8 - Slope Intercept Form
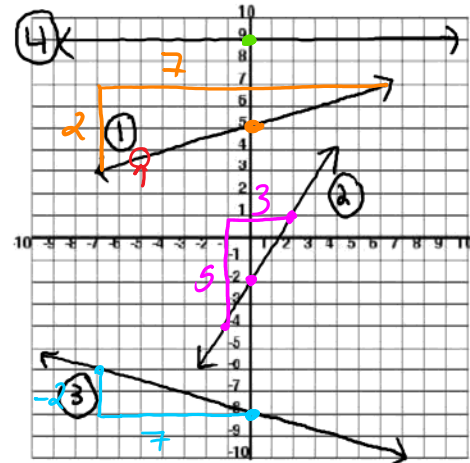
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8) slope-Intercept form

Warm-Up:

1. Determine the slope, y-intercept, and equation of the following lines:

Line #	Slope	y-intercept	Equation
1	$\frac{2}{7}$	5	$y = \frac{2}{7}x + 5$
2	$\frac{5}{3}$	-2	$y = \frac{5}{3}x - 2$
3	$\frac{-2}{7}$	-8	$y = \frac{-2}{7}x - 2$
4	O	9	$y = +9$ $(y = 0x + 9)$

We say the equations above are written in **slope-intercept form.** A general formula for an equation in slope intercept form is $y = mx + b$

The **slope** is the coefficient of x.	The **y-intercept.** (Make note of the sign) $+/-$

$$y = \boxed{-2}x + 7$$

$$\frac{\text{rise}}{\text{run}} = \frac{-2}{1}$$

Part 1: Using Slope Intercept Form

Example #1: Identify the slope and y-intercept for each of the following linear equations.

|	Linear Relation	Slope	y-intercept
a)	$y = 42x + 15$	$42 = \frac{42}{1}$	$+15$
b)	$y = -\frac{9}{100}x - 72$	$-\frac{9}{100}$	-72
c) (horizontal)	$y = 5$ $y = 0x + 5$	O	5
d)	$y = 22x + \frac{1}{3}$	$22 = \frac{22}{1}$	$+\frac{1}{3}$
e)	$y = x$	1	O

$$y = 1x + 0$$
$$y = x$$

$$y = mx + b$$

Example #2: Write the equation of a line based on the following slopes and y-intercepts.

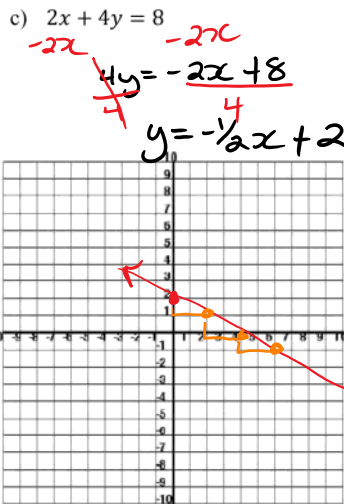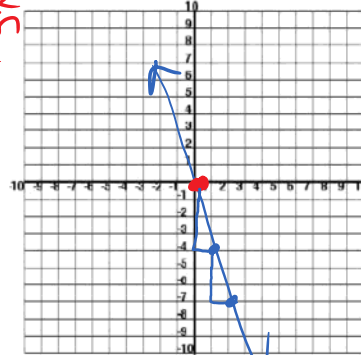| Linear Relation	Slope	y-intercept
a) $y = -\frac{2}{3}x + 7$	$-\frac{2}{3}$	$+7$
b) $y = 3x + \frac{1}{2}$	3	$\frac{1}{2}$
c) $y = \frac{1}{6}x - 2$	$\frac{1}{6}$	-2

Example #3: Sketch a graph of the following equations. Make sure you have at least points on your graph!

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

$\dfrac{rise=1}{run\ 2}$
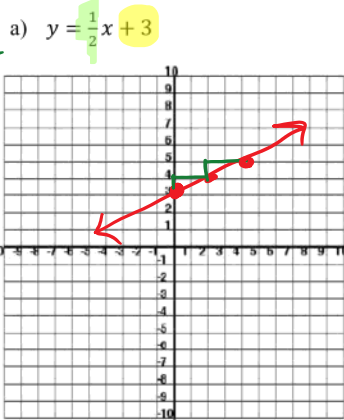
① plot y-int
② use $\frac{rise}{run}$
③ connect min 3 dots

