# 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 ($) | |
|---|---|---|
| 6 | 10.00 | |
| 8 | 11.00 | 1.00 |
| 15 | 14.50 | 3.50 |
| 20 | 17.00 | 2.50 |
| 30 | 22.00 | 5.00 |

2, 7, 5, 10

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

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

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

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

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

All rates of change are the same so it is linear

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 part of the pencil.

What does the rate of change represent in this graph?

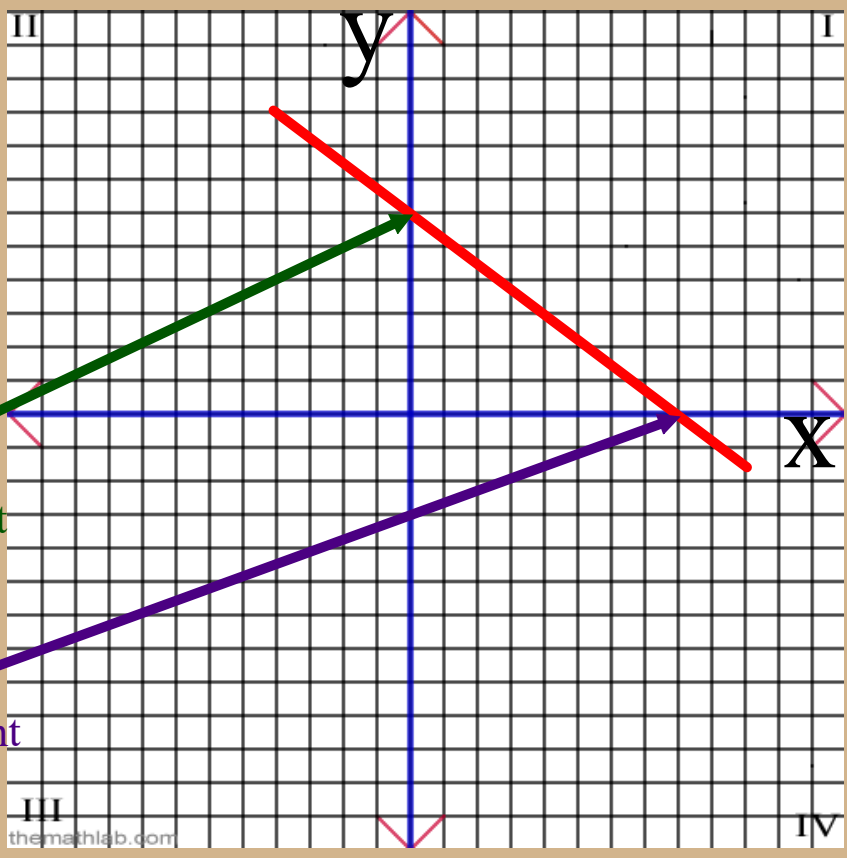
You pay $0.50 for each pencil.

Section 5.7

# Linear Relationships & Graph

1

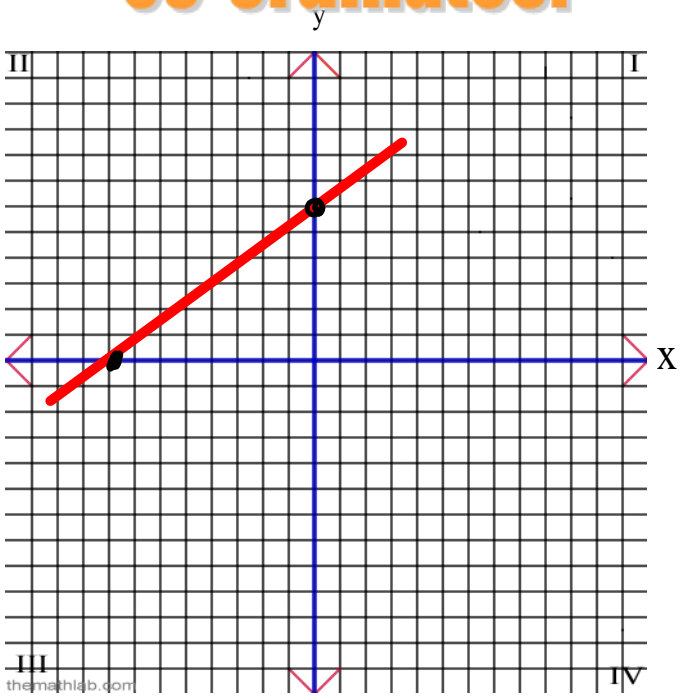
# Intercepts




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

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

# How do you write the co-ordinates?




x-intercept = _____

( , )

Y = 0 for the x-intercept.

