

February 25, 2019, Monday

This is the EOC formula sheet for Algebra 1...
 write down three eqns you have used before....
 Define at least 5 of the variables in the eqns you have used...

Feb 15-10:49 AM

Transformations of EXPONENTIAL FUNCTIONS

$f(x) = -a(b)^{x \pm h} \pm k$

- inverts the exponential (reflects)
- Horizontal Shift
- adjusts the steepness of the exponential
- Vertical Shift

Examples
 $f(x) = 2(\frac{1}{2})^{x+2} + 3$
 $f(x) = -(2)^x - 4$
 $f(x) = 2^x$

Non-examples
 $y = 2x + 3$
 $f(x) = x + 1$

Feb 15-10:50 AM

Characteristics

SAME FOR EVERY EXPONENTIAL GRAPH:
 Zero x-intercepts (#, 0)
 Y-intercept (0, #)
 Domain $(-\infty, +\infty)$

Average Rate of Change: From point A(x₁, y₁) to point B(x₂, y₂) is $\frac{y_2 - y_1}{x_2 - x_1} = \frac{2^2 - 2^1}{2 - 1} = 2$ Asymptote: $y = k$

For an EXPONENTIAL that goes UP TO THE RIGHT:
 Range: $(k, \text{Asymptote})$, $(-\infty, +\infty)$
 Interval of Increase: $(-\infty, +\infty)$
 Interval of Decrease: NONE
 End Behavior:
 As $x \rightarrow -\infty$, $f(x) \rightarrow k$ (asymptote)
 As $x \rightarrow +\infty$, $f(x) \rightarrow \infty$

For an EXPONENTIAL that goes DOWN TO THE RIGHT:
 Range: $(-\infty, k, \text{Asymptote})$
 Interval of Increase: NONE
 Interval of Decrease: $(-\infty, +\infty)$
 End Behavior:
 As $x \rightarrow -\infty$, $f(x) \rightarrow k$ (asymptote)
 As $x \rightarrow +\infty$, $f(x) \rightarrow -\infty$

For an EXPONENTIAL that goes UP TO THE LEFT:
 Range: $(k, \text{Asymptote})$, $(-\infty, +\infty)$
 Interval of Increase: NONE
 Interval of Decrease: $(-\infty, +\infty)$
 End Behavior:
 As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$
 As $x \rightarrow +\infty$, $f(x) \rightarrow k$ (asymptote)

For an EXPONENTIAL that goes DOWN TO THE LEFT:
 Range: $(-\infty, k, \text{Asymptote})$
 Interval of Increase: NONE
 Interval of Decrease: $(-\infty, +\infty)$
 End Behavior:
 As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
 As $x \rightarrow +\infty$, $f(x) \rightarrow k$ (asymptote)

Feb 15-10:51 AM

Algebra 1 - Day 1, 2/26/2018 Graphing Exponential Functions NOTES
 Today's Question: How do I solve an exponential equation algebraically? MCC9-12.A.CED.1

Graphing Exponential Functions

$y = a(b)^x$

1. $y = 2^x$

x	y
-2	.25
-1	.5
0	1
1	2
2	4

2. $y = 3^x$

x	y
-2	1/9
-1	1/3
0	1
1	3
2	9

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

x	y
-2	9
-1	3
0	1
1	1/3
2	1/9

Feb 15-10:51 AM

Writing Exponential Equations Notes

$y = a(b)^x$ $a = 2$
 $y = 2(3)^x$ $b = 3$

1. Bacteria can multiply at an alarming rate when each bacterium splits into two new cells, than another.
 When $x = 0$ this is 5 the y value.

Hour	0	1	2	3	4	5	6	7	8
Bacteria	5	10	20	40	80	160	320	640	1280

a. Write an equation that represents this situation.
 $f(x) = 2(2)^x$

b. After how many hours will there be over 1 million bacteria?
 $1,000,000 = 2(2)^x$ $500,000 = 2^x$ Guessing $x = 35$
 $500,000 = 2^x$ $x = 30$

2. Given the following table, write the equation that represents the information.

x	f(x)
-2	229
-1	73
0	23
1	7
2	2.1
3	0.63

$f(x) = 81(1/3)^x$ $b = 1/3$
 $b = 2^{4/3} = 0.33$ $x = 24$
 $2^{4/3} = 0.33$ $x = 30$
 $2^{4/3} = 0.33$ $x = 30$

3. Each year the local country club sponsors a tennis tournament. It starts with 128 players.
 During each round, half of the players are eliminated.

