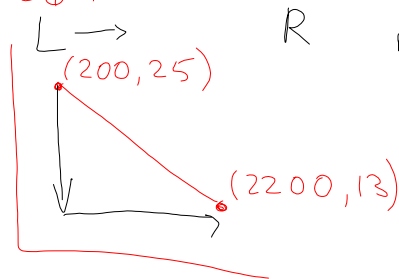


	x	y		$\frac{\Delta y}{\Delta x}$
40	0	50	-10	$\frac{-10}{40} = -\frac{1}{4}$
80	40	40	-20	$\frac{-20}{80} = -\frac{1}{4}$
60	120	20	-15	$\frac{-15}{60} = -\frac{1}{4}$
	180	5		

#5 p.267



$$m = \frac{\text{rise}}{\text{run}} = \frac{-12}{2000}$$

12c) p.269

$$200 \text{ L/min} \longrightarrow 140 \text{ m}^2$$

b) rate of change =  $\frac{\Delta \text{dep}}{\Delta \text{ind}}$  ← Volume / Area

$$= \frac{78 - 39}{50 - 25}$$

$$= \frac{39}{25} \text{ L/m}^2$$

$$= 1.56 \text{ L/m}^2$$

c)

Floor

$$140 \text{ m}^2 \times 1.56 \text{ L/m}^2$$

$$= 218.4 \text{ L}$$



Volume of water to put out fire

Truck

$$\frac{218.4 \text{ L}}{200 \text{ L/min}}$$

$$= 1.1 \text{ min}$$

### 4.3 Equations in the Form $y = mx + b$

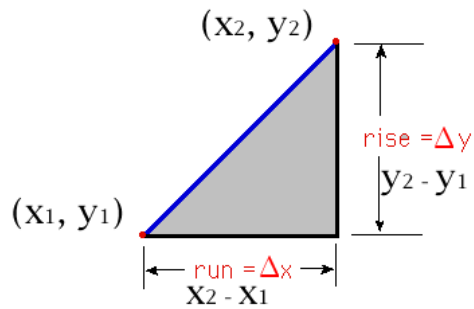
Recall:

😊 slope = rate of change

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

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

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



$\Delta$  is a symbol which means "Change In".

😊  $b$  = initial value  
= y-intercept (where the graph crosses the y axis)

Let's investigate. Sketch each equation in your notes and make observations.

1. Changing  $m$ :

a)  $y = x$

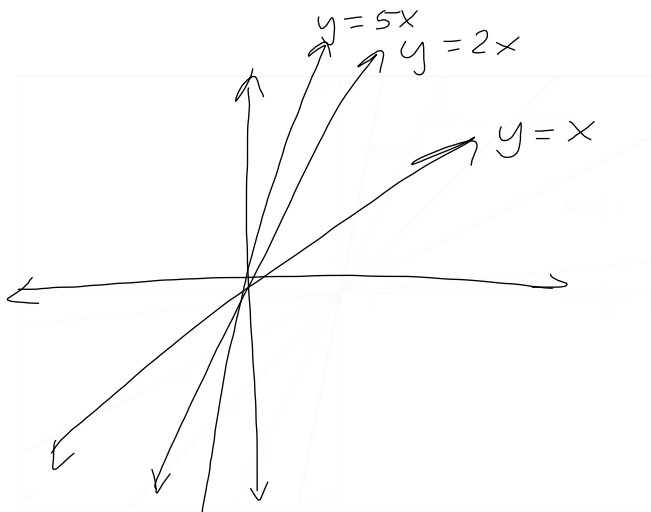
b)  $y = 2x$

c)  $y = 5x$

d)  $y = \frac{1}{2}x$

e)  $y = \frac{1}{10}x$

$y = mx$   
↑



How does the value of  $m$  affect the graph?

As ' $m$ ' gets bigger, the graph gets steeper.

The smaller the number (closer to zero) the graph gets less steep.

f)  $y = -x$

g)  $y = -2x$

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

\* When ' $m$ ' is negative (Slope is negative) graph is decreasing (downward)

1 The graph of  $y = 3.5x$  is Steeper than  $y = 2x$ .

A steeper

B less steep

C same steepness

2 The graph of  $y = -2x$  is <sup>Same</sup> Steeper than  $y = 2x$ .

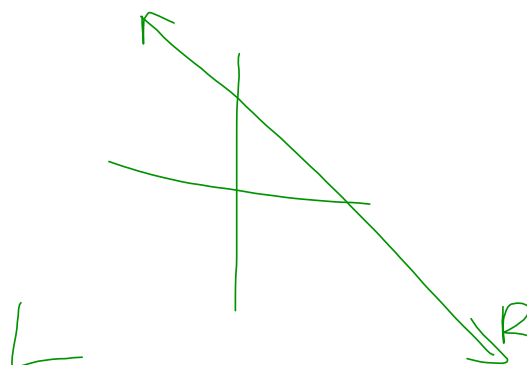
- A steeper
- B less steep
- C same steepness