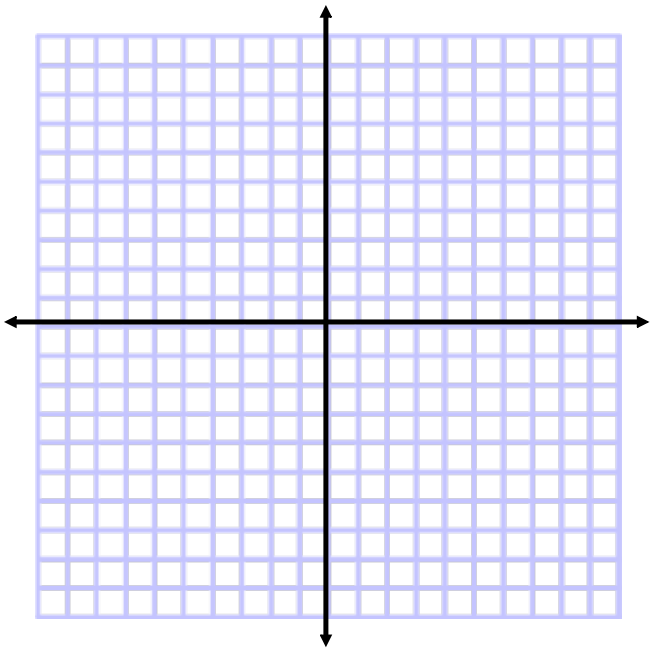
y-intercept = _____

( , )

X = 0 for the y-intercept.

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

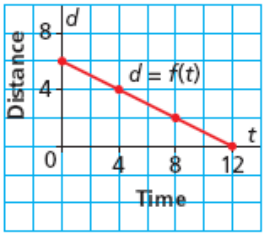
Hint: Find x an y intercepts an plot



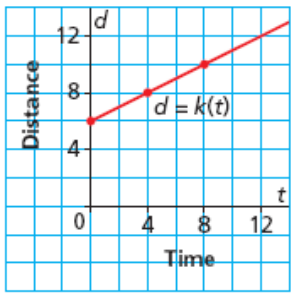
## Example 3 Matching a Graph to a Given Rate of Change and Vertical Intercept

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

a)




b)



