

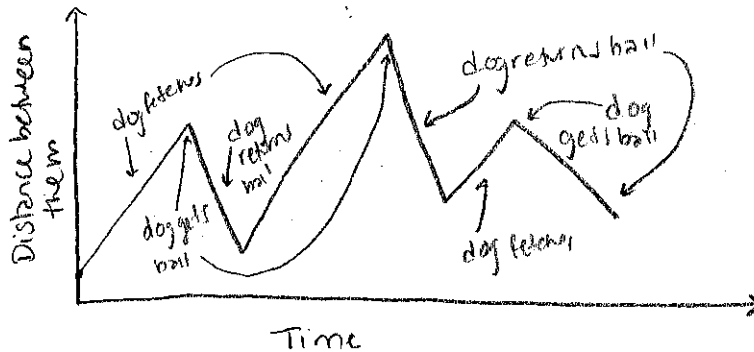
Name: Key  
 Algebra 1

Date: \_\_\_\_\_  
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Functions Study Guide

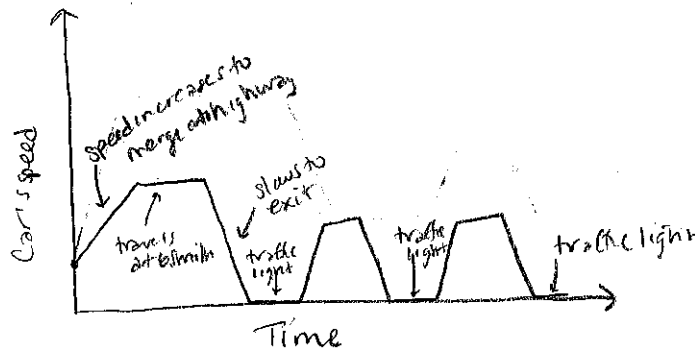
**LT#1: Represent mathematical relationships using graphs.**

1. A dog owner plays fetch with her dog. Sketch a graph to represent the distance between them and the time. Label each section.



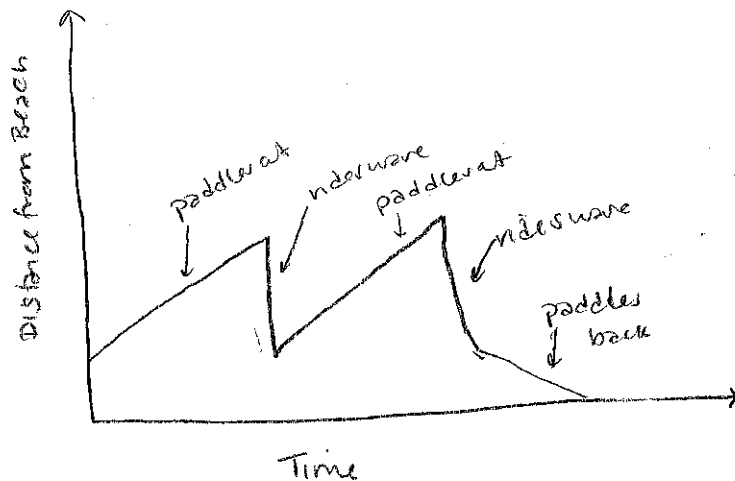
\* graphs may vary

2. A car's speed increases as it merges onto a highway. The car travels at 65 mi/h on the highway until it slows to exit. The car then stops at three traffic lights before reaching its destination. Draw a sketch of a graph that shows the car's speed over time. Label each section.



\* graph may vary

3. A professional surfer paddles out past breaking waves, rides a wave, paddles back out past the breaking waves, rides another wave, and paddles back to the beach. Draw a sketch of a graph that shows the surfer's possible distance from the beach over time. Label each section.



\* graphs may vary

**LT#2: Identify and represent patterns that describe linear functions.**

For each table, identify the independent and dependent variables. Represent the relationship using words, an equation, and a graph.

4.