Rounds	0	1	2	3	4	5	6	7
Number of Players left	128	64	32	16	8	4	2	1

a. Write an equation for this scenario.
 $f(x) = 128(.5)^x$ $b = 1/2$

b. How many players are left after 6 rounds?
 $f(x) = 128(.5)^6 = 2$

4. A colony of insects triples every day. If the colony has 80 insects today, how many will be present in 10 days?
 $f(x) = a(b)^x$
 $f(x) = 80(3)^x$
 $f(x) = 80(3)^{10}$
 $f(x) = 4,723,920$

Feb 15-10:52 AM

Algebra 1 - Day 1, 2/26/2018 Graphing & Working with Exponentials HW Name: _____
 Fill in the table for each exponential function and then graph the function.

1. $y = 2^x$

x	y
-3	1/8
-2	1/4
-1	1/2
0	1
1	2
2	4
3	8

2. $y = 5^x$

x	y
-3	1/125 = .008
-2	1/25 = .04
-1	1/5 = .2
0	1
1	5
2	25
3	125

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

x	y
-3	27
-2	9
-1	3
0	1
1	1/3
2	1/9
3	1/27

Feb 15-10:52 AM

Writing Exponential Models HW

Exponential Model: $y = a(b)^x$ $a =$ start value
 $b =$ what you multiply or divide by (rate of change)

1. Your brother tells you a secret. You see no harm in telling two friends. After this second "passing" of the secret, 4 people now know the secret (you, your brother, you and two friends). If each of these friends now tells two more people, after the third "passing" of the secret, eight people will know. Write an equation to represent the "passing" of the secret. If this pattern of spreading the secret continues, how many people will know the secret after 10 such "passings"?

$y = 1(2)^x$ $y = 1(2)^{10} = 1024$

2. Alice was sitting in the bleachers on her project. She noticed that every 3000 people. Every day the population of a town grows by 2%. Write an equation to represent how many people would be there after 10 days. How many people would there be after 100 days?

$y = 1(26)^x$ $y = 1(26)^{10} = 141167095700000$

3. The following table represents how the amount of caffeine in your system each hour after drinking a cup of coffee.

x	C(t)
0	330
1	165
2	82.5
3	41.25
4	20.625

a. Write an equation based on the information:
 $y = 330(\frac{1}{2})^x$

b. How many hours would it take to have less than 1mg of caffeine left in your system?
 $y = 330(\frac{1}{2})^x = .64$

4. Daily has a leaking faucet in her bathroom. When she noticed the leak, there was a puddle that was $\frac{1}{2}$ inch in diameter. Each hour, the diameter would double. If she doesn't do anything to stop the leak, how large will the puddle be after 10 hours?

$f(x) = 2(3)^x$ $f(x) = 2(3)^{10} = 118098$

Feb 15-10:52 AM

Graphing/Writing Exponential Equations TOTD (2/26) Name _____

Graph the given exponential functions.

$y = 4^x$

x	f(x)
-3	
-2	
-1	
0	
1	
2	
3	

Given the table below, write the equation that represents the information:

x	-2	-1	0	1	2
f(x)	1296	216	36	6	1

a. Write an equation to represent this situation.

b. How many flowers will there be after 15 days?

Feb 15-10:53 AM

Graphing/Writing Exponential Equations TOTD (2/26) Name _____

Graph the given exponential functions.

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

x	f(x)
-3	
-2	
-1	
0	
1	
2	
3	

Given the table below, write the equation that represents the information:

x	-2	-1	0	1	2
f(x)	1	6	36	216	1296

a. Write an equation to represent this situation.

b. How many flowers will there be after 15 days?

Feb 15-10:53 AM

February 26, 2019, Tuesday

State 2 characteristics of each exponential graph.

