Unit: Exponential Functions
Student Handout 2

Name _____

Date _____Pd_____

GRAPHING EXPONENTIAL FUNCTIONS

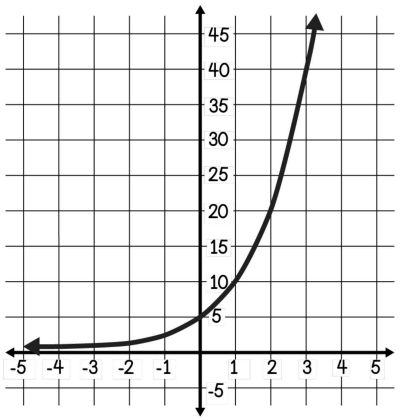
Alberto graphed two exponential functions at the right. Use the functions to answer a-c.

a. Find the y-intercept of f(x) from the graph. Confirm your solution by evaluating f(0).

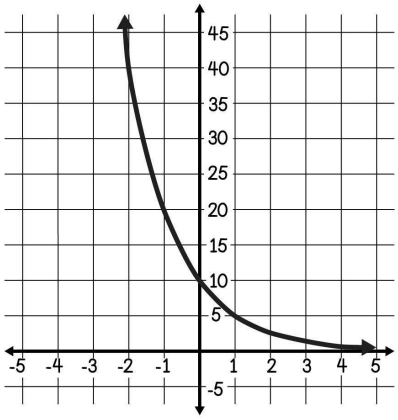
b. Find the y-intercept of g(x) from the graph. Confirm your solution by evaluating g(0).

c. Where do you see the value of the y-intercept in the equation of the exponential functions?

$f(x) = 5 \cdot 2^x$



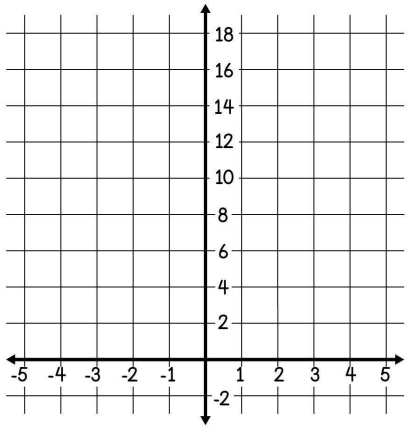
$g(x) = 10 \cdot (0.5)^x$



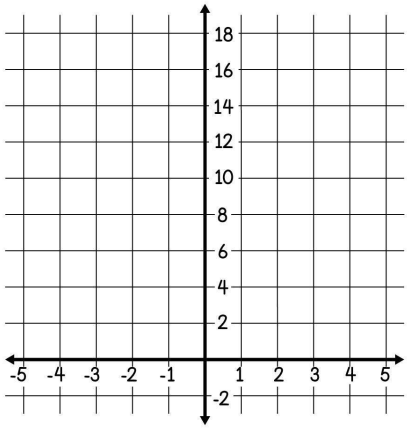
Every exponential function of the form $y = ab^x$ will pass through the point _____. Therefore "a" will always be the y-intercept and is often referred to as the _____ _____.

In 1-4, plot the y-intercept and then use your graphing calculator to sketch the rest of the function.

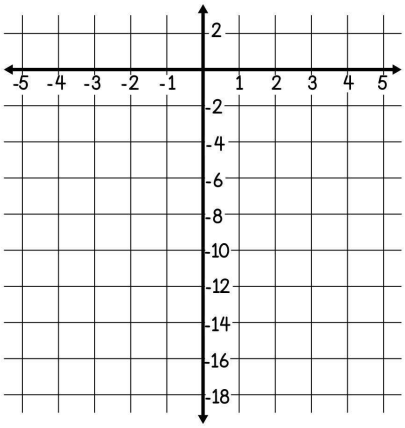
1. $h(x) = 6 \cdot 4^x$



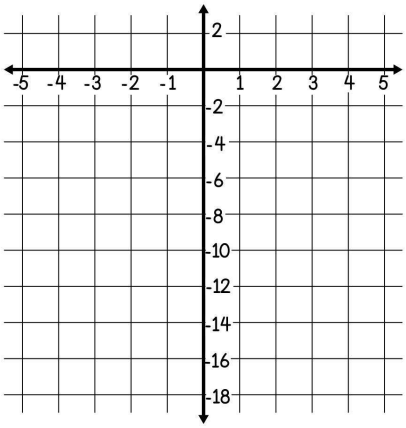
2. $m(x) = 8 \cdot (0.75)^x$



3. $p(x) = -4 \cdot 3^x$



4. $r(x) = -2 \cdot (\frac{1}{3})^x$



5. Use the graphs from 1-4 to answer the following questions.

a. Which graphs are increasing as the value of x increases?

b. Which graphs are decreasing as the value of x increases?

