n represents a number, then write an expression for the difference of three times the number after it was increased by 3 and twice that number.

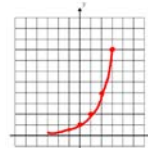
- $f(0) = 10$ This point represents the y-intercept.
 - increasing because the base value is greater than 1
 - greater $11.\bar{6} > 10$
 -



- (2)
- $f(0) = 1$ and $(0,1)$
 $f(1) = 2$ and $(1,2)$
 $f(2) = 4$ and $(2,4)$
 $f(3) = 8$ and $(3,8)$

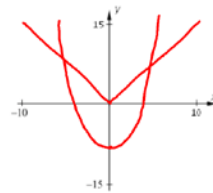
- $f(-1) = \frac{1}{2}$
 $f(-2) = \frac{1}{4}$
 $f(-3) = \frac{1}{8}$

(c)



- increasing
y-intercept = 125
 - decreasing
y-intercept = 22
 - increasing
y-intercept = 256

R1.a.



- $x = \pm\sqrt{8}$
- 2 and 2
- $(-4, 8)$ and $(4, 8)$

- R2. (a) yes
 (b) no
 (c) no
 (d) no

R3. $3(n+3) - 2n$