Warm Up

A company sells pencils.

Is the following a linear or non-linear relation? Prove

# of Pencil n	Cost ($)
6	10.00
8	11.00
15	14.50
20	17.00
30	22.00

Should you connect the dots if you were to draw this on graph paper?

What does the rate of change represent in this graph?

Warm Up

Solutions

A company sells pencils.

Is the following a linear or non-linear relation? Prove

# of Pencil n	Cost ($)	Δx	Δy
6	10.00	2	1.00
8	11.00	7	3.50
15	14.50	5	2.50
20	17.00	10	5.00
30	22.00		

x y

check

$\frac{\Delta y}{\Delta x}$

$\frac{1.00}{2} = 0.5$

$\frac{3.50}{7} = 0.5$

$\frac{2.50}{5} = 0.5$

$\frac{5}{10} = 0.5$

All rates of change are the same so it is linear

0.50 / pencil

Can you connect the dots if you were to draw this on graph paper?

Cannot connect the dots in this graph because you cannot sell ~~jsut~~ just part of the pencil.

Discrete

What does the rate of change represent in this graph?

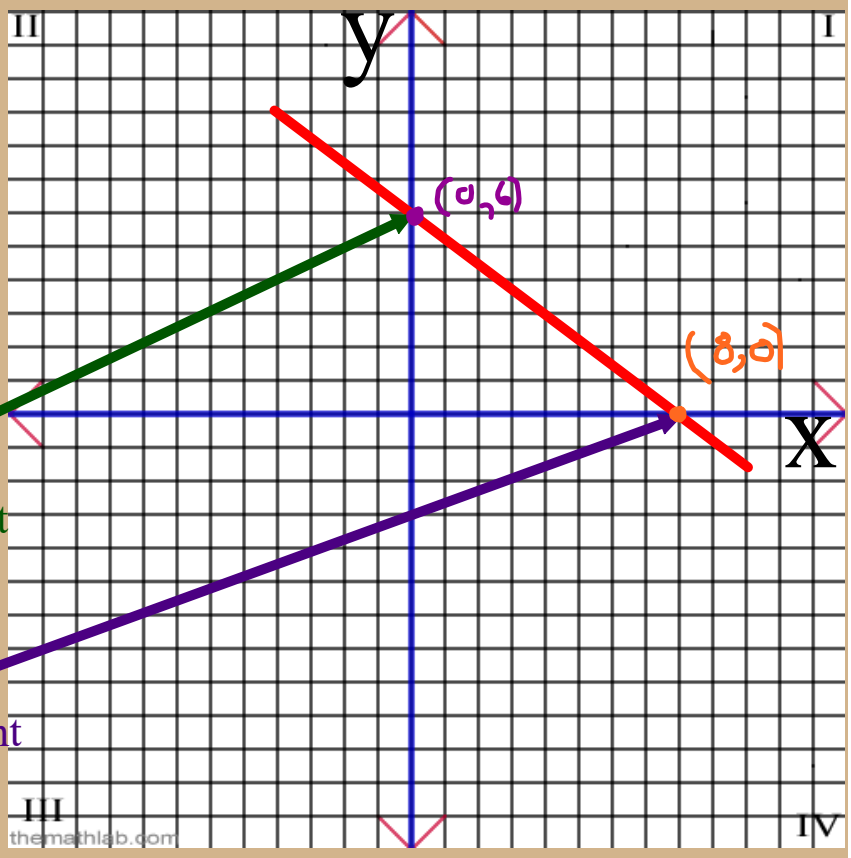
You pay $0.50 for each pencil.