b) $y = -4x + 0$

$m = \dfrac{-4}{1} \quad \dfrac{rise}{run}$

c) $2x + 4y = 8$

$-2x \qquad -2x$

$4y = -2x + 8$

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

d) $(1 cm) \; 6\left(\dfrac{x}{3} - \dfrac{2y}{6} = 2 \right)$

$\dfrac{6x}{3} - 2y = 12$

$2x - 2y = 12 \quad -2x$

$-2x$

$\dfrac{-2y = -2x + 12}{-2} \qquad \dfrac{}{-2}$

$\boxed{y = x - 6}$

$m = 1 \quad y\text{-int} = -6$
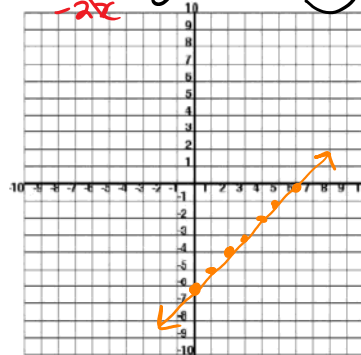
Part 2: Finding Missing Parts in the Equation of the Line

Example #4: Write the equation of a line where the slope is 10, and it passes through the following coordinates.

a) (3, 2)

b) (-6, 6)

c) (-1, 8)

Example #5: Write the equation of a line where the y-intercept is 3, and it passes through the following coordinates.
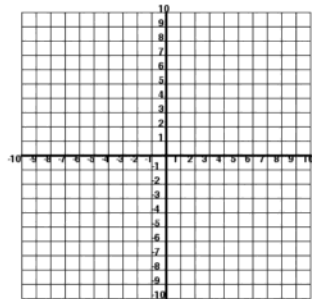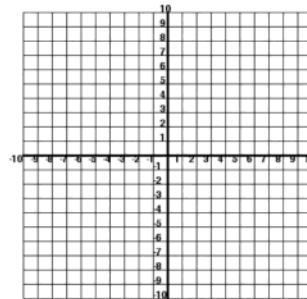
a) (7, 2)

b) (-4, 11)

c) (9, 3)

Today
Pg. 24-27

Homework

assignment # 8
pages #24-29 questions #98-137

Equation of a Line: Slope-Intercept Form

98. Graph the line $y = \frac{2}{3}x - 5$ using a table of values.

99. Graph the line $y = -3x + 5$ using a table of values.

100. What is the slope of the line above?

101. What is the slope of the line above?

102. What is the y-intercept of the line above?

103. What is the y-intercept of the line above?

104. Compare these values to the equation. What do you notice?

105. Compare these values to the equation. What do you notice?

We say the equations above are written in **_slope-intercept form_**. A general formula for an equation in slope intercept form is

$$y = mx + b$$

The slope is the coefficient of *x*.

The *y*-intercept. (Make note of the sign)

Remember, *x* and *y* are the coordinates of ANY point on the line. When substituted, they will satisfy the equation. See your work on the previous page!

State the slope and y-intercept for the line represented by each equation.

| 106. $y = -3x + 2$ | 107. $y = -\frac{3}{5}x - 7$ | 108. $y = \frac{9}{2}x - \frac{3}{2}$ |

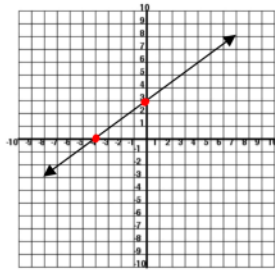Write the equation of each line given the slope and y-intercept.

| 109. $m = 2$, $b = -5$ | 110. $m = \frac{7}{3}$, $b = \frac{2}{3}$ | 111. $m = -3$, $b = -2$ |

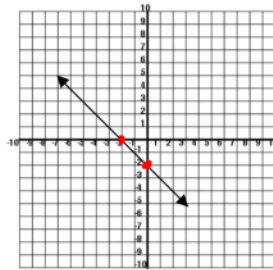For each line below, state the slope, y-intercept, and equation.

| 112. | 113. | 114. |

slope_____   slope_____   slope_____
y-intercept_____   y-intercept_____   y-intercept_____
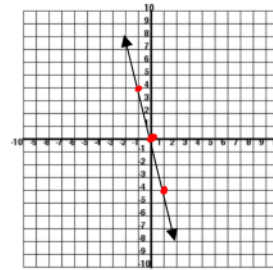
equation: equation: equation:

