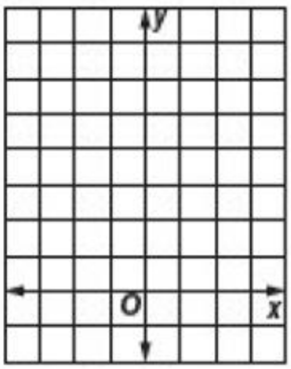
Algebra 2 Honors **Name____________________**
WS: 4.1 Extra Practice **Date___________Block_____**

In 1 – 6, tell whether the function shows growth or decay. Then complete the table (include at least three points) and graph.

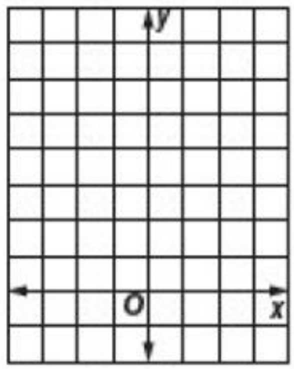
1. $y = 3(2)^x$

x	*y*



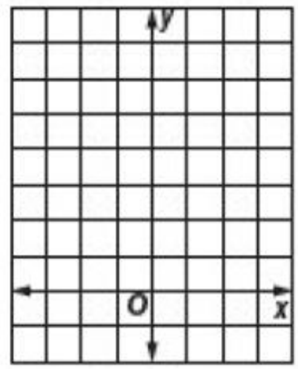
2. $y = \frac{1}{3}(3)^x$

x	*y*



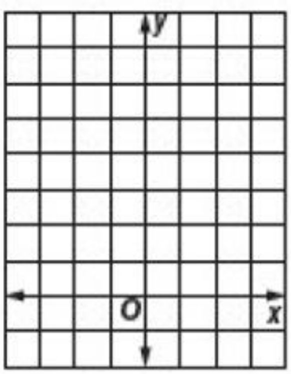
3. $y = 6\left(\frac{1}{2}\right)^x$

x	*y*



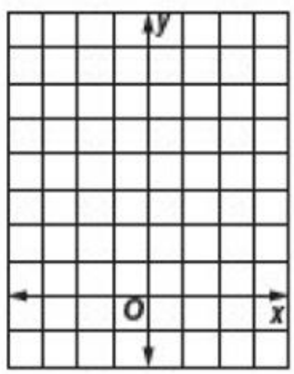
4. $y = 0.25(5)^x$

x	*y*



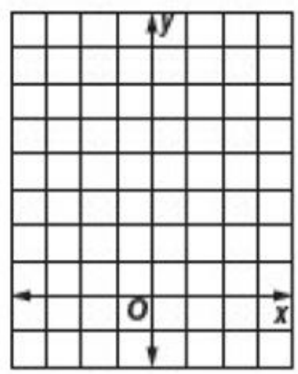
5. $y = 2\left(\frac{1}{2}\right)^x$

x	*y*



6. $y = 3(0.5)^x$

x	*y*



In 7 – 9, match an equation to each situation, and then indicate whether the situation is an example of exponential growth or decay.

7. A coin had a value of $1.17 in 1995. Its value has been increasing at a rate of 9% per year.

A. $A(t) = 1.17(1.09)^t$ B. $A(t) = 1.17(0.91)^t$

8. A business owner has just paid $6000 for a computer. It depreciates at a rate of 22% per year. How much will it be worth in 5 years?

A. $A(5) = 6000(1.22)^5$ B. $A(5) = 6000(0.78)^5$

9. A city had a population of 14,358 residents in 1999. Since then, its population has been decreasing at a rate of about 5.5% per year.

A. $A(t) = 14{,}358(1.055)^t$ B. $A(t) = 14{,}358(0.945)^t$

For exercises 10 and 11, use the following information.

