1. On a Cartesian coordinate system, plot and label the following points.
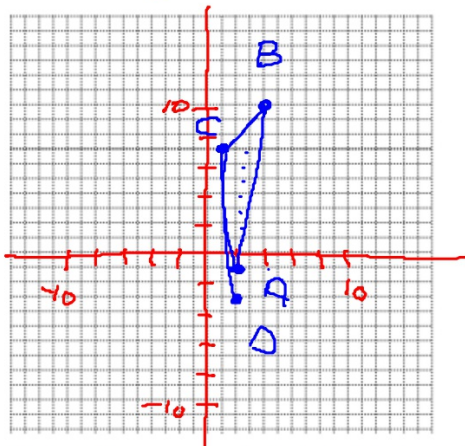
A = (2,-1)   B = (4, 10)   C = (1, 7)   D = (2,-3)

a) Draw the following lines: AB   AC   BC   CD

b) Calculate the slope for each line using a rate triangle:

Slope (AB) = $\dfrac{11}{2}$ Slope (AC) = $\dfrac{8}{-1}$ or $\dfrac{-8}{1}$

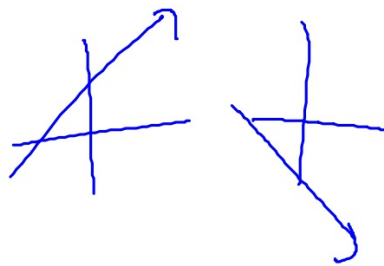c) Calculate the following slopes algebraically. Verify with the graph.

Slope (BC)= $\dfrac{7-10}{1-4} = \dfrac{-3}{-3} = 1$

Slope (CD)= $\dfrac{7--3}{1-2} = \dfrac{10}{-1} = -10$
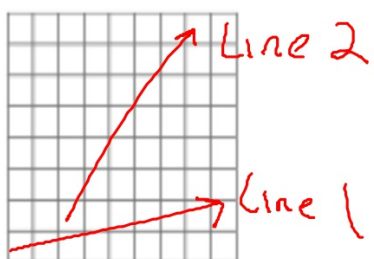
2. Comparison of Slopes

   a) If a line slants upward from left to right, it has a _positive_ slope.

   b) If a line slants downward from left to right, it has a _negative_ slope.
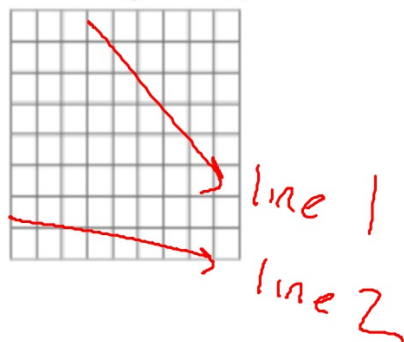
3. Draw two examples of lines with a positive slope and two examples of lines with a negative slope in the corresponding grids below.
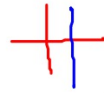
Lines With Positive Slopes

Line 2

Line 1

Lines With Negative Slopes

line 1

line 2

4. Circle the equations of the lines that are horizontal. ⊥ —horizontal
   Underline the equations of lines that are vertical.

a) x=7

b) y=3   ⫪ vertical

c) x=-3

d) y=5

e) y=3x+6

f) y=-2

5. Complete the sentences by filling in the blanks.
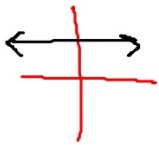
Horizontal Lines

a) The equations of all horizontal lines are of the form $\underline{y = \text{Some number}}$

b) The slope of a horizontal line is $\underline{0}$.

c) Horizontal lines do <u>not</u> cross the x axis.

