

Day 22: Linear Functions and Slope

Situation	Complete Table	Write an Equation	Graph																				
<p>Bailey babysits for the Wilson family. She charges \$5 just to drive there to pay for gas, and then she charges \$9 per hour.</p> <p>Slope = 9                      Y-inter = 5</p>	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr><td>0</td><td>5</td></tr> <tr><td>1</td><td>14</td></tr> <tr><td>2</td><td>23</td></tr> <tr><td>3</td><td>32</td></tr> <tr><td>4</td><td>41</td></tr> <tr><td>5</td><td>50</td></tr> <tr><td>20</td><td>185</td></tr> <tr><td>21.5</td><td>196.5</td></tr> <tr> <td>x</td> <td></td> </tr> </tbody> </table>	x	y	0	5	1	14	2	23	3	32	4	41	5	50	20	185	21.5	196.5	x		<p>Define the variables:                      x: Hours                      y: Amount of Money</p> <p>Equation: <math>y = 9x + 5</math></p>	
x	y																						
0	5																						
1	14																						
2	23																						
3	32																						
4	41																						
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20	185																						
21.5	196.5																						
x																							
<p>Make up a situation:</p> <p>You give your cat 14 treats &amp; he eats 2 treats per bite,</p>	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr><td>0</td><td>14</td></tr> <tr><td>1</td><td>12</td></tr> <tr><td>2</td><td>10</td></tr> <tr><td>3</td><td>8</td></tr> <tr><td>4</td><td>6</td></tr> <tr><td>5</td><td>4</td></tr> <tr><td>20</td><td>-26</td></tr> <tr><td>21.5</td><td>-29</td></tr> <tr> <td>x</td> <td><math>-2x + 14</math></td> </tr> </tbody> </table>	x	y	0	14	1	12	2	10	3	8	4	6	5	4	20	-26	21.5	-29	x	$-2x + 14$	<p>Define the variables:                      x: # of bites                      y: # of treats</p> <p>Equation: <math>y = -2x + 14</math></p>	
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# SLOPE!

Make a list of all the ways you have learned to identify/calculate slope:

Growth, change,  $\frac{\text{rise}}{\text{run}}$ ,  $\frac{y_2 - y_1}{x_2 - x_1}$

## HOW TO CALCULATE SLOPE

Slope is also called Rate of change.

### Situation/Pattern

You decide to go to the pumpkin patch this weekend with your family. Pumpkins cost \$0.99 per lb, and it costs \$3 to enter the pumpkin patch.

$$y = 0.99x + 3$$

X: Pumpkin weight (lb)  
y: Cost (\$)

Figure 1

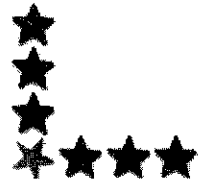


Figure 2



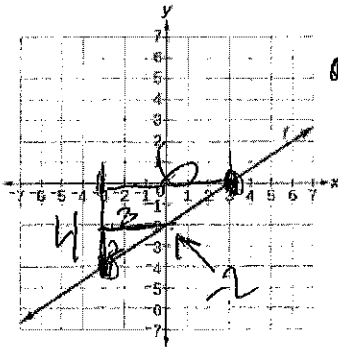
$$y = 2x + 1$$

Figure 3



### Graph

Example:



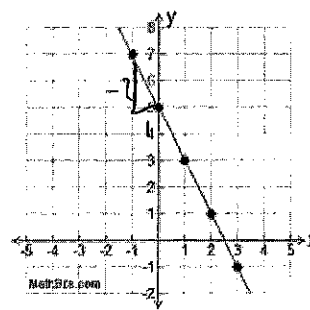
$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$m = \frac{4}{6} = \frac{2}{3}$$

$$b = -2$$

$$y = \frac{2}{3}x - 2$$

Example:



$$m = \frac{-2}{1}$$

$$y = -2x + 5$$

### Table

Example:

x	y
2	-10
6	-4
10	a
14	8
18	14
22	20

Handwritten notes: A vertical arrow on the left indicates a rise of 4 between y = -10 and y = -4. A horizontal arrow at the bottom indicates a run of 6 between x = 2 and x = 8.

$$\frac{\text{rise}}{\text{run}} = \frac{6}{4} = \frac{3}{2}$$

$$y = \frac{3}{2}x - 13$$

You Try:

x	y
-1	13
-3	16
-5	19
-7	22
-9	25
-11	28

$$m = \frac{3}{-2}$$

$$y = \frac{3}{-2}x + 11.5$$

### Two Points

FORMULA:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Example:  $(-1, 2)$  and  $(3, 5)$

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

$$y = \frac{3}{4}x + 2.75$$