The population of New York City increased from 7,322,564 in 1990 to 8,008,278 in 2000. The annual rate of population increase for that period was about 0.9%. Source: www.nyc.gov

10. Write an equation fort he populatino *t* years after 1990.

11. Use the equation to predict the population of New York City in 2010.

For exercises 12 and 13, use the following information.

Zeller Industries bought a piece of weaving equipment for $60,000. It is expected to depreciate at an average rate of 10% per year.

12. Write an equation for the value of the piece of equipment after *t* years.

13. Find the value of the piece of equipment after 6 years.

For exercises 14 and 15, use the following information.

During the 1990s, the forested area of Guatemala decreased at an average rate of 1.7%.
Source: www.worldbank.org

14. If the forested area in Guatemala in 1990 was about 34,000 square kilometers, write an equation for the forested area for *t* years after 1990.

15. If this trend continues, predict the forested area in 2015.

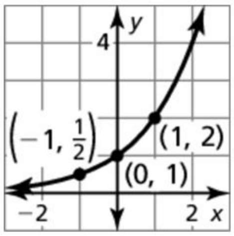
16. The population of Bulgaria has been decreasing at an annual rate of 1.3%. If the population of Bulagaria was about 7,797,000 in the year 2000, predict its population in the year 2010.

17. Carl Gossell is a machinist. He bought some new machinery for about $125,000. He wants to calculate the value of the machinery over the next 10 years for tax purposes. If the machinery depreciates at the rate of 15% per year, what is the value of the machinery (to the nearest $100) at the end of 10 years?

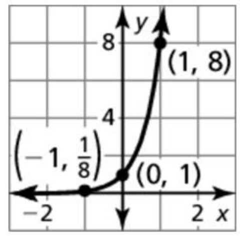
18. A college with a graduating class of 4000 students in the year 2008 predicts that its graduating class will grow 5% per year. Write an exponential function to model the number of students in the graduating class t years after 2008.

In exercises 19 - 21, use the graph of $f(x) = b^x$ to identify the value of the base b.

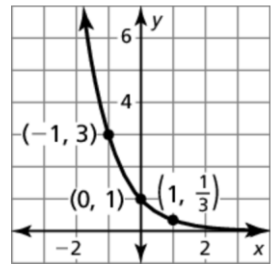
19.



20.



21.



22. The value of a rare coin y (in dollars) can be approximated by the model $y = 0.25(1.06)^t$, where t is the number of years since the coin was minted.

a. Tell whether the model represents exponential growth or exponential decay.

b. Identify the annual percent increase or decrease in the value of the coin.

c. What was the original value of the coin?

d. Estimate when the value of the coin will be $0.60.

23. The value of a truck y (in dollars) can be approximated by the model $y = 54{,}000(0.80)^t$, where t is the number of years since the truck was new.

a. Tell whether the model represents exponential growth or exponential decay.

b. Identify the annual percent increase or decrease in the value of the truck.

c. What was the original value of the truck?

d. Estimate when the value of the truck will be $30,000.

Challenge and Extend

In Exercises 24 - 26, rewrite the function in the form $y = a(1 + r)^t$ or $y = a(1 - r)^t$. Then state the growth or decay rate.

24. $y = a(3)^{t/2}$

25. $y = a(5)^{t/8}$

26. $y = a(0.4)^{3t}$

In Exercises 27 – 30, use the following functions to answer the question.

$y = \left(\frac{1}{5}\right)^x$ $\quad y = 3^x$ $\quad y = 5^x$ $\quad y = \left(\frac{1}{3}\right)^x$ $\quad y = \left(\frac{1}{7}\right)^x$

27. Which function exhibits the fastest growth?

28. Which function exhibits the slowest decay?

29. What is the y-intercept of each function?

30. What is the domain and range of each function?

In Exercises 31 - 34, use the function $f(x) = x^n$ to (a) graph the function with the given value of *n*, (b) classify the type of function, and (c) state the domain and range.

31. $n = \left(\frac{1}{2}\right)$

32. $n = 1$

33. $n = 2$

34. $n = 3$