Section 5.7

Linear Relationships & Graph

1

Intercepts



x=0

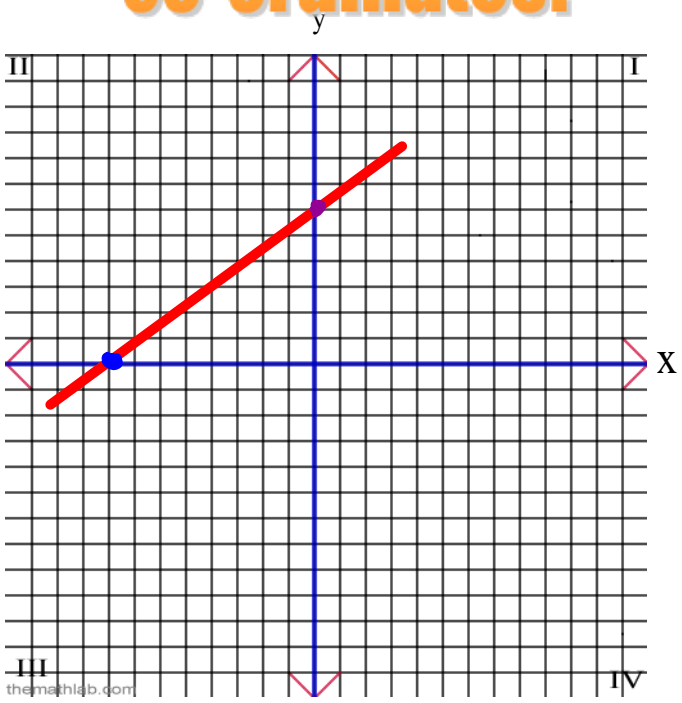
The "y-intercept is the point on the line that crosses the "y" axis.

y=0

The "x-intercept is the point on the line that crosses the "x" axis.

2

How do you write the co-ordinates? (x,y)



x-intercept = -8

(-8, 0)

Y = 0 for the x-intercept.

y-intercept = 6

(0, 6)

X = 0 for the y-intercept.

2) Sketch the function f(x) = 4x - 8

Hint: Find x an y intercepts an plot

x-int → let y = 0 f(x)

$f(x) = 4x - 8$

$0 = 4x - 8$

solve for x

$0 + 8 = 4x - 8 + 8$

$\frac{8}{4} = \frac{4x}{4}$

$2 = x$

(2, 0)

x y

y-int → let x = 0

$f(x) = 4x - 8$

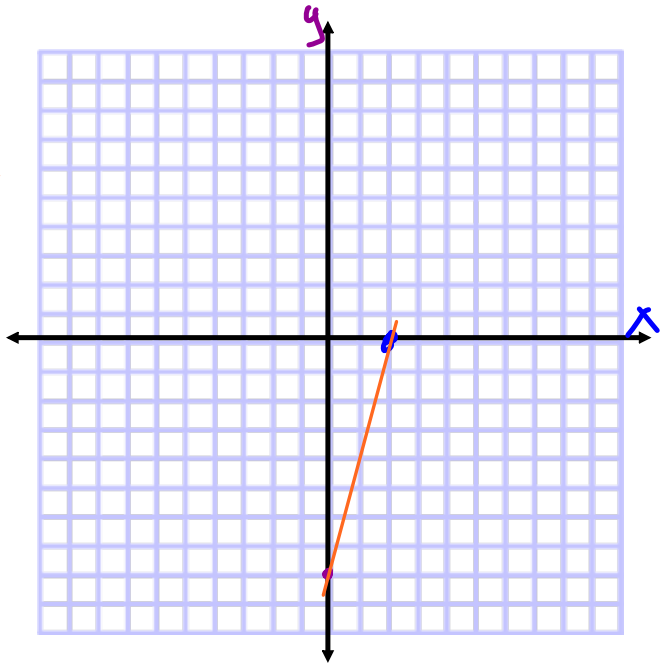
$= 4(0) - 8$

$= 0 - 8$

$f(x) = -8$

y-int = -8

(0, -8)