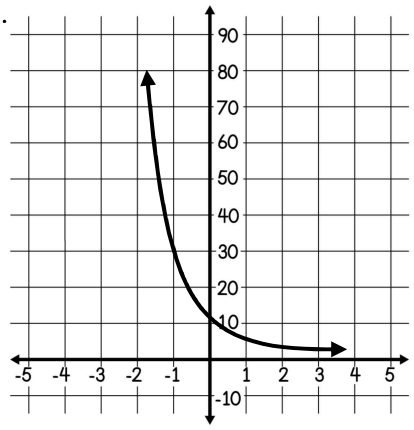
c. Describe the graph when $a > 0$.

d. Describe the graph when $a < 0$.

e. Paula graphed a function that as x increases, y approaches 0. Which function(s) could be Paula's graph?

In 6-8, identify and write an equation for each graph's asymptote. Then use the asymptote to help you determine the domain and range of the function. (Hint: the asymptote will provide the boundary for the _____ of an exponential function.)

6.

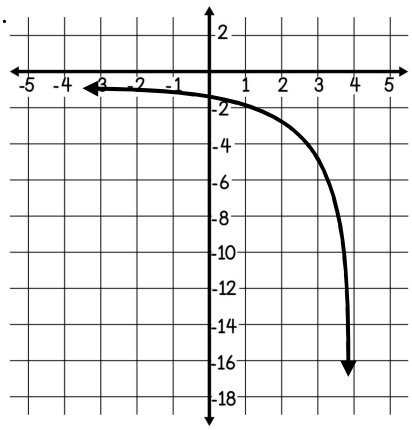


Asymptote: _____

Domain: _____

Range: _____

7.

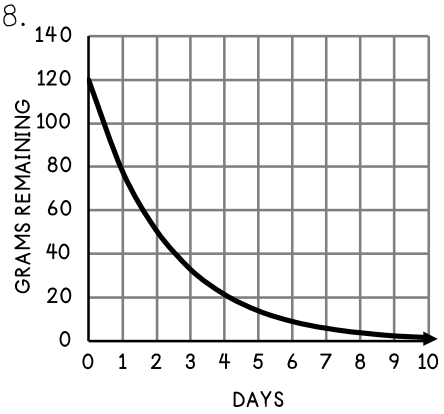


Asymptote: _____

Domain: _____

Range: _____

8.



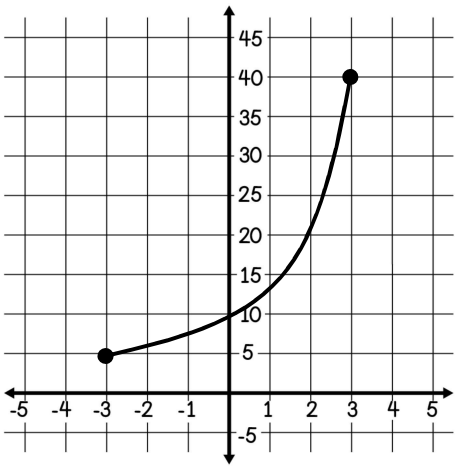
Asymptote: _____

Domain: _____

Range: _____

For 9-11, use your knowledge of exponential functions to answer the following questions.

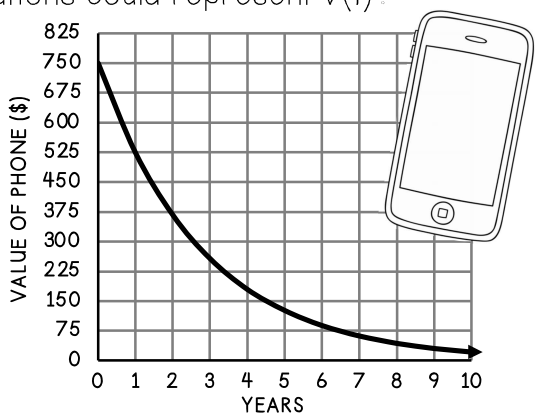
9. The graph shows part of an exponential function. Identify the domain and range of the function.



Domain: _____

Range: _____

10. The value of Alene's cell phone, v(t), is shown on the graph. Which of the following equations could represent v(t)?



a. $v(t) = 750^t$

b. $v(t) = 750(0.7)^t$

c. $v(t) = -750(1.15)^t$

d. $v(t) = 750(0.85)t$

11. Ms. Tressler asked her students to graph $y = 9(7.25)^x$. Mark each statement as true or false. If false, correct the statement in the space below.

_____ a. The function will have a y-intercept at (0, 7.25).

_____ b. The function will be contained in quadrant III and IV.

_____ c. The function has a range of $y > 0$.

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GRAPHING EXPONENTIAL FUNCTIONS

Four students were given exponential functions to analyze. Sketch a graph of each function in 1-4. Then use the clues in A-D to determine each student's function.

