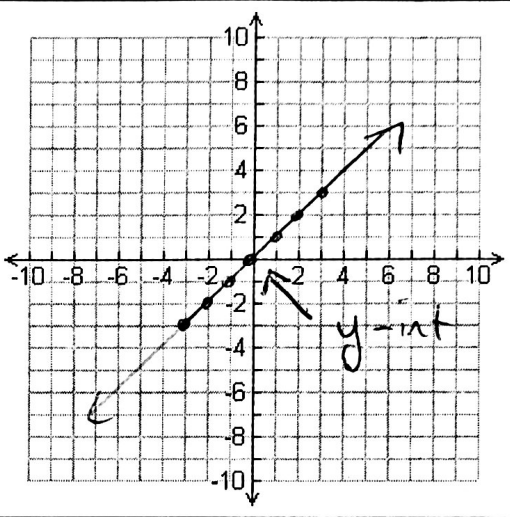
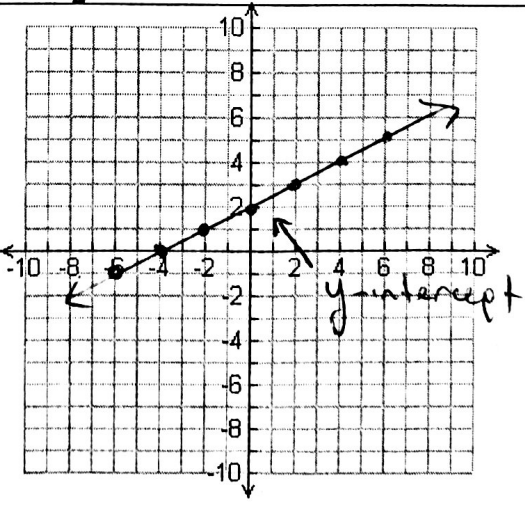