+ slope

— slope

Example 3 Matching a Graph to a Given Rate of Change and Vertical Intercept

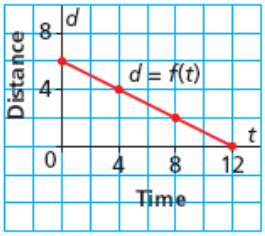
uphill

y-axis

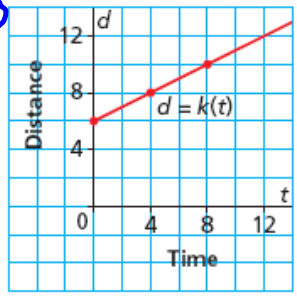
y=6

Which graph has a rate of change of $\frac{1}{2}$ and a vertical intercept of 6? Justify the answer.

a)



b)



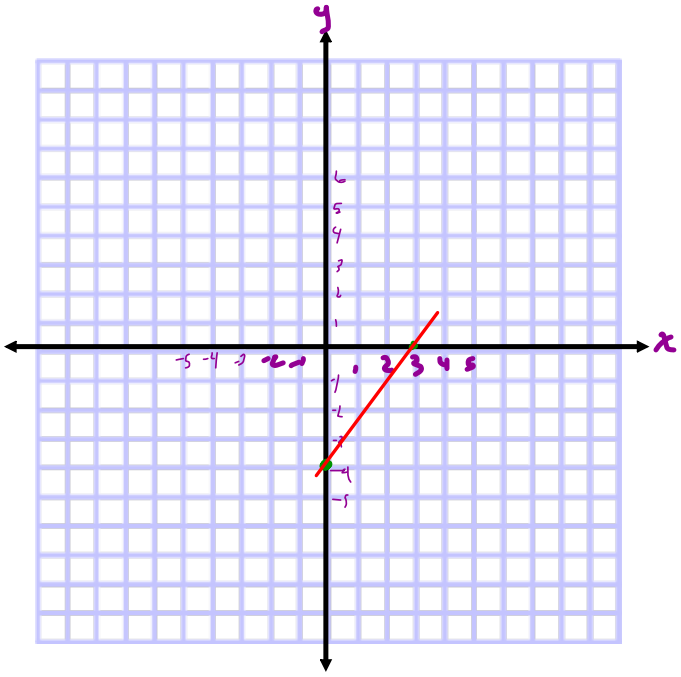
SOLUTION

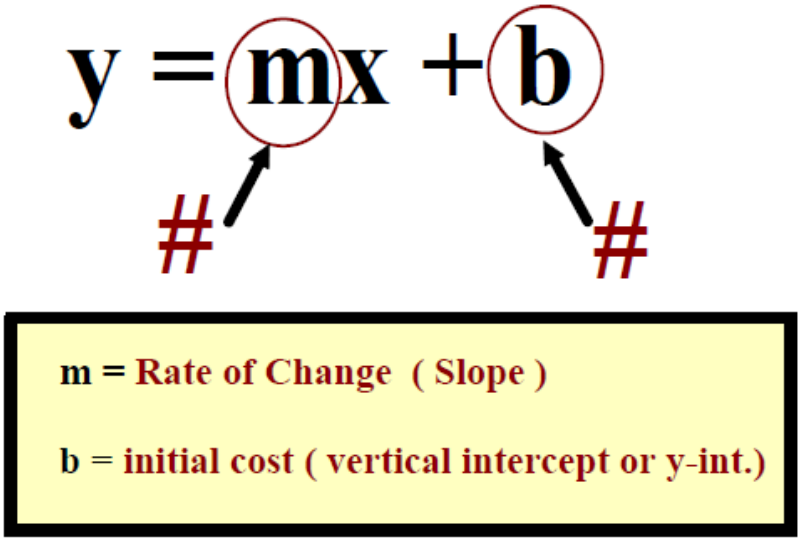
CHECK YOUR UNDERSTANDING

Graph the following:

y intercept = -4

x Intercept= 3




y = mx + b
#
#
m = Rate of Change (Slope)
b = initial cost (vertical intercept or y-int.)

