

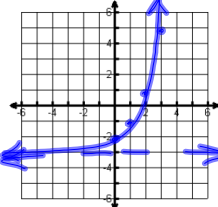
1) Write an explicit rule and find the 6<sup>th</sup> term: 256, 64, 16, 4, ...  
 $a = 256 \left(\frac{1}{4}\right)^{n-1} = 256 \left(\frac{1}{4}\right)^{6-1} = \left(\frac{1}{4}\right)$

2) Consider the sequence 2, 6, 18, 54, ...  
 a) Find the next 3 terms: 162, 486, 1458  
 b) Determine the recursive formula:  $a_1 = 2$ ,  $a_n = 3 \cdot a_{n-1}$   
 c) Determine the explicit formula:  $a_n = 2(3)^{n-1}$

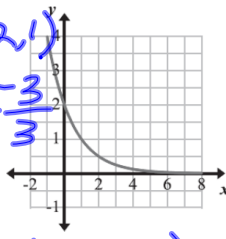
3) Given that a sequence is geometric,  $g_{10} = 98415$ , and the common ratio is 3, find  $g_1$ .  
 $\frac{98415}{3^9} = \frac{(3)^{10-1}}{3^9}$   $a_1 = 5$

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For each of the functions, identify the characteristics.

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


Domain:  $(-\infty, \infty)$   
 Range:  $(-3, \infty)$   
 x-intercept:  $(0, 1.8)$   
 y-intercept:  $(0, -2)$   
 Growth or Decay: Growth  
 End Behavior: As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ ; As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -3$

5)  $(-1, 4), (2, 1)$   
 $\frac{1-4}{2-1} = \frac{-3}{1} = -3$   


Domain:  $(-\infty, \infty)$   
 Range:  $(0, \infty)$   
 x-intercept: none  
 y-intercept:  $(0, 2)$   
 Increasing or Decreasing: Decreasing  
 Rate of change over  $[-1, 2]$ :  $-1$

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

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

b)  $h(x) = -2(3)^{x+1}$   
 reflect x-axis  
 stretch 2  
 left 1

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7) Write an equation for the given description:  
 Exponential that has a base of 4, stretched by 3, moved right 7, and up by 1.  
 $y = 3(4)^{x-7} + 1$

8) Given the equation  $y = 650(1.075)^x$

a. Does the equation represent growth or decay?  
 growth

b. What is the growth factor?  
 1.075

c. What is the rate of growth?  
 .075  $\rightarrow$  7.5%

d. What is the initial value?  
 650

e. Evaluate for  $x=9$ : 1246.20

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

$a_1 = 2$   
 $a_n = 3 \cdot a_{n-1}$

$E: a_n = 2(3)^{n-1}$

Day 1: ○○  
 Day 2: ○○  
 Day 3: ○○○○○○

How many dots will there be on day 7?

$2(3)^{7-1} = 1458 \text{ dots}$

10) 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?

$26.2 = 3(1.5)^{x-1}$  **take 6-7 days**

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11) 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?

$a(1-r)^t = 12500(1-0.07)^{16}$  **\$3914.14**

12) 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.

$y = 1.2 \text{ mil} (1+0.03)^x$

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

$y = 1.2(1+0.03)^{17} = 1.98 \text{ mil now}$   
 $y = 1.2(1+0.03)^{20} = 2.16 \text{ mil 2020}$

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13) Which function represents the sequence?

- A.  $3^{n-1}$
- B.  $6^{n-1}$
- C.  $3(6)^{n-1}$
- D.  $6(3)^{n-1}$

$n$	1	2	3	4	5	...
$a_n$	6	18	54	162	486	...

14) Which function shows the function  $f(x) = 3^x$  being translated 5 units to the left?

- A.  $f(x) = 3^x - 5$  **down.**
- B.  $f(x) = 3^{x+5}$
- C.  $f(x) = 3^{x-5}$
- D.  $f(x) = 3^x + 5$  **up**

15) The table represents an exponential function. Write the equation that represents the function.

$x$	0	1	2	3	4
$y$	3	12	48	192	768

$y = 3(4)^x$

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16) True or False: An exponential function will always have an x-intercept.

17) True or False: An exponential function will always have a y-intercept.

18) Is the graph of the following function increasing or decreasing?  $F(x) = \frac{1}{2}^x$

**decreasing**

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19) The table below describes an exponential function.

x	0	1	2	3
y	64	32	16	8

- a) Is the function exponential growth or exponential decay?
- b) Write the equation of the function.

$$y = 64\left(\frac{1}{2}\right)^x$$

20) An item is purchased for \$4000 and it depreciated in value %10 per year. Write an equation to describe the value of the item in  $t$  years.

$$y = 4000(1 - 0.1)^t$$

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21) Given the function  $y = 3(2)^{x-1} + 4$ ,

- a) Does the function represent growth or decay? b/c of 2
- b) What is the equation of the asymptote?  $y = 4$
- c) Describe the transformations that occur:  
stretch 3 up 4  
right 1

22) Given the function  $y = 5\left(\frac{1}{2}\right)^{x+2} - 3$

- a) Does the function represent growth or decay? b/c of  $\frac{1}{2}$
- b) What is the equation of the asymptote?  $y = -3$
- c) Describe the transformations that occur:  
stretch 5 down 3  
left 2

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