3 The graph of  $y = -3x + 4$  goes

A down to the left

B up to the left

C up to the right

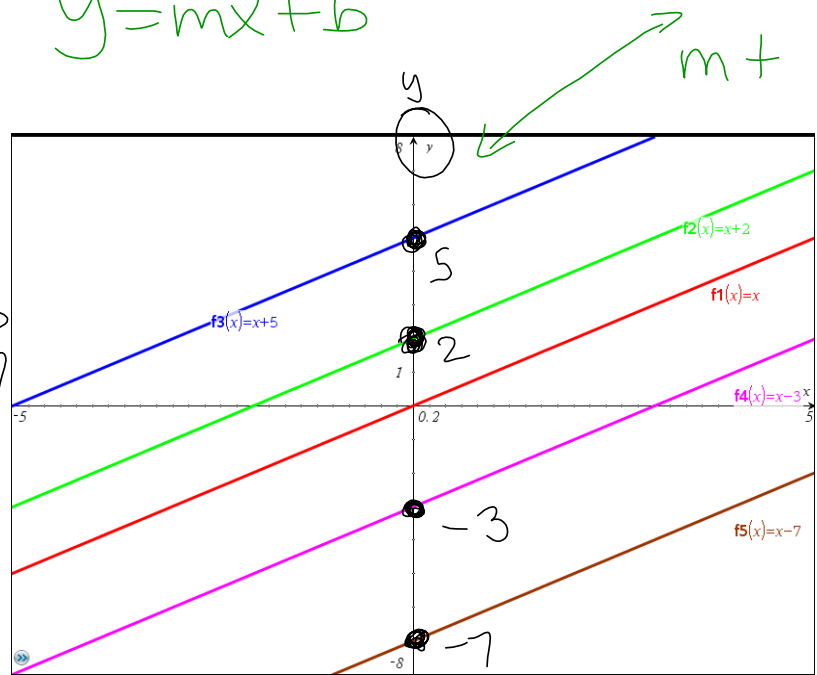


$$m=1$$

$$y=mx+b$$

## 2. Changing $b$ :

- a)  $y=x$
- b)  $y=x+2$  up 2
- c)  $y=x+5$  up 5
- d)  $y=x-3$  down 3
- e)  $y=x-7$  down 7



### How does the value of $b$ affect the graph?

The value of ' $b$ ' moves the graph up / down

\* The value of ' $b$ ' tells us where the graph crosses the y-axis (y-intercept)