Find the Slope and Y-intercept

$y = mx + b$

1) $y = 5x + 10$

m= 5 y-int = 10

$y = mx + b$

2) $P = -2t - 3$

m= -2 b= -3

$y = mx + b$

3) $R = -\frac{5}{2}g + 7$

m= $-\frac{5}{2}$ b= 7

4) $y = 8 + \frac{1}{2}x$

$y = \frac{1}{2}x + 8$ (m, b)

m= $\frac{1}{2}$ b= 8

Worksheet #1

Find the x and y intercepts of the line

1. $8y = 2x - 4$

2. $2y = x + 5$

3. $y = 5x + 4$

4. $2y = 1x + 15$

5. $2y = 4x - 2$

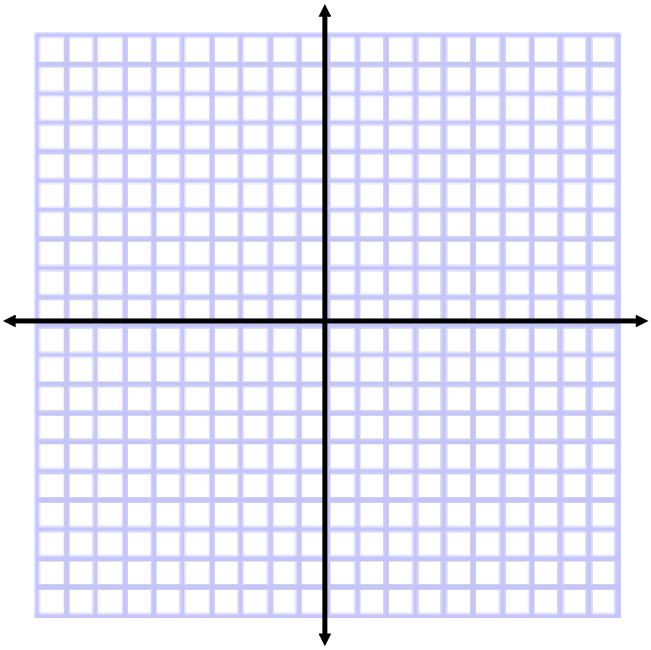
Worksheet #2

Graph the following by finding x an y intercept:

$y = 2x + 10$

What is the rate of change?