Number of Omelets Made, $x$	0	1	2	3
Number of Eggs Left, $y$	12	10	8	5

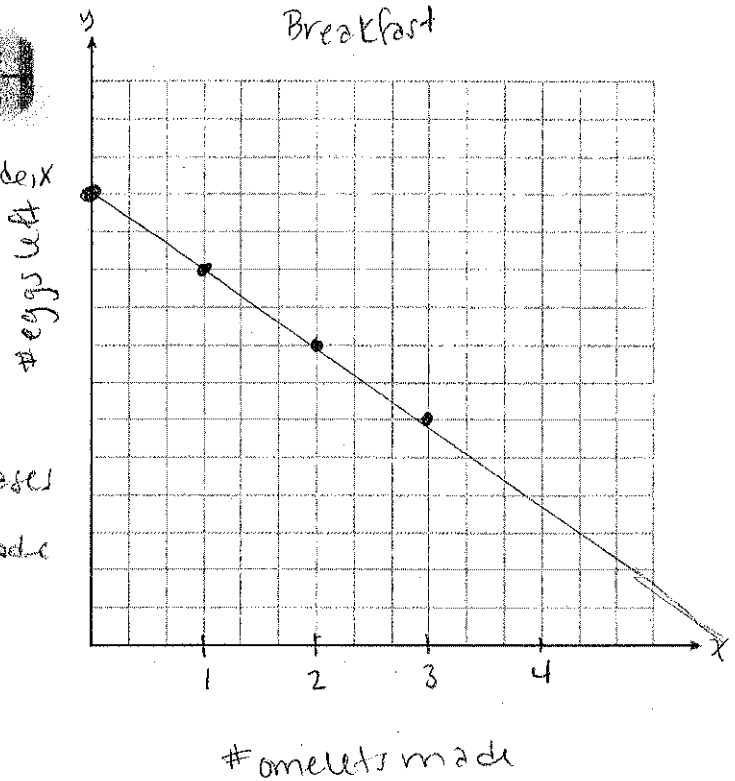
-2   -2   -2

independent: # of omelets made,  $x$

dependent: # eggs left,  $y$

equation:  $y = -2x$

words: # of eggs left decreases by 2 for each omelet made



5.