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

2) $f(x) = 3 \cdot 2^x$

Characteristics
 Domain x
 Range y
 X-intercept
 Y-intercept
 End behavior:
 $x \rightarrow \infty, f(x) \rightarrow$
 $x \rightarrow -\infty, f(x) \rightarrow$

1) exponential
 2) Range: $(0, \infty)$

1) X-intercept: none
 2) EB:
 $x \rightarrow \infty, f(x) \rightarrow \infty$
 $x \rightarrow -\infty, f(x) \rightarrow 0$

Feb 15-10:53 AM

Algebra 1 - Day 2, 2/27/2018 Characteristics

Give the transformations that have taken place from the parent function of $f(x) = 2^x$.

a) $f(x) = 3(2)^x + 4$ $f(x) = 3(2)^{x+2} - 3$
 +4 up, right 2 reflection left 2

c) $f(x) = \frac{1}{2}(2)^{x-1}$ $f(x) = 2^{x+3} + 3$
 up 1, right 1 down 3

Transformations: Reflection
 Domain: $(-\infty, \infty)$ Range: $(-\infty, 0)$ Asymptote: $y = 0$ or x-axis
 Interval: Decreasing X-intercept: NONE Y-intercept: $(0, -1)$
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow -\infty$ $x \rightarrow -\infty, f(x) \rightarrow 0$
 Average Rate of change [0, 1]: $\frac{0-1}{1-0} = -1$

Transformations: up 3
 Domain: \mathbb{R} Range: $(3, \infty)$ Asymptote: $y = 3$
 Interval: decr X-intercept: NONE Y-intercept: 4
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow \infty$ $x \rightarrow -\infty, f(x) \rightarrow 3$
 Average Rate of change [1, 2]: $\frac{3-4}{2-1} = -1$

Transformations: left 1
 Domain: \mathbb{R} Range: $(0, \infty)$ Asymptote: $y = 0$
 Interval: incr X-intercept: NONE Y-intercept: 2
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow \infty$ $x \rightarrow -\infty, f(x) \rightarrow 0$
 Average Rate of change [0, 1]: $\frac{1-0}{1-0} = 1$

Feb 15-10:54 AM

Algebra 1 - Day 2, 2/27/2018 Transformations & Graphing Exponentials HW Name _____

Give the transformations that have taken place from the parent function of $f(x) = 2^x$.

1. $f(x) = 2^{x+5} - 5$ 2. $f(x) = 2^{-x}$ 3. $f(x) = -2^{-x} - 1$

Transformations:
 State 3 points on Graph: _____
 Domain: _____ Range: _____
 Asymptote: _____ Interval: _____
 X-intercept: _____ Y-intercept: _____
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow$ $x \rightarrow -\infty, f(x) \rightarrow$
 Average Rate of change [-2, 0]: _____

Transformations:
 State 3 points on Graph: _____
 Domain: _____ Range: _____
 Asymptote: _____ Interval: _____
 X-intercept: _____ Y-intercept: _____
 End Behavior: $x \rightarrow \infty, f(x) \rightarrow$ $x \rightarrow -\infty, f(x) \rightarrow$
 Average Rate of change [-2, 0]: _____

Feb 15-10:56 AM

TOTD - Transformations/Characteristics
Graph & identify all characteristics.
 $y = \left(\frac{1}{2}\right)^x + 1$

x	y
-2	
-1	
0	
1	
2	

Transformations: _____
Domain: _____ Range: _____
Asymptote: _____
Interval (increase/decrease): INCREASE DECREASE
X-intercept: _____ Y-intercept: _____
End Behavior: _____
 $x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

Average Rate of change [-2, 0]:
Choose one to turn in. You may work with someone!
 $f(x) = a(b)^{x \pm h} \pm k$

TOTD - Transformations/Characteristics
Graph & identify all characteristics.
 $y = 2\left(\frac{1}{3}\right)^{x-h}$

x	y
-1	
0	
1	
2	
3	

Transformations: steepness
Domain: _____ Range: _____
Asymptote: _____
Interval (increase/decrease): INCREASE DECREASE
X-intercept: _____ Y-intercept: _____
End Behavior: _____
 $x \rightarrow -\infty, f(x) \rightarrow$ _____
 $x \rightarrow \infty, f(x) \rightarrow$ _____

