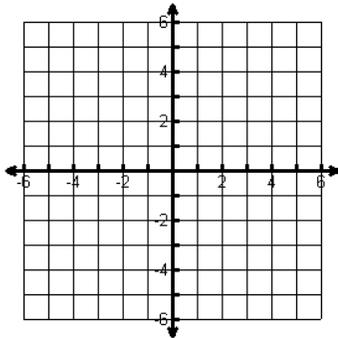


Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Characteristics of Functions:**

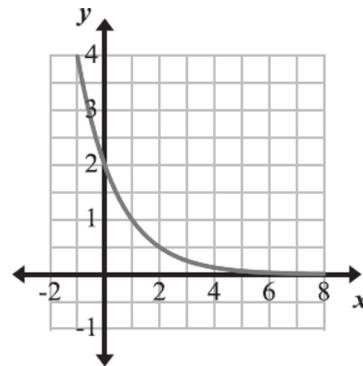
For each of the functions find the following information.

1. Graph the function  $f(x) = (2)^x - 3$



Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_  
 x - intercept: \_\_\_\_\_  
 y- intercept: \_\_\_\_\_  
 Growth or Decay \_\_\_\_\_  
 End Behavior: \_\_\_\_\_

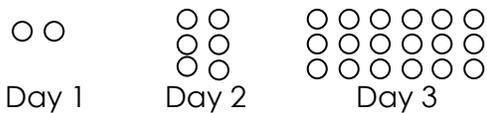
2.



Domain: \_\_\_\_\_  
 Range: \_\_\_\_\_  
 x - intercept: \_\_\_\_\_  
 y- intercept: \_\_\_\_\_  
 Increasing or Decreasing \_\_\_\_\_  
 Rate of change over  $[-1, 2]$  \_\_\_\_\_

**Exponential Models:**

8. Write an explicit formula and recursive formula to model the number of dots per day.



How many dots will there be on day 7?

9. Taylor is training for a marathon. He decides to begin by running 3 miles and increase by 1.5 miles each day.

Write an equation to represent the scenario.

How long will it take him to run 26.2 miles?

10. You bought a Boston Whaler in 2004 for \$12,500. The boat's value depreciates by 7% a year. How much is the boat worth now? How much is it worth in 2020?

11. The population of a large city increases by a rate of 3% a year. When the 2000 census was taken, the population was 1.2 million.

a) Write a model for this population growth.

b) What should the population be now? What is the projected population for 2020?

**Transformations:**

12. Describe the transformations made to  $f(x) = 3^x$  to draw the following functions.

a)  $g(x) = \frac{1}{4}3^{x-2} + 5$

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

b)  $h(x) = -2(3)^{x+1}$

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

13. Give the domain, range, and asymptote for  $g(x) = \frac{1}{4}3^{x-2} + 5$ .

14. Write an equation for the given description.

a. Exponential that has a base of  $\frac{3}{4}$ ,  
been reflected, and shifted down by  
9

b. Exponential that has a base of 4,  
stretched by 3, moved right 7, and up  
by 1.

Simplify the following exponential expressions.

15.  $(3x^5y^3)^2$

16.  $\frac{-27x^5y^4}{9x^3y^4}$

17.  $8x^4y \cdot (2x^2y^3)^3$

Solve the following exponential equations. **Show all work!**

18.  $3^{-3x+1} = 3^{x-9}$

19.  $25^{x-4} = 5^{3x+1}$

20.  $8^{x-1} = \left(\frac{1}{2}\right)^{2x-1}$

21.  $4^{3-x} + 2 = 18$