Paint in Can

Number of Chairs Painted, $p$	Paint Left (oz), $L$
0	126
1	96
2	66
3	36

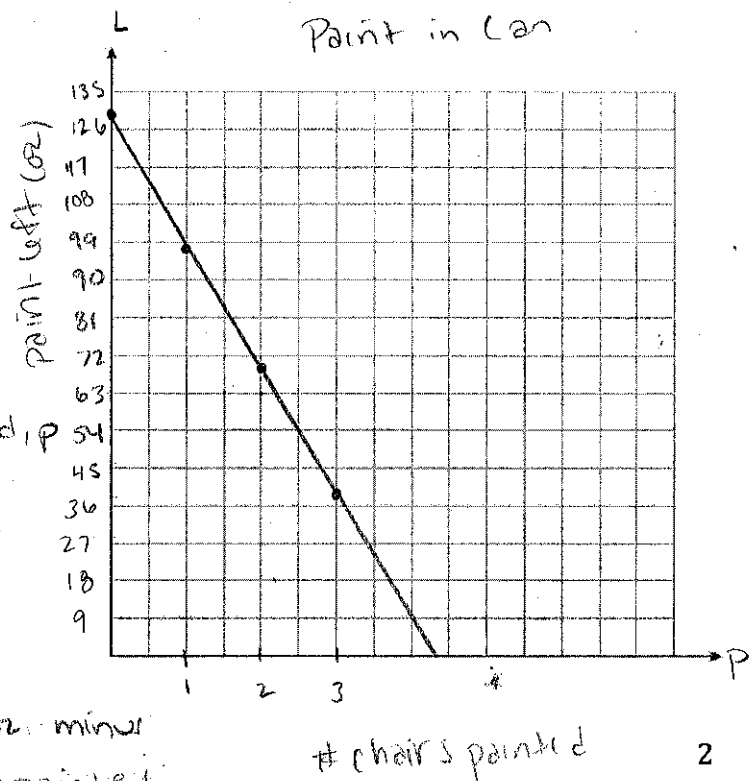
-30   -30   -30

independent: # of chairs painted,  $p$

dependent: paint left (oz),  $L$

equation:  $L = -30p + 126$

words: Paint left (oz) is 126 oz. minus 30 times each chair painted



6. Game Cost

Number of Snacks Purchased, $s$	Total Cost, $C$
0	\$18
1	\$21
2	\$24
3	\$27

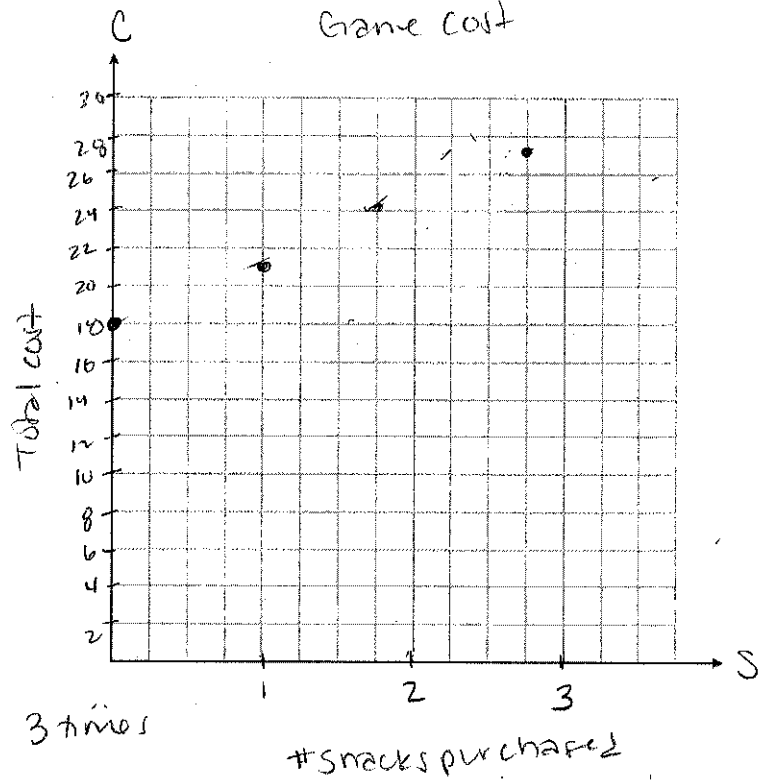
Handwritten annotations: Brackets on the left indicate an increase of +1 in  $s$  for each row. Brackets on the right indicate an increase of +3 in  $C$  for each row.

independent: #snacks purchased,  $s$

dependent: total cost,  $C$

equation:  $C = 3s + 18$

words: total cost is \$18 plus 3 times # snacks purchased



Number of Flights of Stairs Climbed, $n$	Elevation (ft. above sea level), $E$
0	311
1	326
2	341
3	356

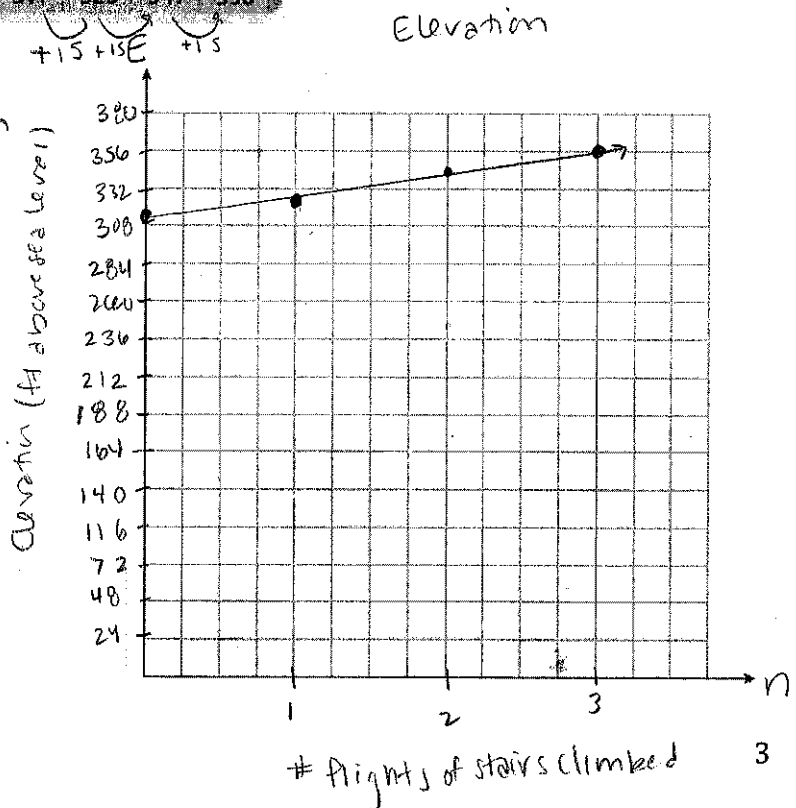
Handwritten annotations: Arched arrows above the table indicate an increase of +1 in  $n$  for each row. Arched arrows below the table indicate an increase of +15 in  $E$  for each row.