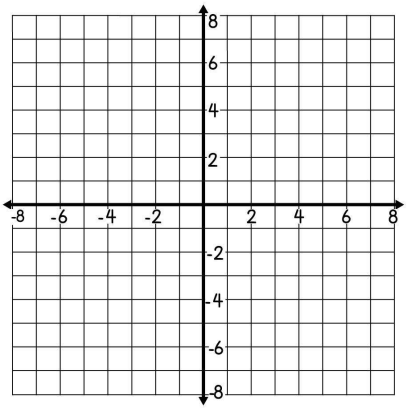
A The y-intercept of Joe's function is -2.

B The range of Diane's function is $y < 0$.

C Kristen's function has a y-intercept at (0, 5).

D Tian's function decreases as the value of x increases.

1. $g(x) = 5 \cdot (1.3)^x$



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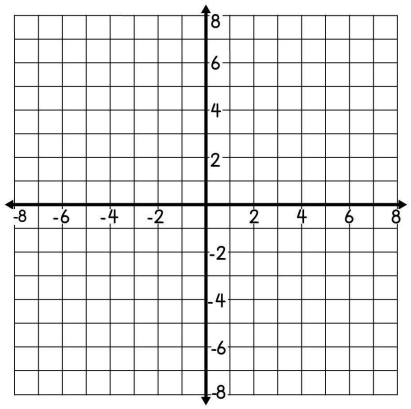
2. $y = -2 \cdot 5^x$



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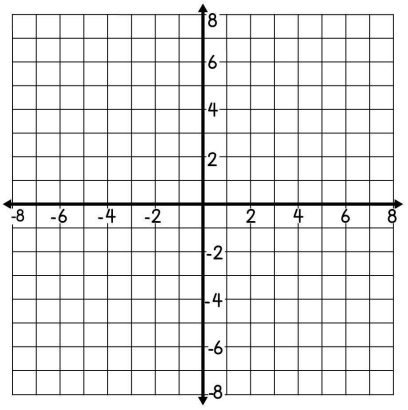
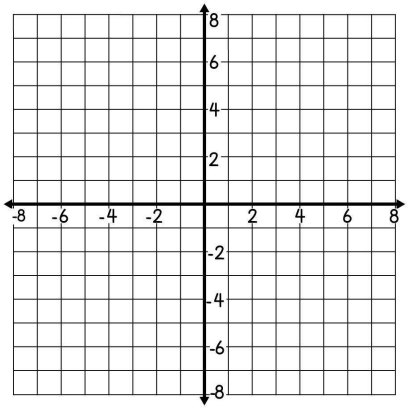
3. $f(x) = -6 \cdot (0.5)^x$



Name: _____

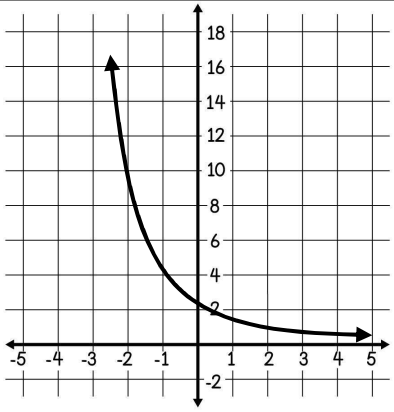
4. $p(x) = 3 \cdot (\frac{1}{2})^x$



Name: _____

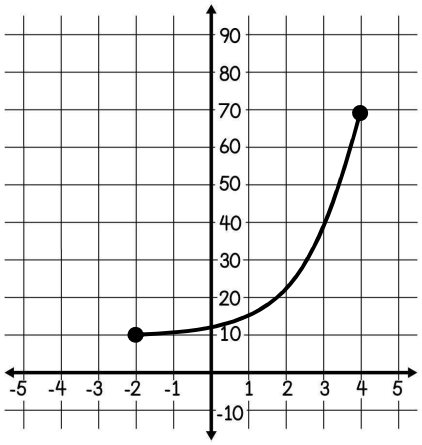
For 5-10, use your knowledge of exponential functions to answer the questions.

5. Mr. Edgar asked his students to find the domain and range of the function shown on the graph. Jenny says the domain is the set of all real numbers greater than -3. Roger says the range is the set of all real numbers greater than zero. Which student is correct?



a. Jenny only
b. Roger only
c. Jenny and Roger
d. Neither student is correct

6. The graph shows part of an exponential function. Find the domain and range of the graph.



D: _____

R: _____

7. Silas graphed the function $y = 15\,(0.62)^x$. Which statement about the function is NOT true?

a. The function will increase as the value of x increases.

b. The y-intercept of the function is 15.

c. The function will have an asymptote at $y = 0$.

d. The range of the function is $y > 0$.

The population of seahorses can be modeled by an exponential function, p(x), shown on the graph below. Let x be the number of years after 2010. Use the graph to answer 8-10.

8. Write an inequality to represent the domain of the situation.

9. Write an inequality to represent the range of the situation.

10. If the equation of the function is $p(x) = n(1.15)^x$, what is the value of n?