Average Rate of change [-1, 0]:
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - \frac{2}{3}}{0 - (-1)} = -\frac{4}{3}$

Feb 15-10:56 AM

Algebra 1 - Day 2, 10/3/2017 Unit 4 Practice Quiz Name _____

1) Use the given graph to identify the characteristics. Fill in the table for each exponential function and then graph the function.
5) $f(x) = 3(2)^x$

x	y
-3	3.95
-2	7.9
-1	15.8
0	31.6
1	63.2
2	126.4
3	252.8

Domain: TR
Range: (0, ∞)
Asymptote: no
X-intercept: NONE
Y-intercept: 3
End Behavior: _____
As $x \rightarrow -\infty, y \rightarrow$ 0
As $x \rightarrow \infty, y \rightarrow$ ∞
Circle one: Increasing
Interval (increase/decrease): INCREASE
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 3}{1 - 0} = 3$

2) Use the given graph to identify the characteristics.
6) $f(x) = 5^{-x}$

x	y
-3	0.008
-2	0.04
-1	0.2
0	1
1	5
2	25
3	125

Domain: TR
Range: (0, ∞)
Asymptote: no
X-intercept: NONE
Y-intercept: 5
End Behavior: _____
As $x \rightarrow -\infty, y \rightarrow$ 0
As $x \rightarrow \infty, y \rightarrow$ ∞
Circle one: Decreasing
Interval (increase/decrease): DECREASE
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 1}{0 - 1} = -4$

3) $f(x) = \left(\frac{1}{2}\right)^x$

x	y
-3	12.5
-2	25
-1	50
0	100
1	50
2	25
3	12.5

Domain: TR
Range: (0, ∞)
Asymptote: no
X-intercept: NONE
Y-intercept: 1
End Behavior: _____
As $x \rightarrow -\infty, y \rightarrow$ ∞
As $x \rightarrow \infty, y \rightarrow$ 0
Circle one: Decreasing
Interval (increase/decrease): DECREASE
 $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{5 - 10}{0 - 1} = 5$

Feb 15-10:56 AM

$f(x) = -a(b)^{x \pm h} \pm k$
Consider the parent function $f(x) = \left(\frac{1}{2}\right)^x$. How would the original graph be transformed?

a) $f(x) = \left(\frac{1}{2}\right)^x$
Steepness

b) $f(x) = \left(\frac{1}{2}\right)^{x-5}$
down 5

c) $f(x) = \left(\frac{1}{2}\right)^{x+4}$
left 4

d) $f(x) = -\left(\frac{1}{2}\right)^x$
reflection

e) $f(x) = -\frac{1}{2}\left(\frac{1}{2}\right)^{x+5}$
reflection
steepness
right 3
up 5

Write an equation for the given graphs:

a) $f(x) = 3(2)^x$
 $b = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 3}{1 - 0} = 3$
 $b = 2$
 $f(x) = a(b)^{x \pm h} \pm k$
 $f(x) = 3(2)^x$

b) $f(x) = 5(2)^x$
 $b = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 5}{1 - 0} = 5$
 $b = 2$
 $f(x) = a(b)^x$
 $f(x) = 5(2)^x$

Feb 15-10:57 AM

Feb. 27, 2019, Wednesday
Copy the exponential graph, state the domain, range, asymptote, interval of increase or interval of decrease, x-intercept, y-intercept, and end behavior

1) $f(x) = 3 \cdot 2^x$

- ✓ D: TR
- ✓ R: (-1, ∞)
- ✓ Asym: y = -1
- ✓ Increase or Decrease: INCREASE
- ✓ x-int: 0
- ✓ y-int: 3
- EB: $x \rightarrow \infty, f(x) \rightarrow \infty$
- EB: $x \rightarrow -\infty, f(x) \rightarrow 0$

right 2
down

Feb 15-10:57 AM

Day 3 - 2/27/2018 Exponential Growth & Decay Notes

$f(x) = a(b)^x$
a = _____ b = _____ x = _____
 $f(x) = 2(1.5)^x$ $f(x) = 2(0.5)^x$

Growth: _____ Decay: _____
Another formula: $f(x) = a(1 + r)^x$
a = _____ r = _____ t = _____
 $f(x) = 2(1 + 0.5)^x$ $f(x) = 2(1 - 0.5)^x$

1) The number of fish in a pond is increasing at a rate of 12% per month. At the beginning of the year, there were 130 fish in the pond. Write a function modeling the number of fish in the pond. Use the function to find the number of fish in the pond after 8 months.

