

Algebra I
Lesson 5.1 – Identifying Linear Functions
Mrs. Snow, Instructor

Linear functions help us to describe many real world situations such as the cost to fill up your gas tank, annual rent cost paid out over 12 months, or travel time at a constant speed. Whether given an equation, graph or a table of values, we can determine whether or not it is a function.

Reminder! A function is a special type of relation that pairs each domain value with only one range value. When you look at your domain, you will see no repeaters. A graph will pass the vertical line test.

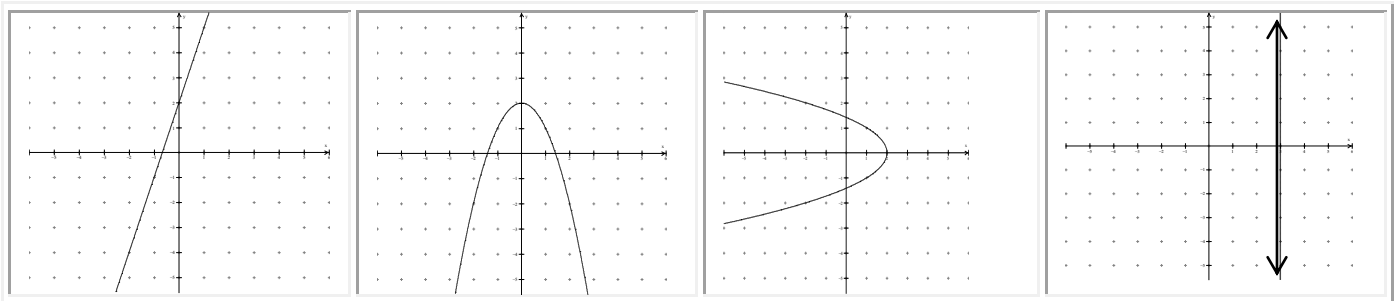
Vocabulary:

Linear function – a function whose graph forms a straight line. A linear function has a constant change in the values of x , the domain, and a constant change in the values of y , the range.

Standard form – a linear equation is considered to be in **standard form** when written as:

$$Ax + By = C; \text{ } A, B, \text{ and } C \text{ are real numbers and } A \text{ and } B \text{ are not both } 0.$$

So, which graph represents a function? (Does it pass the vertical line test?)



Which table of values represents a linear function? (Are there repeaters? Is there a constant change in the x 's and y 's?)

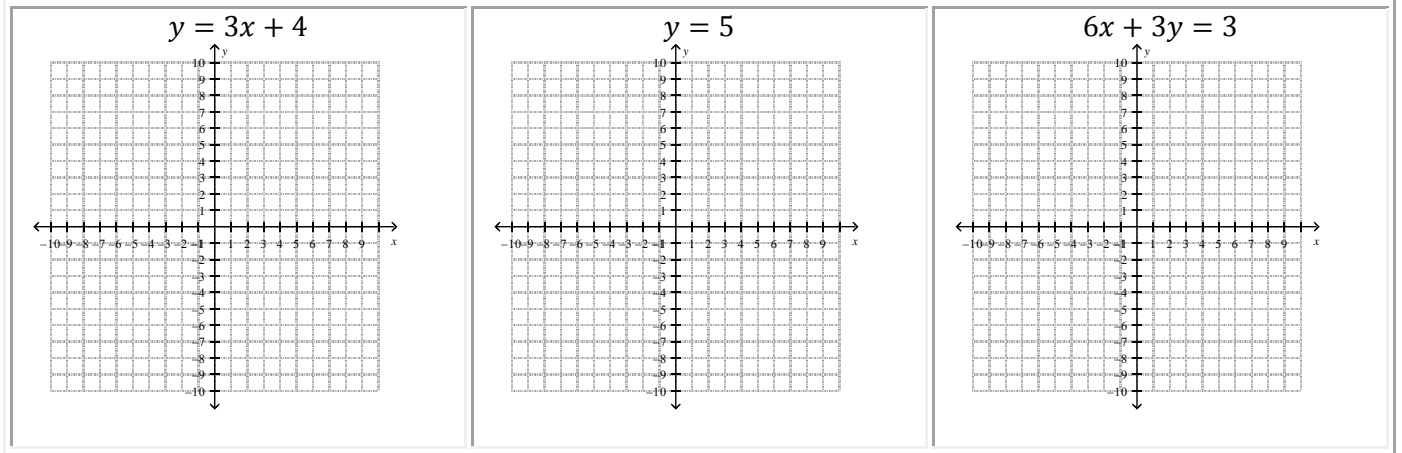
<table border="1" style="margin: auto;"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>-2</td><td>-8</td></tr> <tr><td>-1</td><td>-1</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>1</td></tr> </tbody> </table>	x	y	-2	-8	-1	-1	0	0	1	1	<table border="1" style="margin: auto;"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>1</td><td>1</td></tr> <tr><td>4</td><td>2</td></tr> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>-1</td></tr> <tr><td>4</td><td>-2</td></tr> </tbody> </table>	x	y	1	1	4	2	0	0	1	-1	4	-2	$\{(0,3), (2,7), (4,11), (6,15)\}$ <i>hint: make a table of values!</i>	$\{(0, -2), (1, -4), (2, -6), (3, -8), (4, -10)\}$
x	y																								
-2	-8																								
-1	-1																								
0	0																								
1	1																								
x	y																								
1	1																								
4	2																								
0	0																								
1	-1																								
4	-2																								

Which equation represents a linear function? (Can it be written the standard form?)

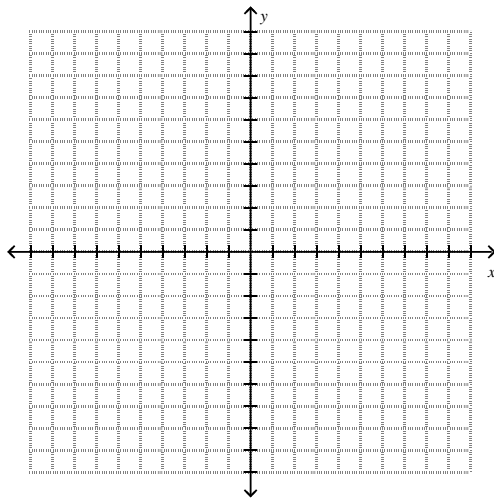
$y = 3x - 4$
 $2x - 8 = 3y$
 $2xy + y = 6$
 $-y = 4x$
 $x + \frac{4}{y} = 3$
 $x + \frac{1}{4}y = 3$
 $y = 2x^2$

In section 4.4 we learned how to graph functions. You were told to make a table of values with a minimum of 4 points. With a linear function 3 points is adequate. While 2 points determine a line, the 3rd point checks to make sure there was not a math error in computing one of the other 2 points.

Graph the following linear functions:



The cost of premium gasoline is \$3.80 for each gallon of gas. The equation $f(x) = 3.80x$ models how much money it will cost for x gallons of gas. Graph this function and give its domain and range (be realistic). Would this be better graphed as a continuous or discrete function?



Jacksonville, Florida has an elevation of 12 ft. above sea level. A hot-air balloon taking off from Jacksonville rises 2 feet per second. The equation $h(t) = 2t + 12$ models the balloon's elevation as a function of time. Graph this function. What is the domain and range? What is significant of the ordered pair (0, 12)?