$$y=mx+b$$

↓ Slope  
rise  
run

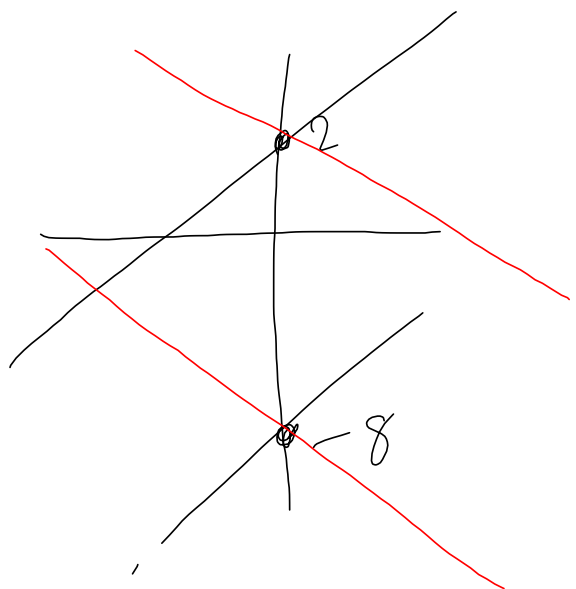
↓ y-intercept

4 The graph of  $y = -3x - 8$  is lower than  $y = -3x + 2$

A higher

B lower

C same y-intercept

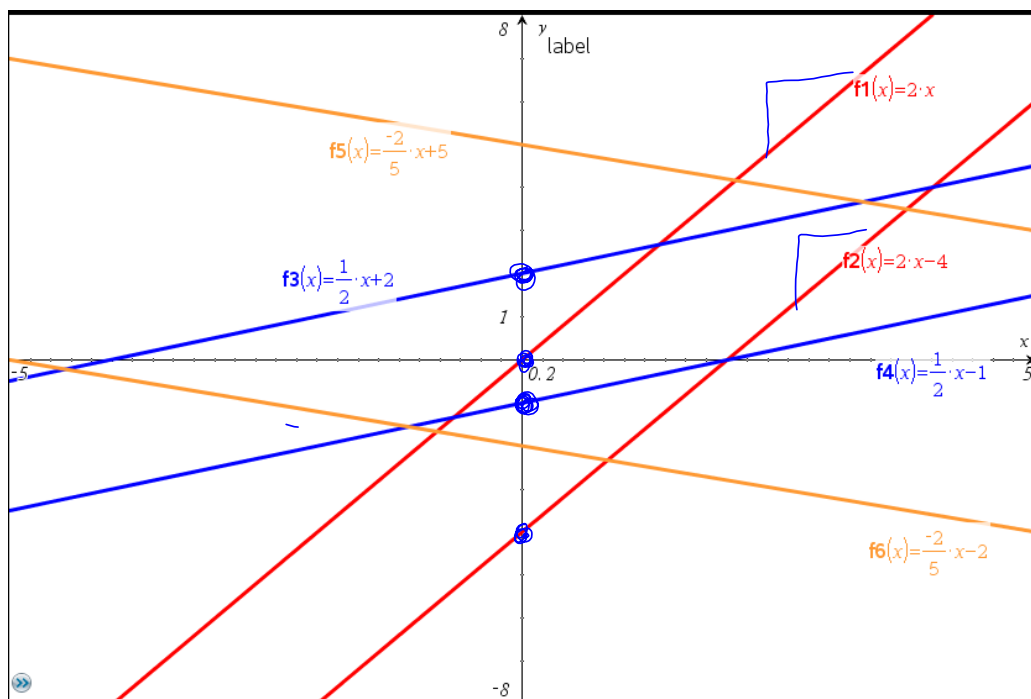


3. Try these pairs of lines:

a)  $y = 2x$        $y = 2x - 4$        $\rightarrow m = 2$       PARALLEL

b)  $y = \frac{1}{2}x + 2$        $y = \frac{1}{2}x - 1$        $\rightarrow m = \frac{1}{2}$       PARALLEL

c)  $y = -\frac{2}{5}x + 5$        $y = -\frac{2}{5}x - 2$        $m = -\frac{2}{5}$       PARALLEL

