Chapter 5 Checklist
Writing Linear Equations

Are you comfortable with each type of problem listed below? If yes, complete the example and check off the box. If not, review your notes for that section, try the example and check your answer to make sure you are correct.   Any topics that you are still unsure about, you should be sure watch teacher videos for that section (if available), try using SlideShark, then follow up with the teacher to clarify any remaining questions.

Chapter 5: Write Linear Equations

5.1: Writing Equations in Slope-Intercept Form

□ I can write an equation given slope and y-intercept. (5.1)   **Ex:** Slope: 0, y-intercept: ½

*don't forget to simplify $0x$ $y = ½$

□ I can write an equation given two points. (5.1)   **Ex:** (0, 5) and (1, 7)

*don't forget that if you have a coordinate where $x = 0$, then the y-coordinate $y = 2x + 5$
   is the y-intercept

□ I can write an equation given two function values. (5.1)   **Ex:** $f(1) = -9$ and $f(0) = -11$
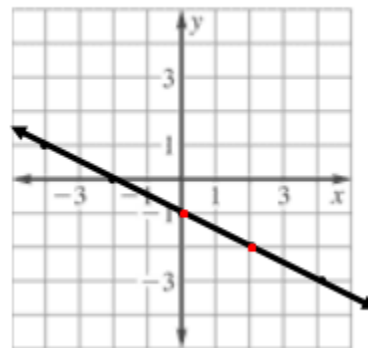
*Create two ordered pairs first $(1, -9)$ and $(0, -11)$ then find slope. $y = 2x - 11$

□ I can write an equation given a graph. (5.1)   **Ex:**

*Use $\frac{rise}{run}$ to find slope (Here it is NEGATIVE!) and look at the graph to see
Where the line crosses the y-axis (this isn't always possible though)

$y = -½\,x - 1$

5.2: Writing Equations in Slope-Intercept Form

□ I can write an equation given slope and one point. (5.2)   **Ex:** a) Slope: 3, passes through (1, 1)

*Replace x and y with the information from the ordered pair.
Replace m with 3. Solve for b and replace both m and b in $y = mx + b$ $y = 3x - 2$

b) Slope: −5, passes through (−4, 7)

$$y = -5x - 13$$

□ I can write an equation given two points. (5.2)

*Find the slope using $\frac{y_2 - y_1}{x_2 - x_1}$ and replace m
*Plug in x and y (choose the easier ordered pair)
*Solve for b, then replace m and b in $y = mx + b$

Ex: a) Passes through (1, 4) and (2, 7)

$$y = 3x + 1$$

b) Passes through (−2, −2) and (1, −1)

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

c) Passes through (−3, 1) and (−3, −1)

$$x = -3$$

*Since the slope is undefined, it is a vertical line. The equation of vertical lines is always $x = \#$

d) Passes through (1, 5) and (−7, 5)

$$y = 5$$

*Since the slope is 0, it is a horizontal line. The equation of Horizontal lines is always $y = \#$

e) Passes through $\left(\frac{9}{2}, 1\right)\left(-\frac{7}{2}, 7\right)$

$$y = -\frac{3}{4}x + \frac{35}{8}$$

f) $f(3) = 1, f(6) = 4$

*Don't forget to make two ordered pairs first: (3, 1) and (6, 4)

$$y = x - 2$$

□ I can find relevant information in word problems to write an equation of the line to represent the situation. (5.2)

Ex: You have a subscription to an online magazine that allows you to view 25 articles from the magazine's archives. You are charged an additional fee for each article after the first 25 articles viewed. After viewing 28 articles, you paid a total of $34.80. After viewing 30 articles, you paid a total of $40.70.

   a. What is the cost per archived article after the first 25 articles viewed?
1. Let $x = \#$ of <u>extra</u> articles, let $y = $ total cost
2. Create two ordered pairs: (3, 34.80) and (5, 40.70)
3. Find the slope: $2.95 (this is the cost per extra article)

b.   What is the cost of the magazine subscription?

Since the cost of the magazine subscription is what you would pay even if you viewed <u>0 extra articles</u>, then you are really find the cost when $x = 0$. Since you are finding cost when $x = 0$, you are really finding the y-intercept (b) since this always occurs when $x = 0$.

To do this, replace m, x and y with values from the information above and solve for b.