For each line below, state the slope, y-intercept, and equation.
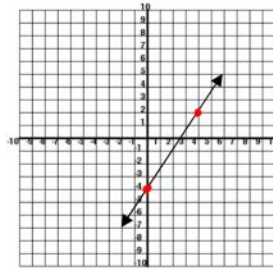
115.
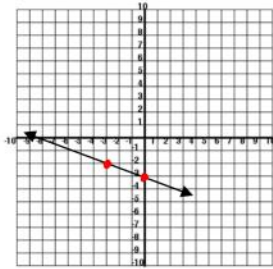
slope_____
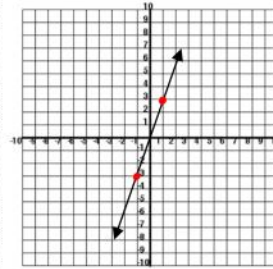y-intercept_____

equation:

116.

slope_____
y-intercept_____

equation:

117.

slope_____
y-intercept_____

equation:

118. What do you notice about the **equation** of the lines passing through the origin?
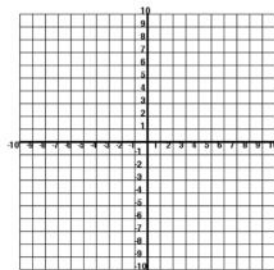
119. When is *b* positive?

120. When is *b* negative?

Graph the equations below by finding the slope and y-intercept from the equation.
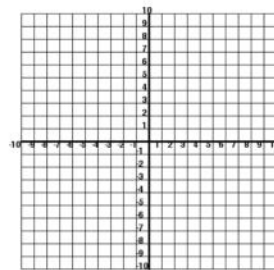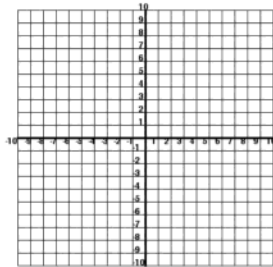
121.

$y = -3x$

122.

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

Graph the equations below by finding the slope and y-intercept from the equation.
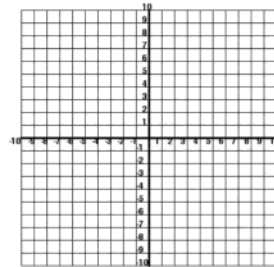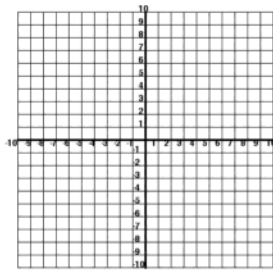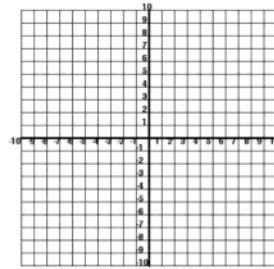
123.
$$y = -x + 3$$

124.
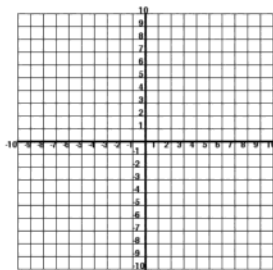$$2y = -10x + 12$$

125.
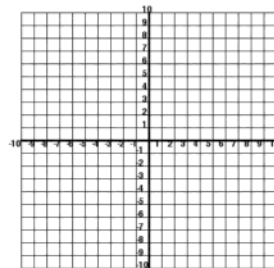$$y - 5 = \frac{1}{3}x - 3$$

126.
$$2x - 5y + 20 = 0$$

127.
$$\frac{x}{3} - \frac{y}{4} = 1$$

128.
$$\frac{2x}{3} + \frac{3y}{4} = -6$$

Determine the value of b for the equation $y = 3x + b$ if the line passes through the following points. Then write the equation in slope-intercept form.

129. $R(2,1)$	130. $K(-1,4)$	131. $A(3,-2)$
$y = 3x + b$ $1 = 3(2) + b$ $1 = 6 + b$ $-5 = b$ Therefore: $y = 3x - 5$		
132. $J(2,1)$	133. $T\left(-2,\frac{1}{2}\right)$	134. $L\left(\frac{2}{3}, 1\right)$

Determine the value of m for the equation $y = mx + 2$ if the line passes through the following points. Then write the equation in slope-intercept form.

135. $R(12,5)$	136. $K(1,-3)$	137. $A(-5,1)$

What you just did above is one way that you will be able to find the equation of a line. **IF** you have the _____ or the _____, you can input the _____ of a point on the line to solve for the unknown part of the equation.

Then you will write the full equation with _____ and _____ in place of *m* and *b*.

The following is another method.