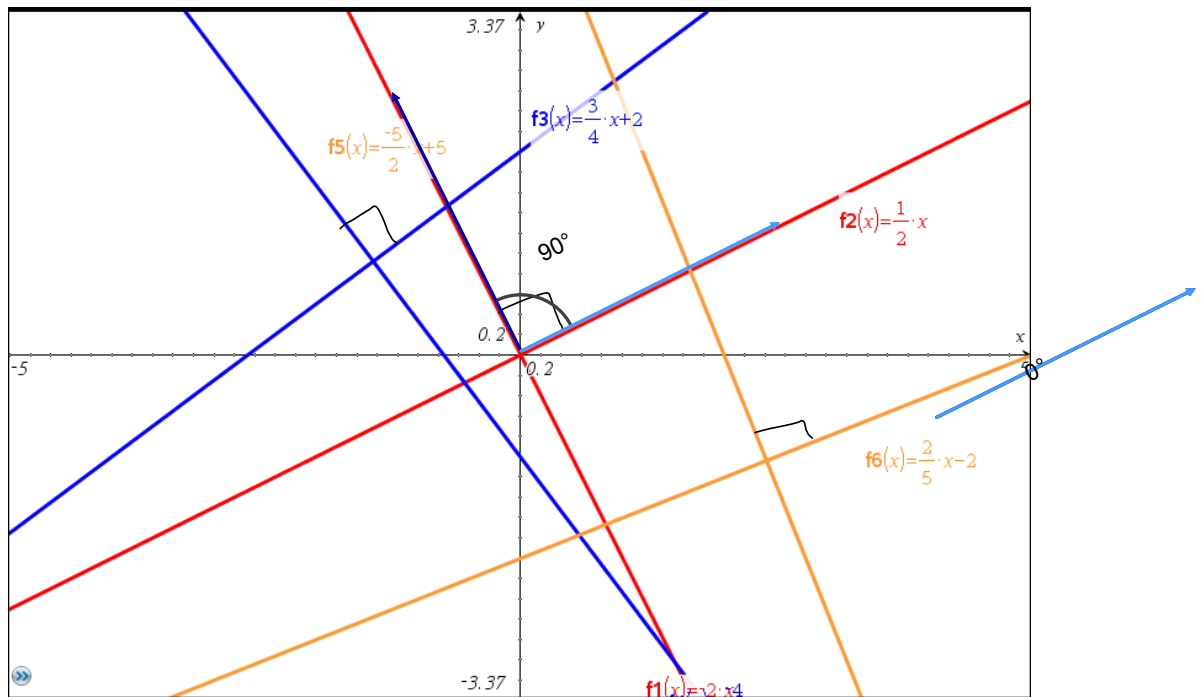


**What is the same in each pair of equations?**



4. Try these pairs of lines with a square window:

- a)  $y = -2x$        $y = \frac{1}{2}x$        $m = -2$        $m = \frac{1}{2}$
- b)  $y = \frac{3}{4}x + 2$        $y = -\frac{4}{3}x - 1$        $m = \frac{3}{4}$        $m = -\frac{4}{3}$
- c)  $y = -\frac{5}{2}x + 5$        $y = \frac{2}{5}x - 2$        $m = -\frac{5}{2}$        $m = \frac{2}{5}$



What can you say about each pair of lines?

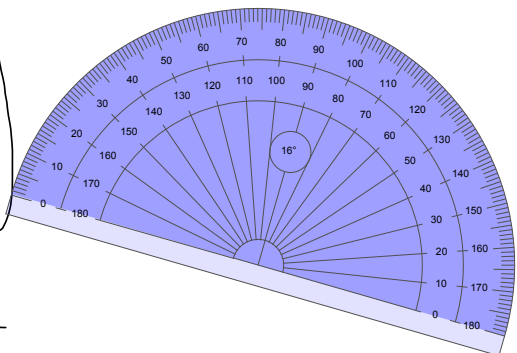
PERPENDICULAR LINES

What do you notice about the slope in each pair of equations?

Slopes that are

NEGATIVE  
RECIPROCAL

$$m = \frac{2}{5} \quad m = -\frac{5}{2}$$



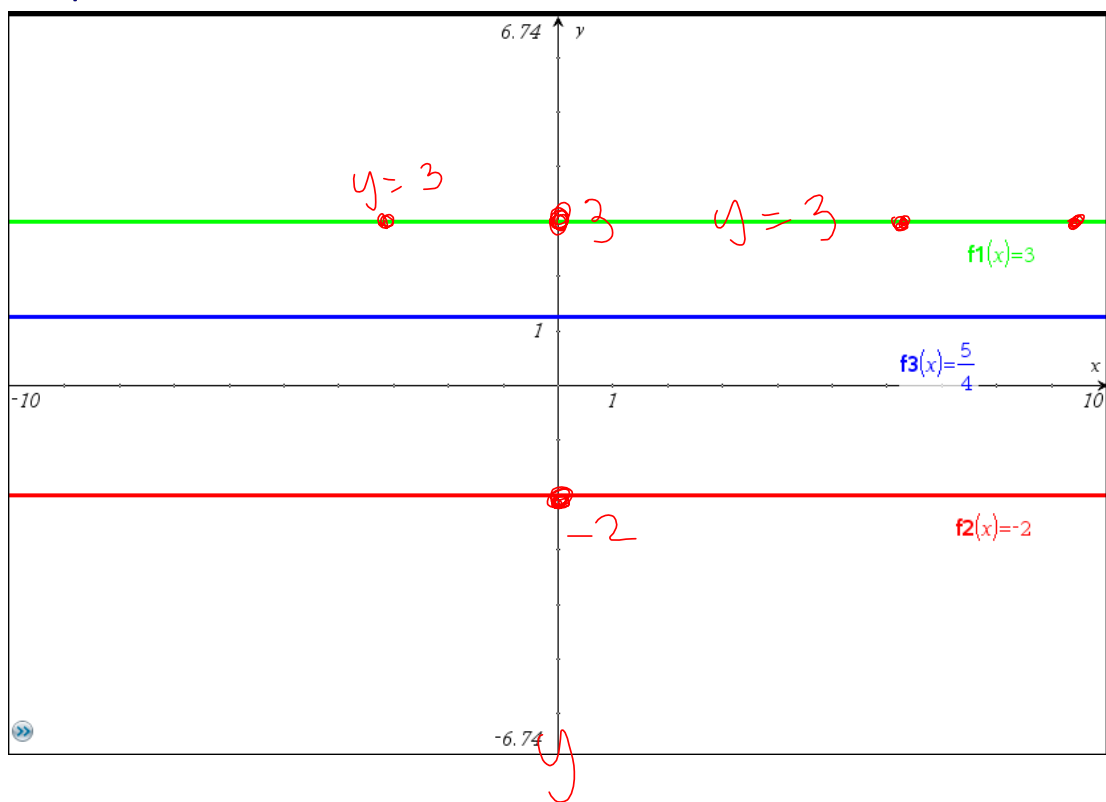
5. More...

a)  $y = 3$

b)  $y = -2$

c)  $y = \frac{5}{4}$

} HORIZONTAL LINE



What do you notice about these lines?