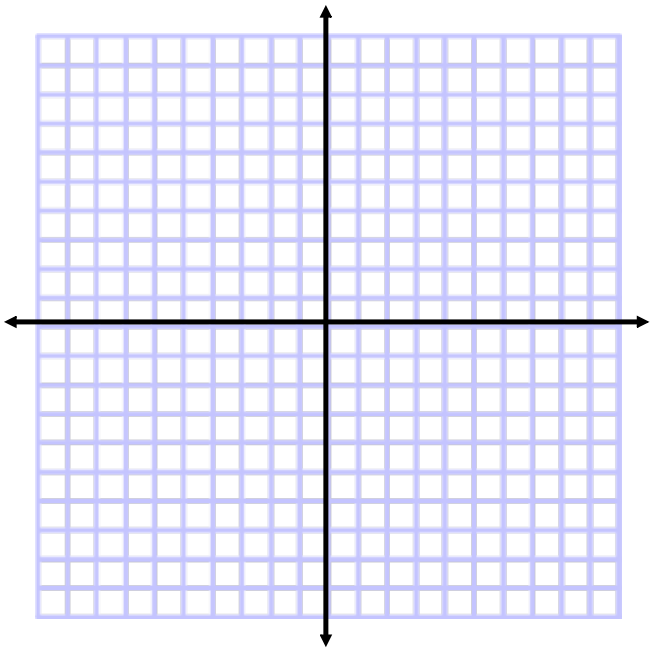

SOLUTION

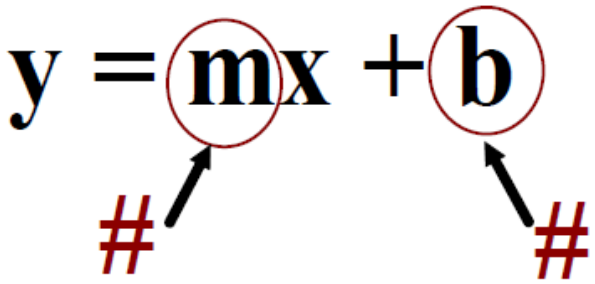
CHECK YOUR UNDERSTANDING

Graph the following:

y intercept = -4

x Intercept= 3






m = Rate of Change ( Slope )

b = initial cost ( vertical intercept or y-int.)

# Find the Slope and Y-intercept

1) $y = 5x + 10$

2) $P = -2t - 3$

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

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

Worksheet #1

Find the x and y intercepts of the line

**1.** $8y = 2x - 4$

**2.** $2y = x + 5$

**3.** $y = 5x + 4$

**4.** $2y = 1x + 15$

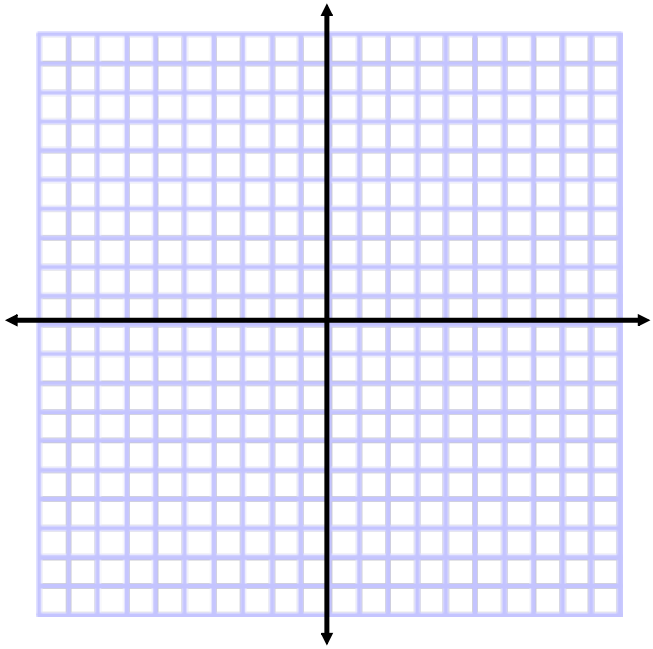
**5.** $2y = 4x - 2$

Worksheet #2

Graph the following by finding x an y intercept:

$y = 2x + 10$

What is the rate of change?