Starting amount:	Growth Factor:	Function:	Number of fish after 8 months:
a = _____	b = 1 + _____	f(x) = _____	f(8) = _____

2) Tom bought a used car for \$7,000.00. The value of his car depreciating by 18% per year. Write a function modeling the value of Tom's car after x years. How much will his car be worth in 10 years?

3) An illness is spreading throughout the community. Currently 6 people are infected. The number of people who have been infected is doubling every day. Write a function modeling the number of people infected after x days. Approximately, how long will it take for 190 people to become infected?

Feb 15-10:58 AM

Day 3 - 2/28/2018 Growth/Decay HW Name _____

Growth: $y = P(1+r)^t$ Decay: $y = P(1-r)^t$

1) The motor population is 25,000 and is decreasing by 20% each year. Write a model for this situation. What will be the motor population after 3 years?

2) The number of mosquitoes at the beach has tripled every year since 1999. In 1999, there were 2,500 mosquitoes. Write a model for this situation. How many mosquitoes would you predict were at the beach in 2005?

3) I bought a car for \$25,000, but its value is depreciating at a rate of 10% per year. How much will my car be worth after 8 years?

4) Your starting salary at a new company is \$34,000 and it increases by 2.5% each year. What will your salary be in 5 years?

5) In 2010 an item cost \$9.00. The price increased by 1.5% each year. How much will it cost in 20 years?

6) The yearly profits of a company are \$25,000. The profits have been decreasing by 6% per year. What will be the profits in 8 years?

7) You bought \$200 worth of stocks in 2012. The value of the stocks has been decreasing by 10% each year. What will your stock be worth in 5 years?

8) Your car cost \$42,500 when you purchased it in 2015. The value of the car decreases by 15% annually. How much will your car be worth in 7 years?

Feb 15-10:59 AM

Feb. 28, 2019, Thursday

Are the following exponential graphs growth (increasing) or decay (decreasing)?

1)

3) $y = 4 \cdot 2^x$

Incr.

2)

4) $y = 4 \cdot (\frac{1}{2})^x$

Decr

skip 3, 5, & 7 on the back!

...quiz

Feb 15-10:59 AM

Day 4 - Geometric Sequences Notes

Geometric Recursive Formula: Geometric Explicit Formula:

	Common ratio	Recursive Formula	Explicit Formula
1, 2, 4, 8, 16, ...	$r = 2$	$a_1 = 1$ $a_n = 2a_{n-1}$	$a_n = 1(2)^{n-1}$
$10, -2, \frac{2}{5}, \dots$	$r = -\frac{2}{5}$	$a_1 = 10$ $a_n = -\frac{2}{5}a_{n-1}$	$a_n = 10(-\frac{2}{5})^{n-1}$
5, 15, 45, 135, ...	$r = 3$	$a_1 = 5$ $a_n = 3a_{n-1}$	$a_n = 5(3)^{n-1}$
320, 80, 20, 5, ...	$r = \frac{1}{4}$	$a_1 = 320$ $a_n = \frac{1}{4}a_{n-1}$	$a_n = 320(\frac{1}{4})^{n-1}$

1. Find the first five terms of the geometric sequence defined as follows:
 Exp $\rightarrow a_1 = -13, r = -1$
 $a_1 = -13, a_2 = 13, a_3 = -13, a_4 = 13, a_5 = -13$

2. Find the first five terms of the geometric sequence defined as follows:
 rec $\rightarrow a_1 = 1, r = 2$
 $a_1 = 1, a_2 = 2, a_3 = 4, a_4 = 8, a_5 = 16$

3. A colony of ants starts with 5 members. The colony increases by 100% each year.
 a. Write an explicit function to represent the sequence.
 $a_n = 5(2)^{n-1}$
 b. How many members will the colony have after 5 years?
 $a_5 = 5(2)^4 = 80$
 c. How many years will it take for the colony to reach greater than 1000 ants?
 $a_n = 5(2)^{n-1} > 1000$
 $2^{n-1} > 200$
 $2^7 = 128, 2^8 = 256$
 Year 8!