Vertical Lines

a) The equations of all vertical lines are of the form $\underline{x = \text{Some number}}$

b) The slope of a vertical line is $\underline{\text{undefined}}$.
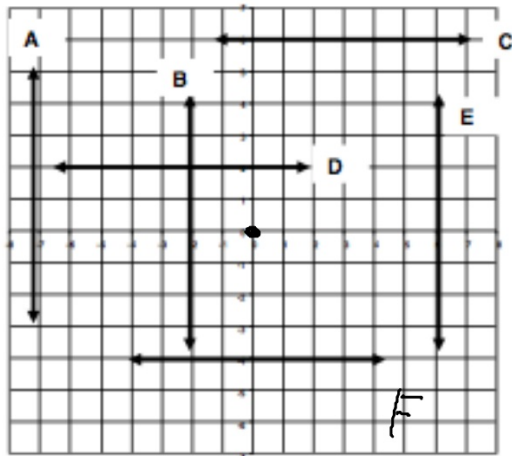
c) Vertical lines do <u>not</u> cross the y axis

6. Write the equation of each line.
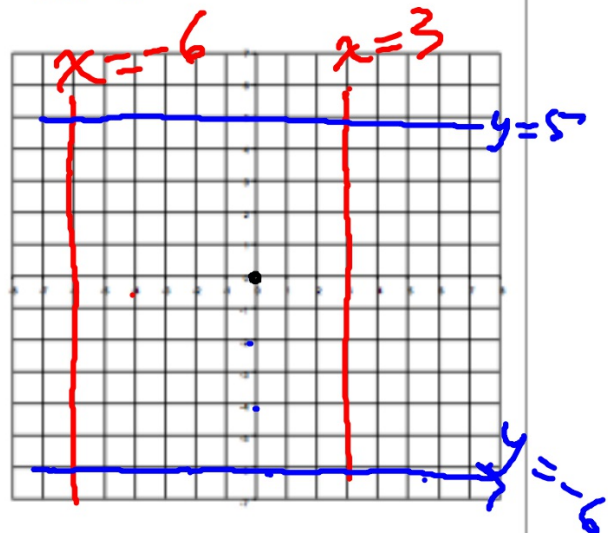A: $x = -7$
C: $y = 6$
E: $x = 6$
F: $y = -4$

7. Graph and label the lines.
A: x = 3
B: y = -6
C: y = 5
D: x = -6

$x = -6$ $x = 3$ $y = 5$ $y = -6$

8. a) When the equation of a line has the form $y=mx+b$,

m is the _Slope_ of the line and

b is the ___y-intercept___
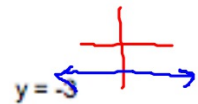
b) State the slope and coordinates of the y-intercept for each.

   i) $y = \frac{2}{5}x - 4$ ii) $y = -3x$ iii) $y = -2x + 5$ iv) $y = -3$

$M = \frac{2}{5}$ $M = -3$ $M = -2$ $M = 0$

$y\text{-int } (0,-4)$ $y\text{-int } (0,0)$ $y\text{-int } (0,5)$ $y \text{ int}$ $(0,-3)$

$$y = mx + b$$

9. Write the equation of each line given:

   a) slope 5 and y-intercept 3

   b) b= 7 m = -½

   c) slope of -2 and passing through A(0, 4) *y-int*

   d) slope parallel to y = 3x + 7 with same y-intercept as y = 8x –19

   $m = 3$

   $b = -19$
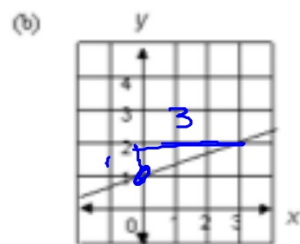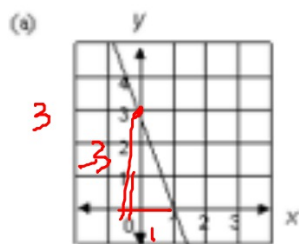
(a) $y = 5x + 3$

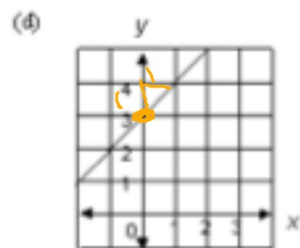(b) $y = -\frac{1}{2}x + 7$
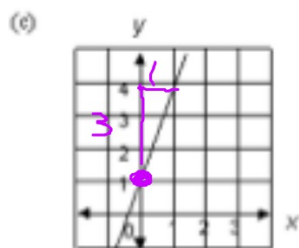
(c) $y = -2x + 4$

