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Date: _____ Linear vs. Exponential Continued

d. "At the start of a carnival, you have 50 ride tickets. Each time you ride the roller coaster, you have to pay 6 tickets."

Linear or exponential? $y =$ $-6x + 50$.

e. "There are 20,000 owls in the wild. Every decade, the number of owls is halved."

Linear or exponential? $y =$ $20{,}000(1/2)^x$.

2. Decide whether the table represents a linear or exponential function. Circle either linear or exponential. Then, write the function formula.

a.

x	0	1	2	3	4	5	6	7
y	2	5	8	11	14	17	20	23

Linear or exponential? $y =$ $3x + 2$.

b.

x	0	1	2	3	4	5	6	7
y	3	6	12	24	48	96	192	384

Linear or exponential? $y =$ $3(2)^x$.

c.

x	0	1	2	3	4	5	6	7
y	10	5	2.5	1.25	.625	.3125	.15625	.078125

Linear or exponential? $y =$ $10(1/2)^x$.

d.

x	0	1	2	3	4	5	6	7
y	12	8	4	0	-4	-8	-12	-16

Linear or exponential? $y =$ $-4x + 12$

e.

x	0	1	2	3	4	5	6	7
y	50	35	24.5	17.15	12.005	8.4035	5.88245	4.117715

Linear or exponential? $y =$ $50(7/10)^x$

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f.

x	0	1	2	3	4	5	6	7
y	40	35	30	25	20	15	10	5

Linear or exponential? $y =$ $-5x + 40$

g.

x	0	1	2	3	4	5	6	7
y	.4	.6	.9	1.35	2.025	3.0375	4.55625	6.834375

Linear or exponential? $y =$ $.4(1.5)^x$

3. Without a calculator, make a table for $f(x) = \frac{1}{2}x + 8$.

x	$f(x) = \frac{1}{2}x + 8$
0	8
1	8.5
2	9
3	9.5
4	10
5	10.5
6	11

4. Without a calculator, make a table for $f(x) = 8 \cdot (\frac{1}{2})^x$. Express answers as fractions.

x	$f(x) = 8 \cdot (\frac{1}{2})^x$ in fractions
0	8
1	4
2	2
3	1
4	1/2
5	1/4
6	1/8

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5. A science experiment involves periodically measuring the number of mold cells present on a piece of bread. At the start of the experiment, there are 50 mold cells. Each time a periodic observation is made, the number of mold cells triples. For example, at observation #1, there are 150 mold cells.

a. Write a function formula equation ($y = \cdots$) for the number of mold cells present, where x stands for the observation number.

$y = 50(3)^x$

b. Fill in the missing outputs of this table.

x = observation number	0	1	2	3	4	5
y = mold cell count	50	150	450	1350	4050	12150

c. Suppose that the mold begins to be visible as green coloration when the mold cell count exceeds 100,000. On which observation will this happen?

$50(3)^7 = 109,350$ day 7

d. What will be the mold cell count on the 20th observation? When you find the answer on your calculator, it will be so large that it displays in scientific notation (E notation). Rewrite the answer as an ordinary big number.

$5(3)^{20} = 1.743392201 \times 10^{11} =$ 174,339,220,100

6. Julie gets a pre-paid cell phone. Initially she has a $40.00 balance on the phone. Each minute of talking costs $0.15.

Let x stand for the amount of time in minutes that Julie has talked on the phone, and let $f(x)$ stand for the remaining dollar value of the phone.

a. Is $f(x)$ a linear function or an exponential function? Explain how you know.

fixed rate per minutes

b. Find a function formula equation $f(x) =$ $-0.15x + 40$

c. Find the value of $f(0)$ and explain its meaning in terms of the cell phone.

$f(0) = -0.15(0) + 40 = 40$

If Julie talks for 0 min, she has $40 remaining

d. Find the value of $f(100)$ and explain its meaning in terms of the cell phone.

$f(100) = 25$

If Julie talks for 100 min, she has $25 remaining

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e. Find the value of x that makes $f(x) = 10$, and explain its meaning in terms of the cell phone.

$f(x) = -.15x + 40 = 10$

$-.15x = -30$

$x = 200$

If Julie talks for 200 minutes, she has $10 remaining.

f. Find the value of x that makes $f(x) = 0$, and explain its meaning in terms of the cell phone.

$f(x) = -.15x + 40 = 0$

$-.15x = -40$

$x = 266.\overline{66}$

Julie will run out of money when she talks 266.66 min.

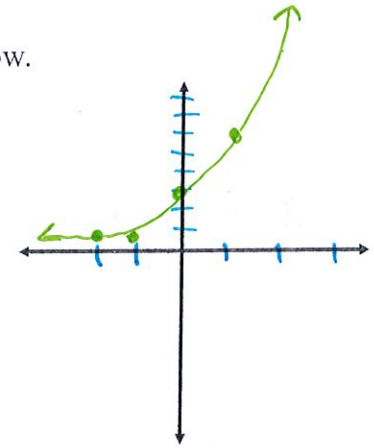
7. Sketch a graph of the function $y = 3 \cdot 2^x$ on the axes below.

Be sure to label the y-intercept.

Hint: the y-intercept is the starting amount

x	y
-2	0.75
-1	1.5
0	3
1	6
2	12

y-int → 0

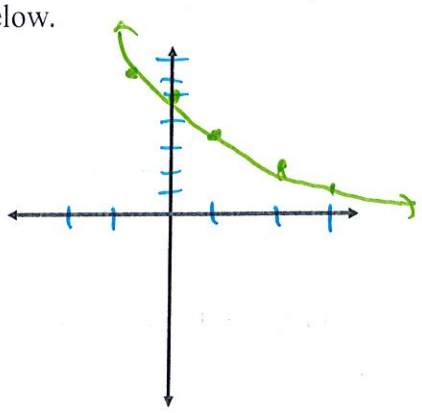


8. Sketch a graph of the function $y = 5 \cdot \left(\frac{3}{4}\right)^x$ on the axes below.

Be sure to label the y-intercept.

x	y
-1	6.7
0	5
1	3.75
2	2.8
3	1.5

y-int → 0



9. Sketch a graph of the function $y = \left(\frac{5}{2}\right)^x$ on the axes below.

Be sure to label the y-intercept.

x	y
-1	.4
0	1
1	2.5
2	6.25
3	15.625

y-int → 0