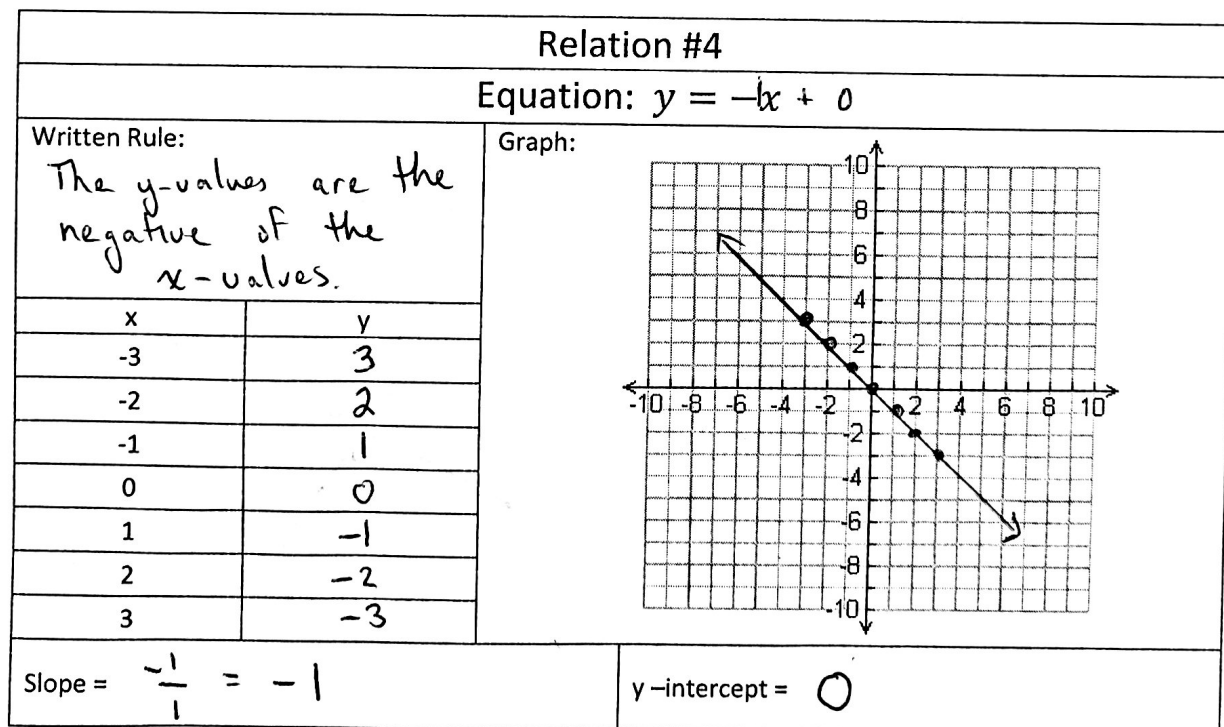
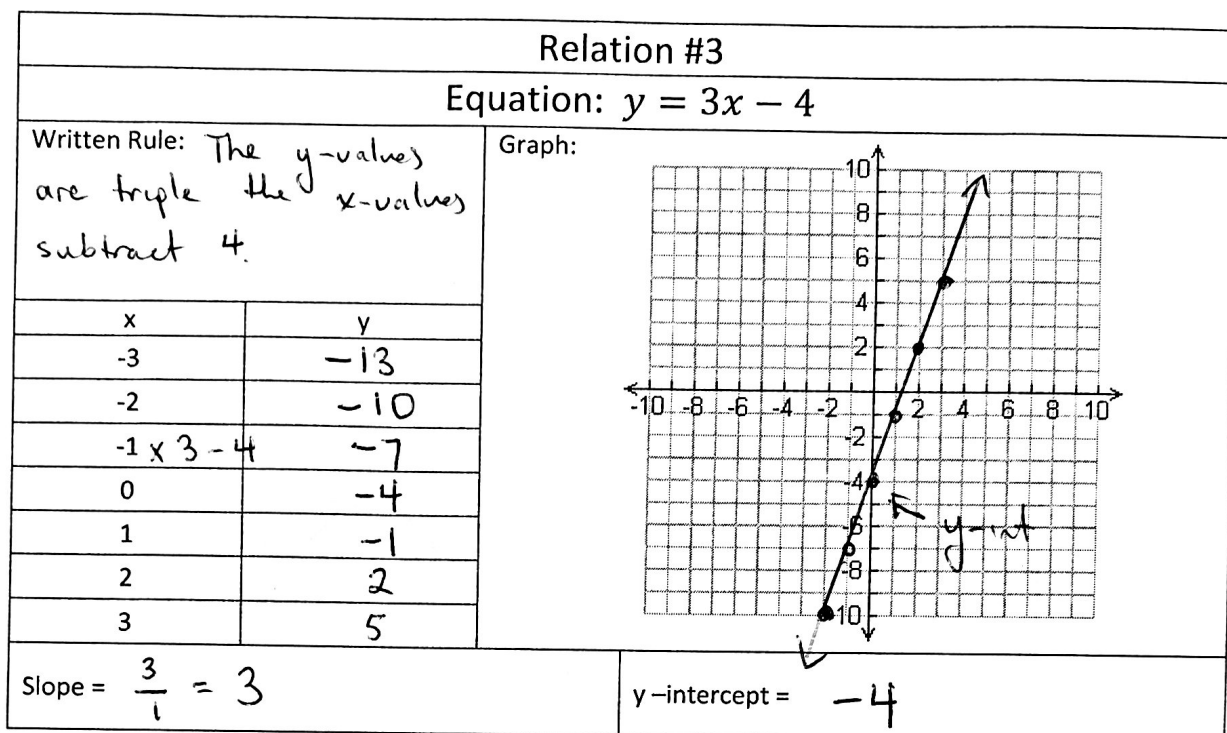
# Investigation: Equations of Lines | MFM2P

For the following 4 relations, describe the written rule, generate points using your table of values, and draw each line. When you've drawn the line, read off the slope of the line, and the y-intercept.

Relation #1																	
Equation: $y = x$																	
<p>Written Rule:</p> <p>The y-values equal the x-values</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>-3</td><td>-3</td></tr> <tr><td>-2</td><td>-2</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> <tr><td>2</td><td>2</td></tr> <tr><td>3</td><td>3</td></tr> </tbody> </table>	x	y	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	<p>Graph:</p> 
x	y																
-3	-3																
-2	-2																
-1	-1																
0	0																
1	1																
2	2																
3	3																
<p>Slope = <math>\frac{1}{1} = 1</math></p>	<p>y-intercept = 0</p>																

Relation #2																	
Equation: $y = \frac{1}{2}x + 2$																	
<p>Written Rule: The y-values are half the x-values, plus 2</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 50%;">x</th> <th style="width: 50%;">y</th> </tr> </thead> <tbody> <tr><td>-6 = 2 + 2</td><td>-1</td></tr> <tr><td>-4</td><td>0</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>0</td><td>2</td></tr> <tr><td>2</td><td>3</td></tr> <tr><td>4</td><td>4</td></tr> <tr><td>6</td><td>5</td></tr> </tbody> </table>	x	y	-6 = 2 + 2	-1	-4	0	-2	1	0	2	2	3	4	4	6	5	<p>Graph:</p> 
x	y																
-6 = 2 + 2	-1																
-4	0																
-2	1																
0	2																
2	3																
4	4																
6	5																
<p>Slope = <math>\frac{1}{2}</math></p>	<p>y-intercept = 2</p>																

# Investigation: Equations of Lines | MFM2P



If you look at the equation carefully, you can actually just read off the slope and y-intercept. This means that we can make graphs of linear relations straight from the equation!

