

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Geometry Notes CG - 2: Equations of Lines

Ex: Graph the following

a.  $x = 3$

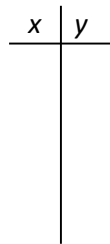
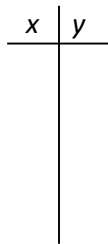
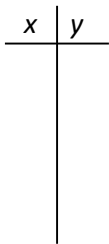
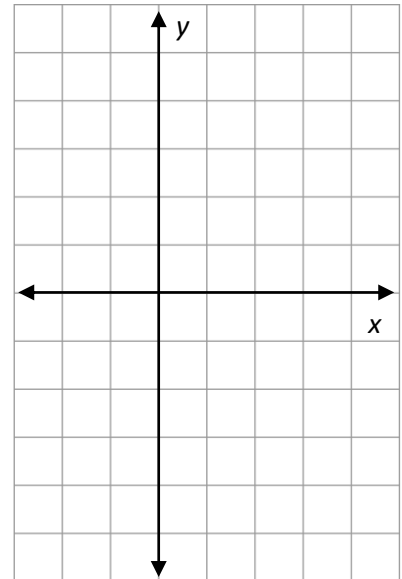
b.  $y = -2$

c.  $y = -2x + 3$

$x$  is *always* 3;  
 $y$  can be anything.

$y$  is *always* -2;  
 $x$  can be anything.

$x$  can be anything;  
 $y$  "depends on"  $x$ .



### Summary

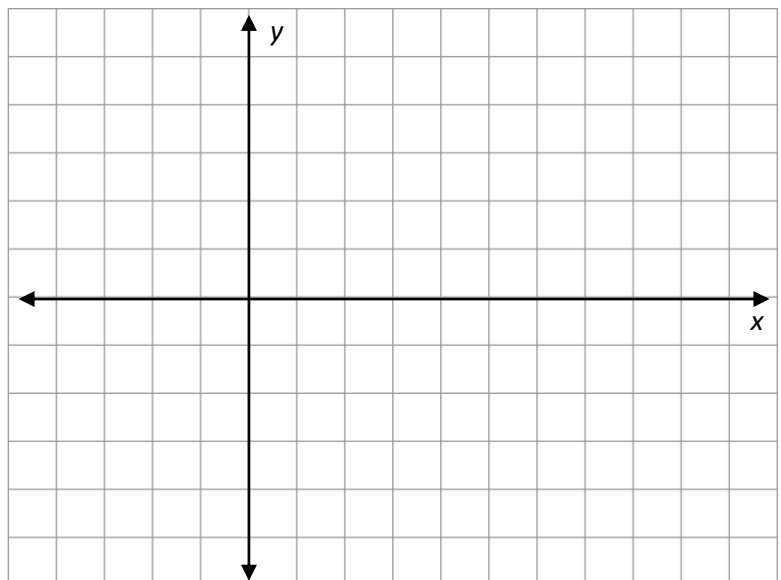
$x = a$  (where  $a$  is a number): Vertical line through  $a$  on the  $x$ -axis. Undefined slope.

$y = b$  (where  $b$  is a number): Horizontal line through  $b$  on the  $y$ -axis. Slope = 0.

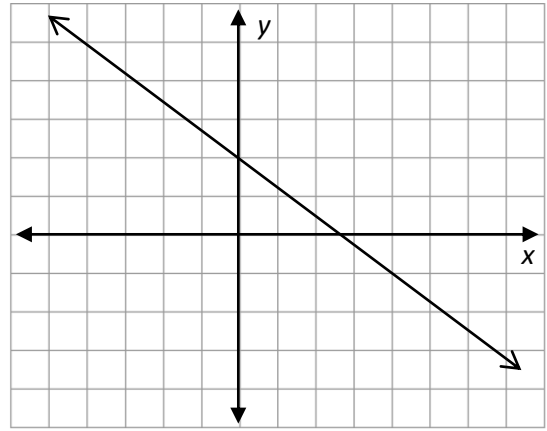
$y = mx + b$  ( $m, b$  both numbers): Diagonal line (unless  $m = 0$ ). Slope of  $m$ .

Passes through  $b$  on the  $y$ -axis ( $y$ -intercept is  $b$ ).

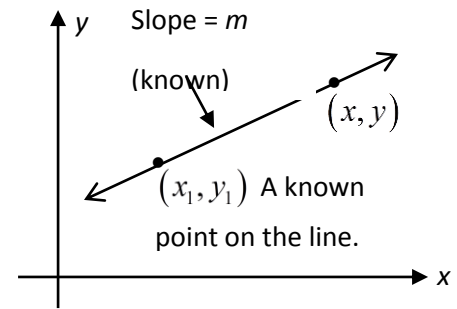
Ex: Graph the inequality  $2x - 5y < 15$



Ex: Write an equation for the line in the graph:



**Point - Slope Equation of a Line:**



Ex: Write an equation for the line having slope  $\frac{2}{5}$  and passing through the point  $(-4, 7)$ .

Ex: Write an equation of the line that passes through the points  $(-3, 12)$  and  $(9, -8)$ .

Ex: Write an equation of the line parallel to the line  $3x + 2y = 5$  and passing through the point  $(-8, 3)$

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**Geometry HW: CG - 2**

1. Find the slope and  $y$ -intercept for each of the following lines. Then graph each line on graph paper. (The lines may all be graphed on one set of axes but *label* each line.)

a.  $y = 5$

b.  $y = -2x$

c.  $y = 8 - x$

d.  $3x - 6y = 12$

2. On a *new* set of axes, graph and label the following:

a.  $y \geq x + 1$

b.  $2x + 3y < 12$

c.  $x \geq 6$

3. Write the equation of the line having the given slope and  $y$ -intercept:

a. slope =  $-2$ ,  $y$ -intercept is  $6$       b. slope =  $\frac{1}{2}$ ;  $y$ -intercept at the origin      c. slope =  $0$ ,  $y$ -intercept is  $4$

4. Find the equation of the line having slope  $3$  and passing through the point  $(4, -3)$ .

5. Find the equation of the line that passes through the points  $(3, 2)$  and  $(6, -4)$ .

6. Find the equation of the line passing through the points  $(3, -2)$  and  $(3, 4)$ .

7. a. Graph the line  $y = 3x - 7$ .

b. For the line in part (a), how much does  $y$  change when  $x$  increases by  $1$  unit? Does  $y$  increase or decrease?

c. Graph the line  $y = -\frac{1}{2}x + 3$ . (This may go on the same axes as part a.)

d. For the line in part (c), how much does  $y$  change when  $x$  increases by  $1$  unit?

e. For the line  $y = -\frac{3}{8}x + 6$ , how much does  $y$  change when  $x$  increases by one unit? Does  $y$  increase or decrease? (Note: you should be able to answer this without needing to graph the line.)

8. The speed of sound at sea-level depends on temperature according to the equation  $S = 0.60T + 331.45$  where  $S$  is the speed in meters per second and  $T$  is the temperature in degrees Celsius.
- What is the slope of the line?
  - What is the speed of sound at  $0^{\circ}\text{C}$ ?
  - Every time the temperature goes up by  $1^{\circ}\text{C}$ , by how much will the speed of sound change? Will it increase or decrease?