Algebra 1 Unit 4 Review

1. A population of 550 is decreasing by 3.5% per year. Write a function that models this situation.

2. Which of the following is an exponential decay model?
   a. $y = -3\left(\frac{6}{5}\right)^x$
   b. $y = 4\left(\frac{3}{2}\right)^x$
   c. $y = -3(6)^x$
   d. $y = 2(0.25)^x$

3. The function $f(x) = 2400(1.65)^x$, where x is the time in years, models a growing sand flea population. How many sand fleas will there be in 2 years and by what percent is the population growing?

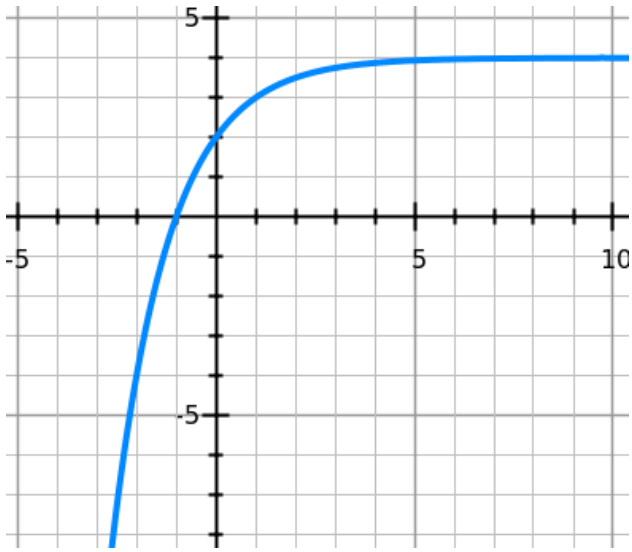
4. The value of a new Toyota Prius is $30,000. This value is decreasing at a rate of 13% per year. Write an exponential function to model this situation. Then find the value of the car in 5 years.

   Model:_____ Value after 5 years:_____

5. The function $f(x) = 1500(.8)^x$ represents the equation for the number of mosquitos after the first freezing temperatures of the year. What would the resulting mosquito population after 25 days and by what percent is the mosquito population decreasing by?

6. What exponential transformations occur in the equation: $f(x) = -4\left(\frac{1}{2}\right)^{x-5} + 2$
   a. Shrink by 4, decay by $\frac{1}{2}$, right 5, down 2
   b. Reflection, Stretch by 4, decay by $\frac{1}{2}$, right 5, up 2
   c. Reflection, Shrink by $\frac{1}{2}$, growth by 4, left 5, down 2
   d. Stretch by 4, decay by $\frac{1}{2}$, right 4, down 2

7. State the domain for the function to the right.
   a. $[-1, 5]$
   b. $(-\infty, \infty)$
   c. [1,0)
   d. $(-\infty, 4]$



8. State the range for the function to the right.
   a. $[-\infty, 2]$
   b. All Real Numbers
   c. $(-\infty, 4)$
   d. $(4, \infty)$

9. Complete the statement by correctly describing the end behavior of both ends of the graph.
   As x → -∞, y → _____
   As x → +∞, y → _____

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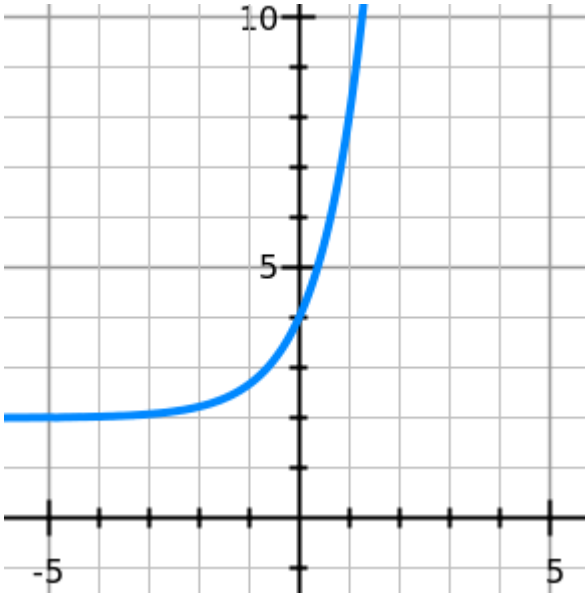
10. Find the characteristics of the following graph.