# Graphing Linear Relations | MFM2P

KEY IDEA: The relation  $y = mx + b$  is a linear relation, where...

- $m$  gives you the slope
- $b$  gives you the y-intercept
- $y = mx + b$  always produce a line

Example: Read off the slope and y-intercept from the following equations...

Equation of Line	Slope (m)	y-intercept (b)
$y = 5x - 6$	5	-6
$y = \frac{2}{3}x + 4$	$\frac{2}{3}$	4
$y = -2x + 0$	-2	0
$y = -x + 1$	-1	1
$y = 5$	0	5

$$y = 0x + 5$$

To graph a line in this form is easy. You just plot the y-intercept, and then use the slope to plot more points.

Graph the following 3 lines on the grid provided by reading off the slope and y-intercept :

a)  $y = 2x + 5$

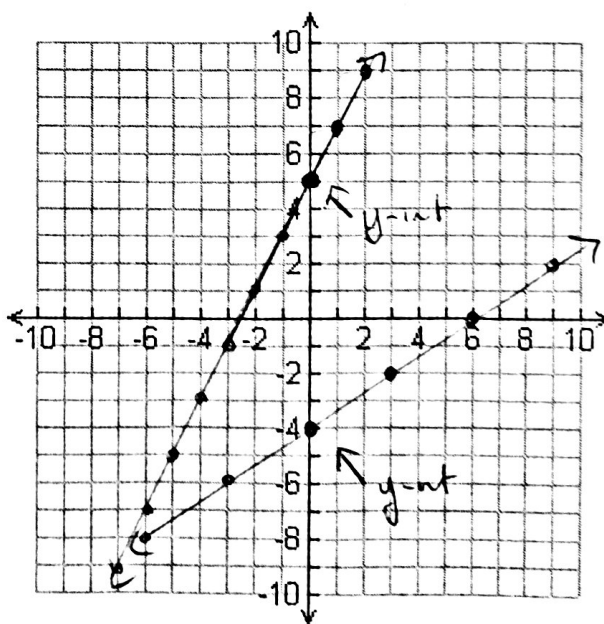
Slope: 2 or  $\frac{2}{1}$

y-intercept: 5

b)  $y = \frac{2}{3}x - 4$

Slope:  $\frac{2}{3}$

y-intercept: -4

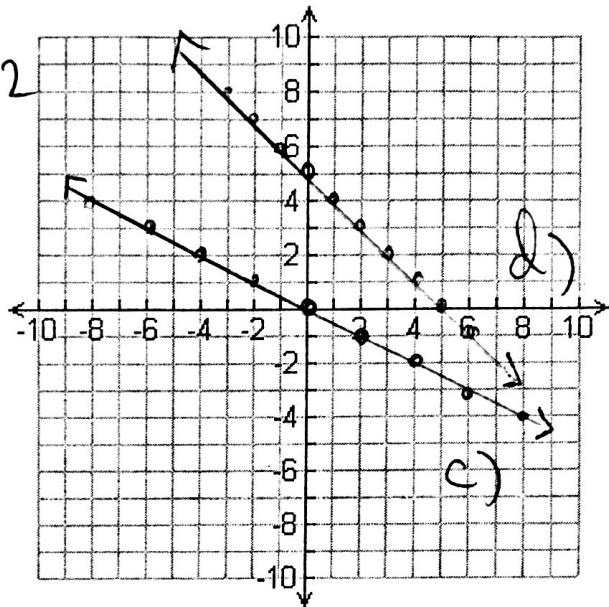


# Graphing Linear Relations | MFM2P

c)  $y = -\frac{1}{2}x$

Slope:  $-\frac{1}{2}$  rise = -1 run = 2

y-intercept: 0



d)  $y = -x + 5$

Slope: -1 rise = -1 run = 1

y-intercept: 5

You try graphing the following:

a) $y = 3x - 4$	b) $y = \frac{1}{3}x + 5$	c) $y = -x - 4$	d) $y = 7$
Slope (m) = $3/1$	Slope (m) = $\frac{1}{3}$	Slope (m) = $-1/1$	Slope (m) = 0 (horizontal)
y-int (b) = -4	y-int (b) = 5	y-int (b) = -4	y-int (b) = 7