Worksheet #3

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

1) $y = x - 3$

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

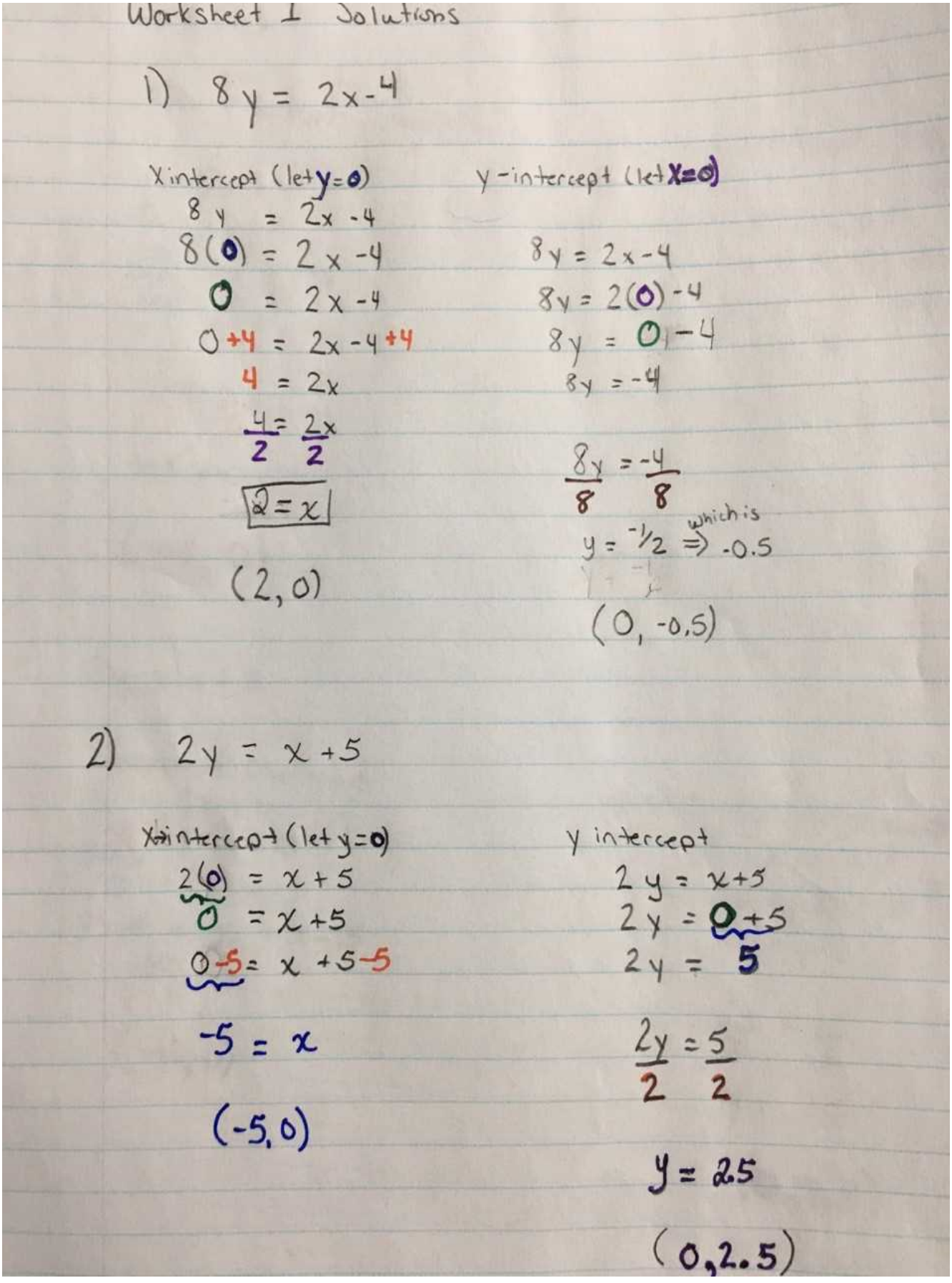
3) $y = -\frac{6}{5}x + 1$

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 $y = 0$

$0 = 2x + 10$

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

$-10 = 2x$

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

$-5 = x$

$(-5, 0)$

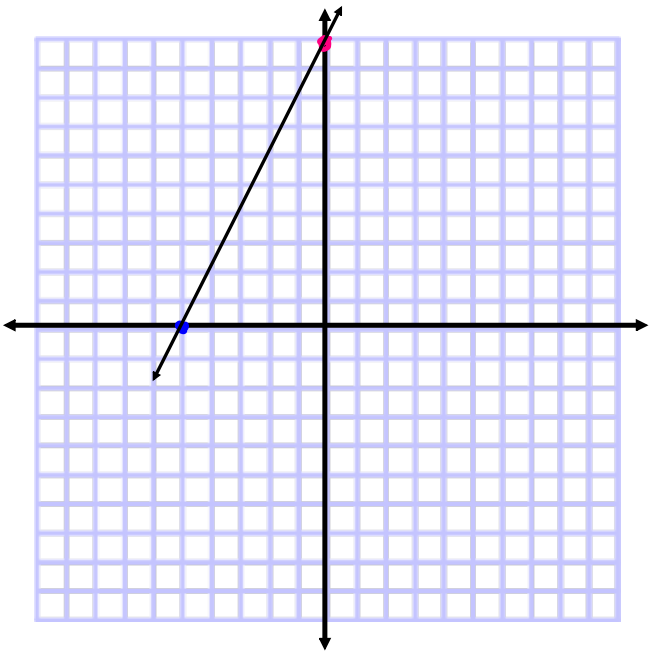
**y-intercept**

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)