(d) $y = 3x + ^-19$

OR

$y = 3x - 19$

10. Find the equation of each line.

(a)

3

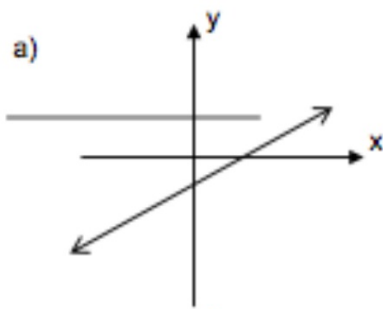$\frac{3}{1}$

(b)

3

(a) $y = -3x + 3$

(b) $y = \frac{1}{3}x + 1$
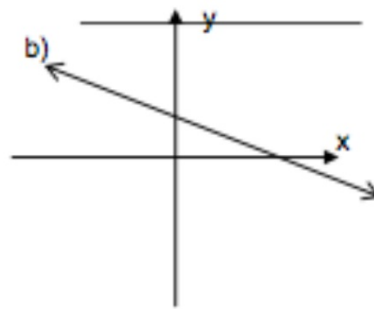
(c)

3

(d)

(c) $y = 3x + 1$

(d) $y = x + 3$

11. State two possible equations for each line.

a)

1) $y = \frac{1}{2}x - 5$

2) $y = x - 3$

b)

1) $y = -2x + 3$

2) $y = -\frac{1}{2}x + 5$
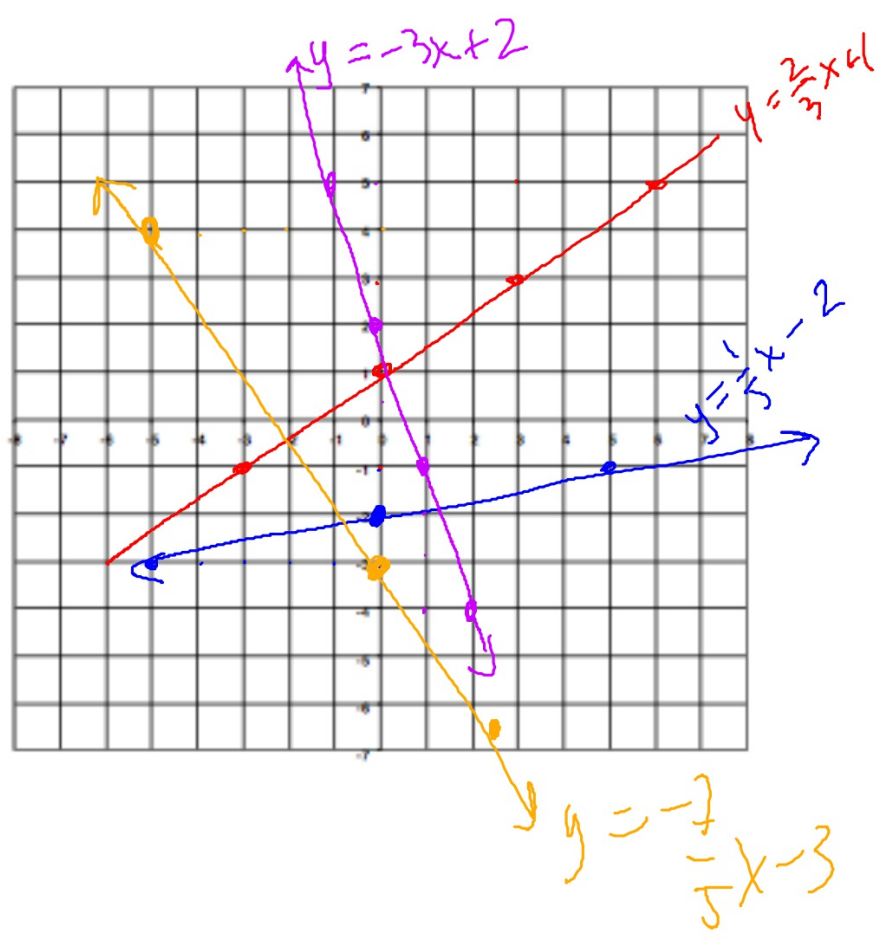
c) Justify your choices for m and b:

positive slope
negative y-int

negative slope
positive y-int.