4. Find the common ratio and the missing term in the sequence
 7, 21, 63, 189, 567, ...
 $r = \frac{21}{7} = 3$

Feb 15-11:02 AM

Geometric Sequences HW

Find the next three terms in each geometric sequence.

1. $2, 6, 18, \dots$ $r = 3$
 $2 \cdot 3 = 6, 6 \cdot 3 = 18, 18 \cdot 3 = 54, 54 \cdot 3 = 162$

2. $400, 200, 100, 50, \dots$ $r = \frac{1}{2}$
 $400 \cdot \frac{1}{2} = 200, 200 \cdot \frac{1}{2} = 100, 100 \cdot \frac{1}{2} = 50, 50 \cdot \frac{1}{2} = 25$

3. $1, -2, 4, -8, 16, \dots$ $r = -2$
 $1 \cdot (-2) = -2, -2 \cdot (-2) = 4, 4 \cdot (-2) = -8, -8 \cdot (-2) = 16, 16 \cdot (-2) = -32$

4. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \dots$ $r = \frac{1}{2}$
 $1 \cdot \frac{1}{2} = \frac{1}{2}, \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}, \frac{1}{4} \cdot \frac{1}{2} = \frac{1}{8}, \frac{1}{8} \cdot \frac{1}{2} = \frac{1}{16}$

5. $2, -6, 18, -54, \dots$ $r = -3$
 $2 \cdot (-3) = -6, -6 \cdot (-3) = 18, 18 \cdot (-3) = -54, -54 \cdot (-3) = 162$

6. $9, 27, 81, 243, \dots$ $r = 3$
 $9 \cdot 3 = 27, 27 \cdot 3 = 81, 81 \cdot 3 = 243, 243 \cdot 3 = 729$

7. $5, -5, 5, -5, \dots$ $r = -1$
 $5 \cdot (-1) = -5, -5 \cdot (-1) = 5, 5 \cdot (-1) = -5, -5 \cdot (-1) = 5$

8. $12, 3, \frac{3}{4}, \dots$ $r = \frac{1}{4}$
 $12 \cdot \frac{1}{4} = 3, 3 \cdot \frac{1}{4} = \frac{3}{4}, \frac{3}{4} \cdot \frac{1}{4} = \frac{3}{16}$

9. The first term of a geometric sequence is 1, and the common ratio is 10. What is the 10th term of the sequence?
 $a_1 = 1, r = 10$
 $a_{10} = 1(10)^{10-1} = 1,000,000,000$

10. What is the 10th term of the geometric sequence 6, 12, 24, ...?
 $a_1 = 6, r = 2$
 $a_{10} = 6(2)^{10-1} = 6(2)^9 = 6(512) = 3072$

11. A construction company is building homes in a neighborhood. During the 1st month they built 3 homes, during the 2nd month they built 6 homes, and during the 3rd month they built 12 homes.

a. Write the recursive rule for the sequence.
 $a_n = 2a_{n-1}$

b. Write the explicit rule for the sequence.
 $a_n = 3(2)^{n-1}$

c. When will the construction company build 48 homes?
 $48 = 3(2)^{n-1}$
 $16 = 2^{n-1}$
 $2^4 = 2^{n-1}$
 $4 = n-1$
 $n = 5$

Feb 15-11:04 AM

Algebra I

Geometric Sequence Practice

State if each sequence is geometric.

1) $-4, -8, -16, 32, \dots$

2) $2, -12, -26, -40, \dots$

3) $11, 17, 23, 29, \dots$

4) $4, 12, 36, 108, \dots$

5) $-10, -5, 0, 5, \dots$

6) $-2, -12, -72, -432, \dots$

7) $1, 6, 36, 216, \dots$

8) $9, 99, 999, 9999, \dots$

Find the common ratio.