independent: # flights of stairs climbed,  $n$

dependent: elevation,  $E$

Equation:  $E = 15n + 311$

words: elevation is 311 plus 15 times # of flights of stairs climbed



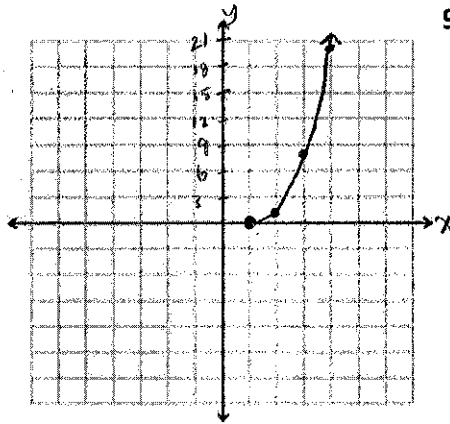
**LT#3: Identify and represent patterns that describe nonlinear functions.**

Graph each function shown by each table. Tell whether the function is *linear* or *nonlinear*.

8.

x	y
1	0
2	1
3	8
4	20

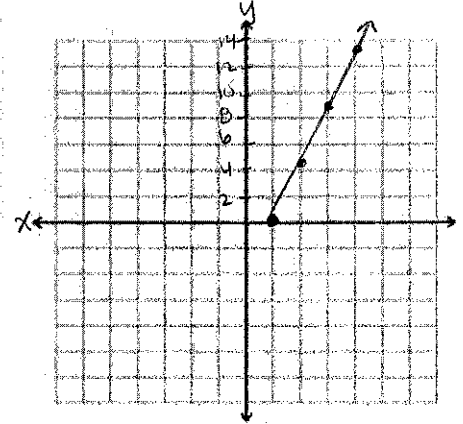
nonlinear



9.

x	y
1	0
2	45
3	9
4	135

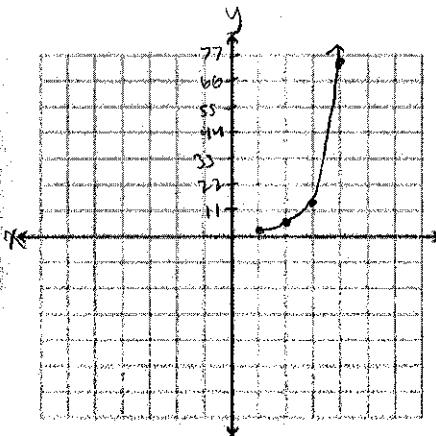
linear



10.

x	y
1	2
2	6
3	12
4	72

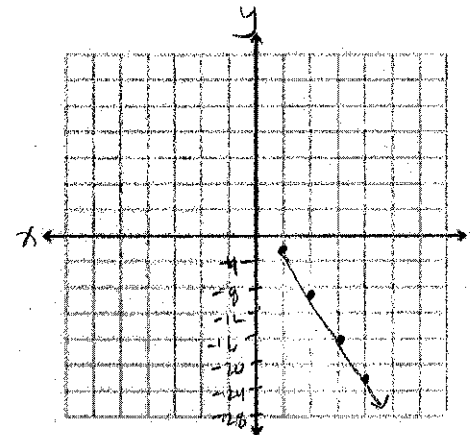
nonlinear



11.

x	y
1	2
2	-9
3	-16
4	-23

linear



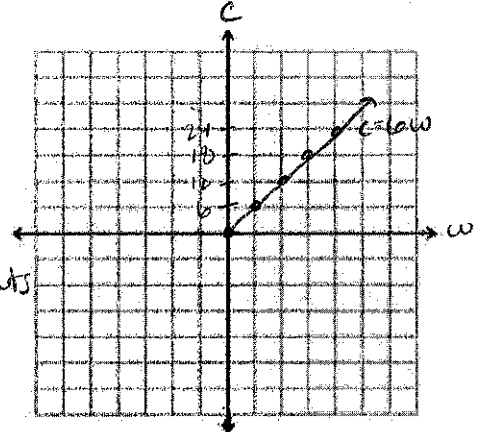
**LT#4: Graph equations that represent functions.**

Graph the function rule by making a table of values. Explain why the graph is *continuous* or *discrete*.