12. Draw rough sketches of the following lines showing the y-intercept and slope triangle for each.

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

b) $y = \frac{1}{5}x - 2$

c) $y = -3x + 2$

d) $y = -\frac{7}{5}x - 3$

$y = -3x + 2$

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

$y = \frac{1}{5}x - 2$

$y = \frac{-7}{5}x - 3$

Answer the following questions based on the lines graphed below.

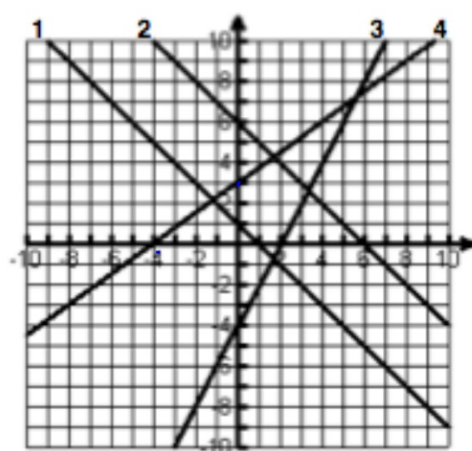13.   Which lines will have positive slopes?

Line 3 & 4

14.   Which lines will have negative slopes?

Line 1 & 2

15.   Fill in the table by listing the coordinates for the x-intercepts and y-intercepts.

Line	x-intercepts	y-intercepts
1	(1, 0)	(0, 1)
2	(6, 0)	(0, 6)
3	(2, 0)	(0, -4)
4	(-4, 0)	(0, 3)

18. Find the equation of the line given the point and slope.

a) (2, 1); m = 3

$$y - 1 = 3(x - 2)$$

OR $y = mx + b$

$$y = 3x + b$$

$$1 = 3(2) + b$$

$$-5 = b$$

$$\boxed{y = 3x - 5}$$

b) (-3, 4); m = ¾

$$y - 4 = \frac{3}{4}(x + 3)$$

OR $y = mx + b$

$$4 = \frac{3}{4}(-3) + b$$

$$4 = \frac{-9}{4} + b$$

$$4 + \frac{9}{4} = b$$

$$6\frac{1}{4} = b$$

$$\boxed{y = \frac{3}{4}x + \frac{25}{4}}$$

18. Find the equation of the line given the point and slope.

~~MMMMMMMMM~~

~~MMMMMMMM~~

$$y + 5 = -1(x-4)$$

c) (4,-5); m = -1

OR

$$y = mx + b$$

$$-5 = -1(4) + b$$

$$-5 = -4 + b$$

$$-1 = b$$

$$\boxed{y = -x - 1}$$

$$y - 0 = -6(x-5)$$

d) (5, 0); m = -6

OR

$$y = mx + b$$

$$0 = -6(5) + b$$

$$30 = b$$

$$\boxed{y = -6x + 30}$$

19. Find the equation of the line joining the two given points.

a) (2, 1); (-3, 4); $m = \dfrac{4-1}{-3-2} = \dfrac{3}{-5}$

$$\boxed{y - 1 = -\frac{3}{5}(x - 2)}$$

OR

$y = -\frac{3}{5}x + b$

$1 = -\frac{3}{5}(2) + b$

$1 = -\frac{6}{5} + b$

$1 + \frac{6}{5} = b$

$\frac{11}{5} = b$

so $\boxed{y = -\frac{3}{5}x + \frac{11}{5}}$

c) (4, -5); (5, 0); $m = \dfrac{0 - -5}{5 - 4}$

$= \dfrac{5}{1}$

$y = mx + b$

$y = 5x + b$

$-5 = 5(4) + b$

$-25 = b$

$$\boxed{y = 5x - 25}$$

OR

$$\boxed{y + 5 = 5(x - 4)}$$