9) $-4, -8, -16, 32, \dots$

10) $-3, 9, -27, 81, \dots$

11) $2, 8, 32, 128, \dots$

12) $4, 12, 36, 108, \dots$

Feb 15-11:04 AM

13) $3, -9, 27, -81, \dots$

14) $-1, -4, -16, -64, \dots$

15) $3, 6, 12, 24, \dots$

16) $-4, 20, -100, 500, \dots$

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

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

18) $a_n = a_{n-1} \cdot 5$
 $a_1 = 2$

19) $a_n = a_{n-1} \cdot 5$
 $a_1 = -1$

20) $a_n = a_{n-1} \cdot 4$
 $a_1 = -2$

21) $a_n = a_{n-1} \cdot 4$
 $a_1 = -0.5$

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

23) $a_n = a_{n-1} \cdot \frac{1}{2}$
 $a_1 = 4$

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

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Given the explicit formula for a geometric sequence find the 8th term.

25) $a_n = \frac{1}{2} \left(\frac{1}{2}\right)^{n-1}$

26) $a_n = 4 \cdot (-2)^{n-1}$

27) $a_n = 3 \cdot (-2)^{n-1}$

28) $a_n = 3 \cdot \left(\frac{1}{5}\right)^{n-1}$

29) $a_n = 32 \cdot \left(\frac{1}{2}\right)^{n-1}$

30) $a_n = 2^{n-1}$

31) $a_n = 2 \cdot 4^{n-1}$

32) $a_n = \frac{2}{3} \cdot \left(\frac{1}{3}\right)^{n-1}$

Find the recursive formula.

33) $-0.5, 1, -2, 4, \dots$

34) $3, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}, \dots$

35) $972, 324, 108, 36, \dots$

36) $1, 5, 25, 125, \dots$

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37) 375, 75, 15, 3, ... 38) 4, 20, 100, 500, ...

39) -1, 6, -36, 216, ... 40) $1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \dots$

Find the explicit formula.

41) -3, 6, -12, 24, ... 42) 125, -25, 5, -1, ...

43) $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$ 44) -2, 10, -50, 250, ...

45) -0.2, -1, -5, -25, ... 46) 1875, 375, 75, 15, ...

47) 32, 16, 8, 4, ... 48) -3, -9, -27, -81, ...

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March 1, 2019, Friday

2. Identify the characteristics of the function below.

Domain: \mathbb{R}

Range: $(0, \infty)$

Asymptote: $y=0$

X-intercept: NONE

Y-intercept: 2

Circle one: Increasing Decreasing

End Behavior:
As $x \rightarrow -\infty, y \rightarrow \infty$
As $x \rightarrow \infty, y \rightarrow 0$

Write an exponential equation given the table.

X	-3	-2	-1	0	1	2
Y	$\frac{1}{8}$	$\frac{1}{4}$	1	2	4	8

A. $y = 2(2)^x$
B. $y = 1(4)^x$
C. $y = 4(2)^x$
D. $y = 4(2)^x$

Arithmetic or geometric? $d = 12 - 6 = 6$, $d = 24 - 12 = 12$

16. Consider the first six terms of this sequence: 6, 12, 24, 48, 96, ...
Which equation defines the sequence?
a) $y_n = 6 \cdot 2^{n-1}$
b) $y_n = 3 \cdot (2)^{n-1}$
c) $y_n = 6 \cdot (2)^{n-1}$

Geometric Sequence Formulas
Recursive: $a_n = r(a_{n-1})$
Explicit: $a_n = a_1 \cdot r^{n-1}$

$y = 4(2)^x$
 $y = 4(2)^0 = 4$
 $y = 4(2)^1 = 8$
 $y = 4(2)^2 = 16$

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6. Write an equation for the given graph.

A. $f(x) = 2 \cdot 3^x$
B. $f(x) = 3 \cdot 2^x$
C. $f(x) = 5 \cdot 2^x$
D. $f(x) = 2 \cdot 2^x$

Quiz Review

$f(x) = a(b)^x$
 $f(x) = 2(3)^x$

$b = \frac{y_2}{y_1}$
 $b = \frac{6}{2} = 3$

4) y when $x=0$

4. Calculate the average rate of change of the graph over the interval $[0, 2]$.

$m = \frac{y_2 - y_1}{x_2 - x_1}$
 $m = \frac{4 - 1}{2 - 0} = \frac{3}{2} = 1.5$

Mar 1-9:13 AM

TOTD - Geometric Sequences

Create your own geometric sequence. The first term in your sequence is 12,620 and your sequence is decreasing.