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



Worksheet #3

Find the rate of change (m) and the y intercept (b) in the equation $y = mx + b$

1) $y = x - 3$

2) $y = -\frac{1}{2}x + 3$

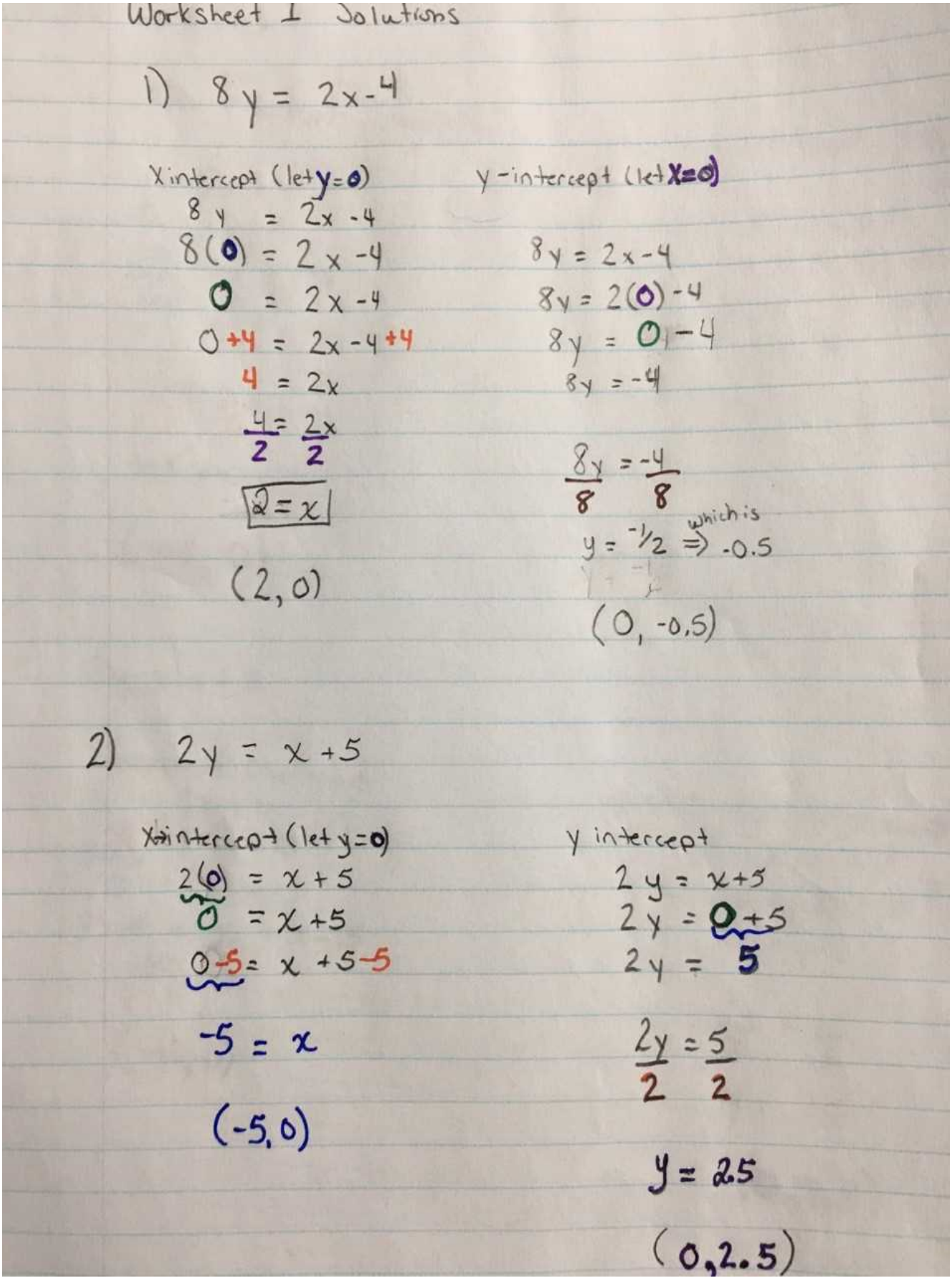
3) $y = -\frac{6}{5}x + 1$

4) $y = -2x - 5$

5) $y = -\frac{1}{5}x + 1$

6) $y = 2x - 2$

Worksheet #1 Solutions



Worksheet 1 Solutions

1) $8y = 2x - 4$

x intercept (let $y = 0$)

$8y = 2x - 4$

$8(0) = 2x - 4$

$0 = 2x - 4$

$0 + 4 = 2x - 4 + 4$

$4 = 2x$

$\frac{4}{2} = \frac{2x}{2}$

$2 = x$

$(2, 0)$

y-intercept (let $x = 0$)

$8y = 2x - 4$

$8y = 2(0) - 4$

$8y = 0 - 4$

$8y = -4$

$\frac{8y}{8} = \frac{-4}{8}$

$y = -1/2$ which is $\Rightarrow -0.5$

$(0, -0.5)$

2) $2y = x + 5$

x intercept (let $y = 0$)

$2(0) = x + 5$

$0 = x + 5$

$0 - 5 = x + 5 - 5$

$-5 = x$

$(-5, 0)$

y intercept

$2y = x + 5$

$2y = 0 + 5$

$2y = 5$

$\frac{2y}{2} = \frac{5}{2}$

$y = 2.5$

$(0, 2.5)$

3) $y = 5x + 4$

x-intercept (let $y = 0$)