Domain: _____

Range: _____

Growth or Decay: _____

Y-intercept: _____

Horizontal Asymptote: _____

Increasing or Decreasing: _____

End Behavior: $as\ x \rightarrow -\infty, y \rightarrow$ _____

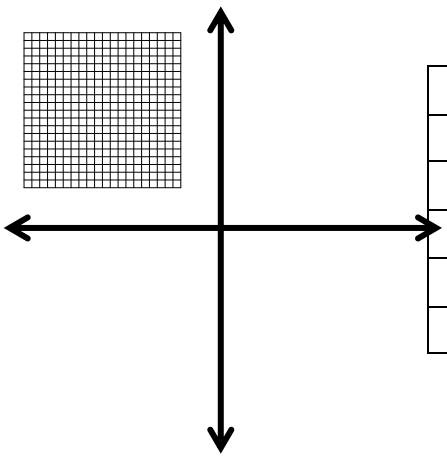
$as\ x \rightarrow +\infty, y \rightarrow$ _____

11. For the function $f(x) = 2(3)^x + 1$
   a) What is the y-intercept? _____
   b) What is the asymptote? _____
   c) Growth or Decay?

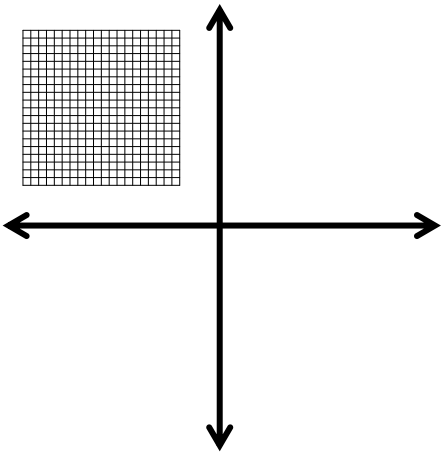
12. For the function $f(x) = \frac{1}{2}\left(\frac{3}{2}\right)^x$
   a) What is the y-intercept? _____
   b) What is the asymptote? _____
   c) Growth or Decay?

13. Sketch the graphs of each of the following functions.

$f(x) = -2(0.4)^x + 3$	
x	y
-1	
0	
1	
2	



$g(x) = 2^x - 3$	
x	y
-1	
0	
1	
2	



14. If a Jeff invests $400 in an account that pays 6.5% interest, write the model and find the balance after 20 years.

Model:_____ Value after 20 years:_____

15. Describe the transformation in the following equation: $f(x) = -3\left(\frac{5}{4}\right)^{x+4} - 2$

16. Describe the transformation in the following $f(x) = 2\left(\frac{1}{4}\right)^{x-3} + 1$

17. Classify each model as exponential growth or decay

a. $y = (0.032)^x$	b. $y = (1.01)^{x+3}$	c. $y = (3.22)^x$	d. $y = (1 - 0.12)^x$

18. Find the explicit for the nth term and find the given term.

9, 18, 36, 72….	-1, 3, -9, 27, …	10, 50, 250, 1250, …	7, 49, 343, 2401, …
a_{25} =	a_{20} =	a_{11} =	a_{10} =

19. For each of the following determine the PERCENT that each sequence is changing by:

    a. 23, 32.2, 45.08, 63.11…

    b. 10, 12.5, 15.63, 19.53….

    c. 54, 51.3, 48.74, 46.30….

20. Frank is saving up to buy an engagement ring for his girlfriend. He has a savings account that pays 8.9% interest. What is the least amount of money he needs to put in now to have $3,500 in three years?

21. Felix Baumgartner attempted the highest sky dive on record in 2010. He jumped from a height of 24 miles above the earth! (he had to wear a special suit almost like an astronaut!) After his first second he reached a speed of 7 mph, at 2 seconds he was at 7.14 mph and at 3 seconds he was at 7.28 mph. (This is true by the way! He was in free fall for over 4 MINUTES and reached speeds of 843.6 mph! He broke the sound barrier BY HIMSELF! WHOA!)
    b) What percent is his speed changing by?

    a) How fast was he going when he reached 60 seconds?