12. You cost  $c$  to buy  $w$  pounds of walnuts at \$6/lb is represented by  $c = 6w$ .

w	c
0	0
1	6
2	12
3	18
4	24

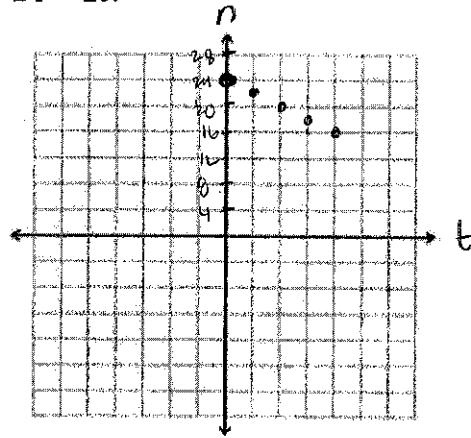
continuous  
because you  
can buy  
fractional  
lbs of walnuts



13. A truck originally held 24 chairs. You remove 2 chairs at a time. The number of chairs  $n$  remaining after you make  $t$  trips is represented by  $n = 24 - 2t$ .

$t$	$n$
0	24
1	22
2	20
3	18
4	16

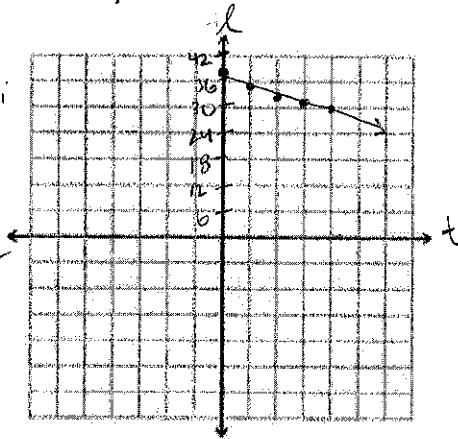
discrete;  
cannot remove  
fractional  
chairs



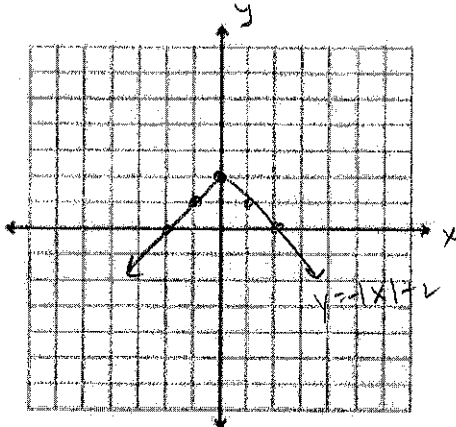
14. A burst pipe fills a basement with 37 in. of water. A pump empties the water at a rate of 1.5 in./h. The water level,  $l$ , in inches, after  $t$  hours is represented by  $l = 37 - 1.5t$ .

$t$	$l$
0	37
1	35.5
2	34
3	32.5
4	31

continuous;  
can have  
fractional  
in. of water



15. Graph  $y = -|x| + 2$



$x$	$y$
-2	$- -2  + 2 = 0$
-1	$- -1  + 2 = 1$
0	$ 0  + 2 = 2$
1	$- 1  + 2 = 1$
2	$- 2  + 2 = 0$

**LT#5: Write equations that represent functions.**

Write a function rule to represent each situation. Define your variables if necessary.

16. At a bicycle motocross (BMX) track, you pay \$40 for a racing license plus \$15 per race.

$$r = \# \text{ races}$$

$$C = \text{total cost} \quad C = 40 + 15r$$

17. The volume  $V$  remaining in a  $243\text{-ft}^3$  pile of gravel decreases by  $0.2\text{ ft}^3$  with each shovelful  $s$  of gravel spread in a walkway.

$$V = 243 - 0.2s$$

18. Your total cost  $C$  for hiring a garden designer is \$200 for an initial consultation plus \$45 for each hour  $h$  the designer spends drawing plans.

$$C = 200 + 45h$$

**LT#6: Determine whether a relation is a function.**

**LT#7: Find domain and range and use function notation.**

Tell whether each relation is a function.

19.  $\{(-1,7), (9,4), (3,-2), (5,3), (9,1)\}$

not a function

20.  $\{(2,5), (3,5), (4,-4), (5,-4), (6,8)\}$

function

Evaluate each function for  $x = 2$  and  $x = 7$ .

21.  $f(x) = 2x - 8$

$$f(2) = 2(2) - 8 = -4$$

$$f(7) = 2(7) - 8 = 6$$

22.  $h(x) = -4x + 61$

$$h(2) = -4(2) + 61 = 53$$

$$h(7) = -4(7) + 61 = 33$$

23. The domain to  $t(x) = -3.8x - 4.2$  is  $\{-3, -1.4, 0, 8\}$ . What is the range?

$x$	$t(x)$
-3	-7.2
-1.4	-4.2
0	-4.2
8	-34.6

$$\{-7.2, -4.2, -34.6\}$$