

Name _____ Date _____

Downtown and Uptown Graphs of Exponential Functions

Vocabulary

Define the term in your own words.

1. horizontal asymptote

Problem Set

Write a function that represents each population as a function of time.

1. Blueville has a population of 7000. Its population is increasing at a rate of 1.4%.

$$P(t) = P_0 \cdot (1 + r)^t$$

$$P(t) = 7000 \cdot (1 + 0.014)^t$$

$$P(t) = 7000 \cdot 1.014^t$$

2. Youngstown has a population of 12,000. Its population is increasing at a rate of 1.2%.

3. Greenville has a population of 8000. Its population is decreasing at a rate of 1.75%.

4. North Park has a population of 14,000. Its population is decreasing at a rate of 3.1%.

5. West Lake has a population of 9500. Its population is increasing at a rate of 2.8%.

6. Springfield has a population of 11,500. Its population is decreasing at a rate of 1.25%.

Waynesburg has a population of 16,000. Its population is increasing at a rate of 1.5%. The function $P(t) = 16,000 \cdot 1.015^t$ represents the population as a function of time. Determine the population after each given number of years. Round your answer to the nearest whole number.

7. 1 year

$$P(t) = 16,000 \cdot 1.015^t$$

$$P(1) = 16,000 \cdot 1.015^1$$

$$P(1) = 16,240$$

The population after 1 year
will be 16,240.

8. 3 years

9. 5 years

10. 10 years

5

11. 20 years

12. 50 years

Name _____ Date _____

Morristown has a population of 18,000. Its population is decreasing at a rate of 1.2%. The function, $P(t) = 18,000 \cdot 0.988^t$ represents the population as a function of time. Use a graphing calculator to estimate the number of years it will take for the population to reach each given amount.

13. 17,000

It will take about 4.7 years for the population to reach 17,000.

14. 15,000

15. half

16. one-third

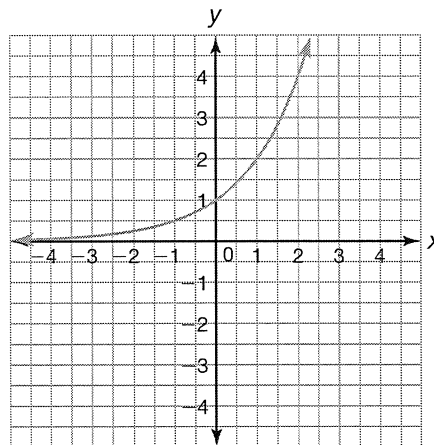
17. 0

18. 10,000

Complete each table and graph the function. Identify the x-intercept, y-intercept, asymptote, domain, range, and interval(s) of increase or decrease for the function.

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

x	f(x)
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4



x-intercept: none

y-intercept: (0, 1)

asymptote: $y = 0$

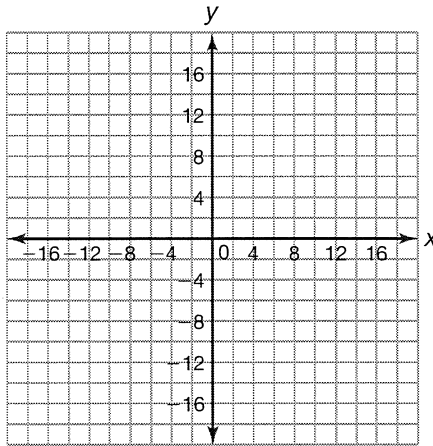
domain: all real numbers

range: $y > 0$

interval(s) of increase or decrease: increasing over the entire domain

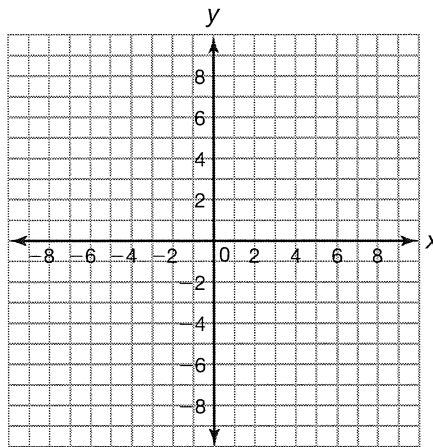
20. $f(x) = 4^x$

x	f(x)
-2	
-1	
0	
1	
2	



21. $f(x) = \frac{1}{3}^x$

x	f(x)
-2	
-1	
0	
1	
2	

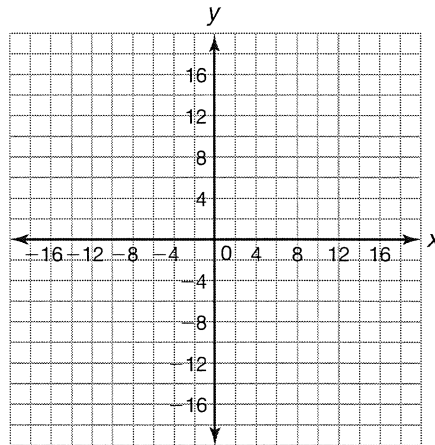


5

Name _____ Date _____

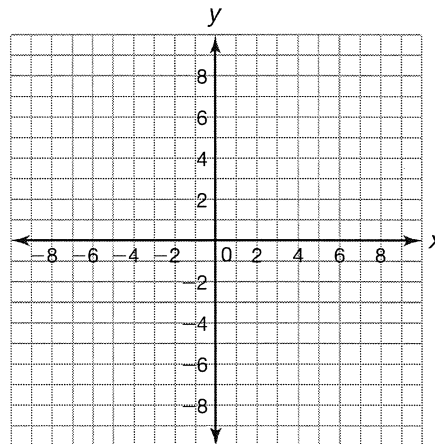
22. $f(x) = \frac{1}{4}^x$

x	f(x)
-2	
-1	
0	
1	
2	



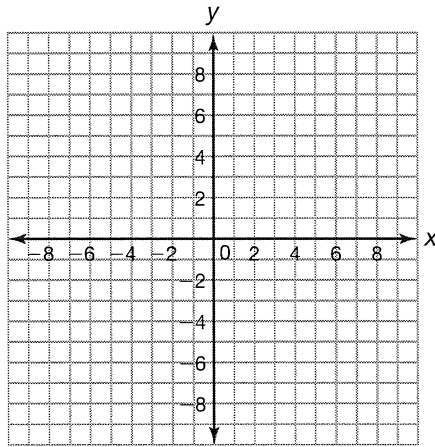
23. $f(x) = -2 \cdot 2^x$

x	f(x)
-2	
-1	
0	
1	
2	



24. $f(x) = -2 \cdot \frac{1}{2}^x$

x	f(x)
-2	
-1	
0	
1	
2	



5