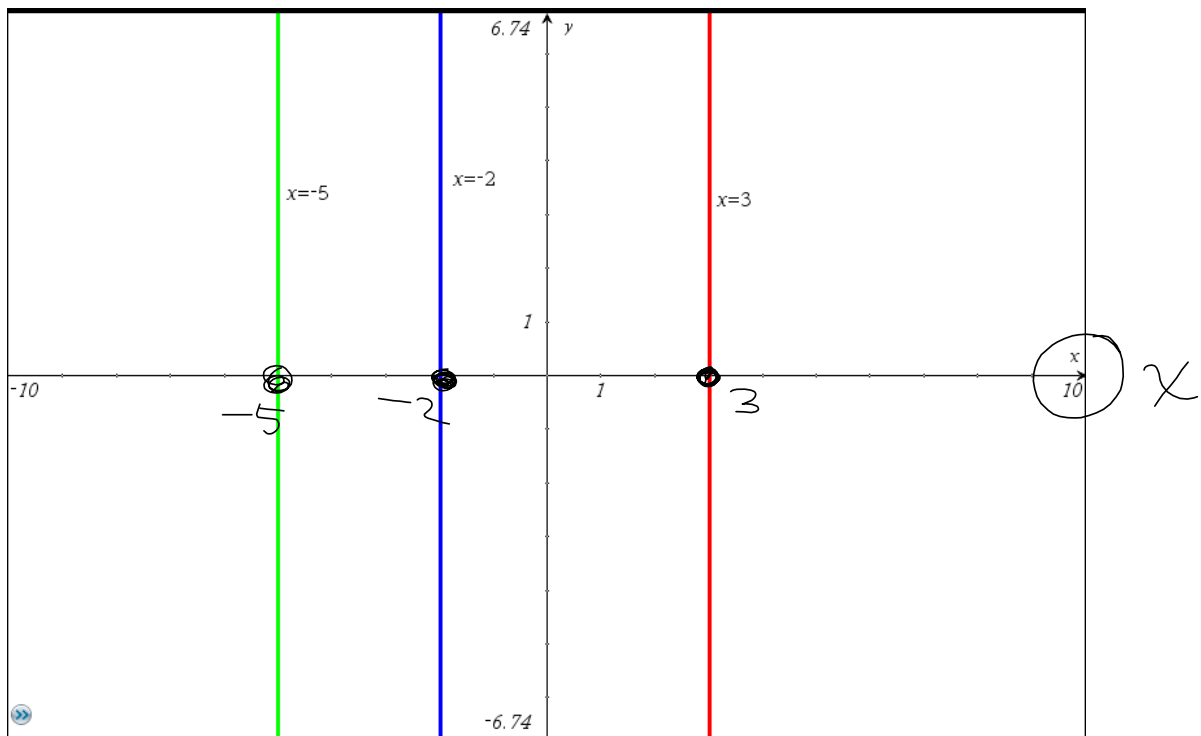
What is the slope of each line?

5. Graph (by hand)

- a)  $x = 3$
- b)  $x = -2$
- c)  $x = -5$



# VERTICAL LINES

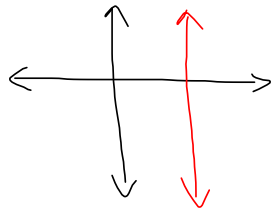
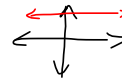


**What do you notice about these lines?**

**What is the slope of each line?**

## SUMMARY

- ★ The equation of a line can be written in slope-intercept form:  
 $y = mx + b$  where  $m$  is the slope &  $b$  is the y-intercept
- ★ Parallel lines have equal slopes.
- ★ Perpendicular lines have slopes that are negative reciprocals.
- ★ A horizontal line is written in the form  $y = b$ . The slope of a horizontal line is 0.
- ★ A vertical line is written in the form  $x = a$ . The slope of a vertical line is undefined.



$m = \text{undefined}$

**Homework:**  
**Page 303 #C1, C3, 1 to 4**  
**Page 327 #C1, C2, 3**

Homework:  
Page 303 #C1,C3,1 to 4  
Page 327 #C1, C2, 3



QUIZ -  
Tomorrow!

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

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{Slope} = \frac{\Delta y}{\Delta x}$$

Rate of Change = Slope, with Units