$y = 5x + 4$
$0 = 5x + 4$
$0 - 4 = 5x + 4 - 4$
$-4 = 5x$

$\frac{-4}{5} = \frac{5x}{5}$

$-0.8 = x$

$(-0.8, 0)$

y-intercept let $x = 0$

$y = 5x + 4$
$y = 5(0) + 4$
$y = 0 + 4$
$y = 4$

$(0, 4)$

4) $2y = 1x + 15$

x-intercept (let $y = 0$)

$2y = 1x + 15$
$2(0) = 1x + 15$
$0 = x + 15$
$0 - 15 = x + 15 - 15$
$-15 = x$

$(-15, 0)$

y-intercept (let $x = 0$)

$2y = 1x + 15$
$2y = 0 + 15$
$2y = 15$

$\frac{2y}{2} = \frac{15}{2}$

$y = 7.5$

$(0, 7.5)$

Worksheet #1 Solutions

5) $2y = 4x - 2$

x-intercept (let $y = 0$)

$2(0) = 4x - 2$

$0 = 4x - 2$

$0 + 2 = 4x - 2 + 2$

$2 = 4x$

$\frac{2}{4} = \frac{4x}{4}$

$0.5 = x$

$(0.5, 0)$

y-intercept (let $x = 0$)

$2y = 4x - 2$

$2y = 4(0) - 2$

$2y = 0 - 2$

$2y = -2$

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

$y = -1$

$(0, -1)$

Worksheet #2

Solutions

Graph the following by finding x an y intercept:

$y = 2x + 10$

x-intercept

Let $y = 0$

$0 = 2x + 10$

$0-10 = 2x + 10-10$

$-10 = 2x$

$\frac{-10}{2} = \frac{2x}{2}$

$-5 = x$

(-5, 0)

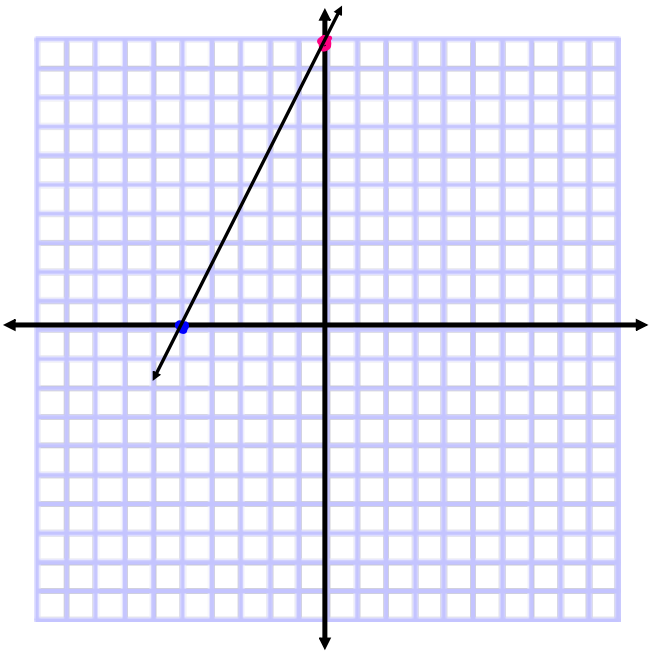
y-intercept

Let $x = 0$

$y = 2(0) + 10$

$y = 10$

(0, 10)



What is the rate of change?

$\frac{\text{Rise}}{\text{Run}}$ $\frac{+10}{+5} = 2$

Worksheet #3 Solutions

Find the rate of change and the y intercept in the equation

1) $y = x - 3$

understood 1 in front of x

m=1

b=-3 ⇒ (0,-3)

2) $y = -\frac{1}{2}x + 3$

$m = -\frac{1}{2}$ $b = 3$ (0,3)

3) $y = -\frac{6}{5}x + 1$

$m = -\frac{6}{5}$ $b = 1$ (0,1)

4) $y = -2x - 5$

m=-2

b=-5 (0,-5)

5) $y = -\frac{1}{5}x + 1$

$m = -\frac{1}{5}$

$b = 1$ (0,1)

6) $y = 2x - 2$

$m = 2$

$b = -2$ (0,-2)