

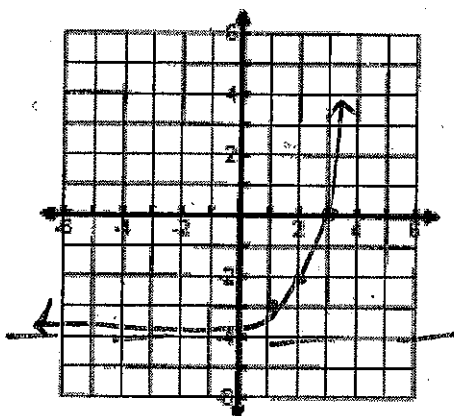
Name Key-Walsh

Date _____

Unit 4 Test Review

1. Graph the function $f(x) = 2^{x-1} - 4$

x	y
-1	-
0	-1/2
1	-3
2	-2
3	0



Domain: $(-\infty, \infty)$ Range: $(-4, \infty)$

y-int: $(0, -3.5)$ Asymptote: $y = -4$

Increasing or Decreasing

2. Whitney invests \$100 in an account that earns 3.2% interest per year.

a. Write an exponential function to represent this scenario.

$$100(1 + .032)^x$$

b. How much money is in the account after 4 years?

$$\$113.43$$

3. Describe the transformations from $f(x) = 3^x$ to $g(x) = 5(3)^{x-1} + 2$

1) Stretch 5

2) Right 1

3) Up 2

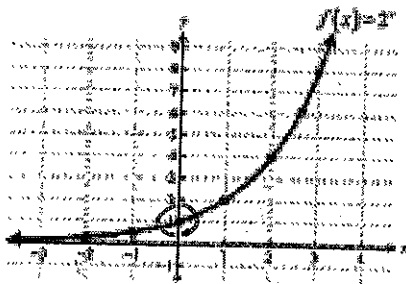
4. Using the following parent functions, write a new function given the following transformations: reflection, stretch, move left, and move down. ****Answers may vary****

I. $f(x) = 3^x$ $-2(3)^{x+2} - 5$

II. $f(x) = \frac{1}{2}^x$ $-4\left(\frac{1}{2}\right)^{x+2} - 5$

III. $f(x) = 5^x$ $-3(5)^{x+2} - 5$

5. What is the y-intercept of the graph below?



(0, 1)

6. What is the rate of change for the function $f(x) = 2(4)^{x-5}$ over the interval $5 \leq x \leq 8$

(5, 2)
(8, 128)

$$\frac{128 - 2}{8 - 5} = \frac{126}{3} = \frac{42}{1}$$

7. The value of a car generally decreases over time. Declan buys a car for \$20,000. After 1 year, the car is worth 18,000. After 2 years, the car is worth 16,000. After 3 years, the car is worth 14,000. Write a function that describes the relationship?

0 20 000
1 18 000
2 16 000
3 14 000

$$r = \frac{18}{20} = .9$$

$$20000(.9)^x$$

OR

$$18000(.9)^{x-1}$$

8. The population of Harrison High School is 1600 students. Based on the growth of the population in past years, it is estimated that after 1 year the population will be 1920 students. Similarly, after 2 years it will be 2340. Write a function that describes this relationship.

0 16000
1 1920
2 2340

$$r = \frac{1920}{1600} = 1.2$$

$$16000(1.2)^x$$

OR

$$1920(1.2)^{x-1}$$

9. Given $f(x) = 4^x$ and $g(x) = -3(4)^x + 2$. Describe the transformations performed on $f(x)$ to get $g(x)$. Also, that is the asymptote for each and how did it change.

1. Reflection (-)

2. Stretch (3)

3. Up (2) ← Asymptote

10. For each of the functions below, identify the transformations made on the parent function.

I. $f(x) = 4^x$ to $f(x) = -(4)^{x-5}$ Reflection, Right 5

II. $f(x) = 3^x$ to $f(x) = 2(3)^{x+3}+5$ stretch, left 3, up 5

III. $f(x) = 7^x$ to $f(x) = -\frac{1}{2}(7)^{x+3} - 1$ Reflection, Shrink, left 3, Down 1

11. Annie invested \$500 in to her savings account that pays 4.7% annual interest.

Write a function to model this scenario.

$$500(1 + .047)^x$$

12. Given the function $320(.32)^t$, determine if this function models growth or decay and identify the percentage of that growth or decay. Decay $.32 < 1$

rate

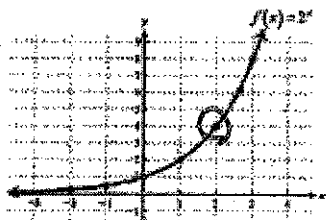
$$1 - .32 = .68$$

13. The population of the city of Kennesaw increases by a rate of 8.4% a year. When the 2010 census was taken, the population was 668,078. Assuming the population will continue to grow at the rate, predict Kennesaw's population in 2019.

$$668078(1 + .084)^9$$

$$1380672.6 \approx 1,380,673 \text{ people}$$

14. Given the graph of $f(x)$ below, what is $f(2)$?



$$f(2) = 4$$

Unit 4 Study Guide: Geometric Sequences

Date _____

Period _____

Find the term named in the problem and the explicit formula.

15) 2, -4, 8, -16, ...

Find a_{12}

$$2(-2)^{12-1}$$

44

16) 3, 6, 12, 24, ...

Find a_{12}

$$3(2)^{12-1}$$

6144

Given the recursive formula for a geometric sequence find the first five terms.

17) $a_n = a_{n-1} \cdot 6$

$a_1 = -4$

$a_1 = -4 \downarrow \times 6$

$a_2 = -24$

$a_3 = -144$

$a_4 = -864$

$a_5 = -5184$

18) $a_n = a_{n-1} \cdot 3$

$a_1 = -2$

$a_1 = -2 \downarrow \times 3$

$a_2 = -6$

$a_3 = -18$

$a_4 = -54$

$a_5 = -162$

Given the recursive formula for a geometric sequence find the explicit formula.

19) $a_n = a_{n-1} \cdot -5$

$a_1 = 2$

$a_n = a_1 (r)^{n-1}$

$= 2(-5)^{n-1}$

20) $a_n = a_{n-1} \cdot -3$

$a_1 = -3$

$a_n = a_1 (r)^{n-1}$

$= -3(-3)^{n-1}$