12,620, _____, _____, _____, ...

a) = _____, r = _____

Write the recursive formula for YOUR sequence. Write the explicit formula for YOUR sequence.

Find the 6th term in your sequence using the explicit formula.

TOTD - Geometric Sequences

Create your own geometric sequence. The first term in your sequence is 8 and your sequence is growing.

8, _____, _____, _____, ...

a) = _____, r = _____

Write the recursive formula for YOUR sequence. Write the explicit formula for YOUR sequence.

Find the 6th term in your sequence using the explicit formula.

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TOTD - Geometric Sequences

Create your own geometric sequence. The first term in your sequence is 24330 and your sequence is decreasing.

24330, _____, _____, _____, ...

a) = _____, r = _____

Write the recursive formula for YOUR sequence. Write the explicit formula for YOUR sequence.

Find the 6th term in your sequence using the explicit formula.

TOTD - Geometric Sequences

Create your own geometric sequence. The first term in your sequence is 3 and your sequence is growing.

3, _____, _____, _____, ...

a) = _____, r = _____

Write the recursive formula for YOUR sequence. Write the explicit formula for YOUR sequence.

Find the 6th term in your sequence using the explicit formula.

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Algebra 1 - Day 4, 3/1/2018 Unit 4 Test Review


1) Write an explicit rule and find the 6th term: 256, 64, 16, 4, ...

2) Consider the sequence 2, 6, 18, 54, ...
a) Find the next 3 terms b) Determine the recursive formula c) Determine the explicit formula

3) Given that a sequence is geometric, $a_{10} = 98415$, and the common ratio is 3, find a_1 .

For each of the functions, identify the characteristics.

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

5) 

Domain: _____
Range: _____
x-intercept: _____
y-intercept: _____
Growth or Decay: _____
End Behavior: _____

6) Describe the transformations made to $f(x) = 3^x$ to draw the following functions.
a) $g(x) = \frac{1}{2} \cdot 3^x + 5$ b) $h(x) = -3(2)^{x-1}$










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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.

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

- Does the equation represent growth or decay?
- What is the growth factor?
- What is the rate of growth?
- What is the initial value?
- Evaluate for $x=9$

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

Day 1	Day 2	Day 3
		
		
		

How many dots will there be on day 7?

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?

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1) A boat was purchased 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?

2) 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. Write a model for this population growth. What should the population be now? What is the projected population for 2020?

3) Which function represents the sequence?

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

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

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

5) Which table represents an exponential function. Write the equation that represents the function.

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

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

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

8) True or False: The graph of the following function is increasing or decreasing? $f(x) = 5^x$

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19) The table below describes an exponential function.

x	0	1	2	3
f	64	32	16	8

- Is this function exponential growth or exponential decay?
- Write the equation of the function.

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

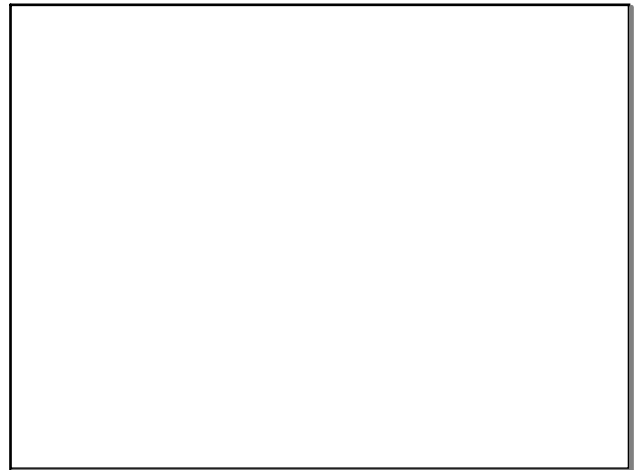
21) Given the function $y = 3(2)^{x-1} + 4$.

- Does the function represent growth or decay? _____
- What is the equation of the asymptote? _____
- Describe the transformations that occur: _____

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

- Does the function represent growth or decay? _____
- What is the equation of the asymptote? _____
- Describe the transformations that occur: _____

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Feb 27-3:09 PM