$b = \$25.95$

*If you had also been asked to write an equation to represent the total cost for any number of extra articles this equation would have been:

$$y = 2.95x + 25.95$$

Ex: A delivery service charges a base price for an overnight delivery of a package, plus an extra charge for each pound the package weighs. A customer is billed \$22.85 for shipping a 3-lb package and \$40 for shipping a 10-lb package.

a.   Write an equation that gives the total cost for shipping a package of any weight.

1. Let $x = \#$ pounds, Let $y =$ total cost

2. Set up two ordered pairs: (3, 22.85) and (10, 40)
3. Find the slope: 2.45 (this is the cost per pound)
4. Find the y-intercept by replacing m, x, and y. Solve for b. 15.50
5. Plug in m and b into $y = mx + b$

$$y = 2.45x + 15.5$$

b.   Then find the cost of shipping a 15-lb package.

Replace x with 15 and solve

$$y = 52.25$$

5.5: Write Equation of Parallel and Perpendicular Lines

□ I can write equations of parallel lines using given information (5.5)

Ex: Write the equation of the line that is parallel to $-6x + y = -1$ and passes through the point (1, 7)

*Find the slope of the first line ($-6x + y = -1$) by rewriting the equation in slope-intercept form: $y = -1 + 6x$ so $m = 6$

Use this slope (they are the same since the lines are parallel) and the x and y from the given ordered pair (1, 7) to solve for b.

$$y = 6x + 1$$

□ I can write equations of perpendicular lines using given information (5.5)

Ex: Write the equation of the line that is perpendicular to $y + 3 = 2x$ and passes through the point $(-5, 2)$

*Find the slope of the first line $(y + 3 = 2x)$ by rewriting the equation in slope-intercept form: $y = 2x - 3$ so $m = 2$

Use the <u>opposite reciprocal</u> of this slope (since they are perpendicular) which is $-½$ and the x and y from the given ordered pair $(-5, 2)$ to solve for b.

$$y = -½x - ½$$

□ I can determine, using equations of lines, if line are parallel or perpendicular (5.5)

Ex: Determine which lines, if any, are parallel or perpendicular:

a. $y = \dfrac{3}{5}x + 1$ 　　　　 b. $5y = 3x - 2$ 　　　　 c. $10x - 6y = -4$

1. Find the slope of each line by rewriting each equation in slope-intercept form.

$m = \dfrac{3}{5}$ 　　　　 $y = \dfrac{3}{5}x - \dfrac{2}{5}$ 　　　　 $y = \dfrac{5}{3}x + \dfrac{2}{3}$

　　　　　　　　　　 $m = \dfrac{3}{5}$ 　　　　 $m = \dfrac{5}{3}$

Lines a and b are parallel since their slopes slope are the same.
Since line c's slope isn't the opposite (it is only the reciprocal) it is not parallel.

5.4: Write Equations of Lines in Standard Form

□ I can write equivalent equations in standard form. (5.4) 　　　　 **Ex:** Write two equivalent equations:

　　　　　　　　　　　　　　　　　　　　　　　　　　 $3x - 6y = 9$

*Multiply (or divide if possible) <u>every term</u> by the same number 　　　 $x - 2y = 3$
　　　　　　　　　　　　　　　　　　　　　　　　　　 $6x - 12y = 18$

□ I can write equations in standard form. (5.4) 　　　　 **Ex:** a) Passes through $(4, 4)$ and $(8, 2)$
1. Find slope-intercept equation first
2. Move x term over to the y-side.
3. Make sure A is positive and there are no fractions or decimals. 　　　 $x + 2y = 12$

b) Passes through $(-2, 3)$ and $(-4, -5)$

$4x - y = -11$

□ I can write equations of horizontal and vertical lines. (5.4)

Vertical lines are always $x = \#$
Horizontal lines are always $y = \#$

Ex: a) Write the horizontal equation through (7, 2)

$$y = 2$$

b) Write the vertical equation through (−4, 5)

$$x = -4$$

□ I can complete equations in standard form. (5.4)
1. Replace x and y using the ordered pair
2. Solve for the missing coefficient
3. Plug the coefficient into the original equation
4. Make sure A is positive and there are no fractions or decimals.

Ex: a) $5x + By = 6$ passes through (2, 1)

$$5x - 4y = 6$$

b) $Ax + 5y = 7$ passes through (4, 3)

$$2x - 5y = -7$$