# 2.4 Standard Form

SWBAT graph linear equations in standard form.

Assignments:

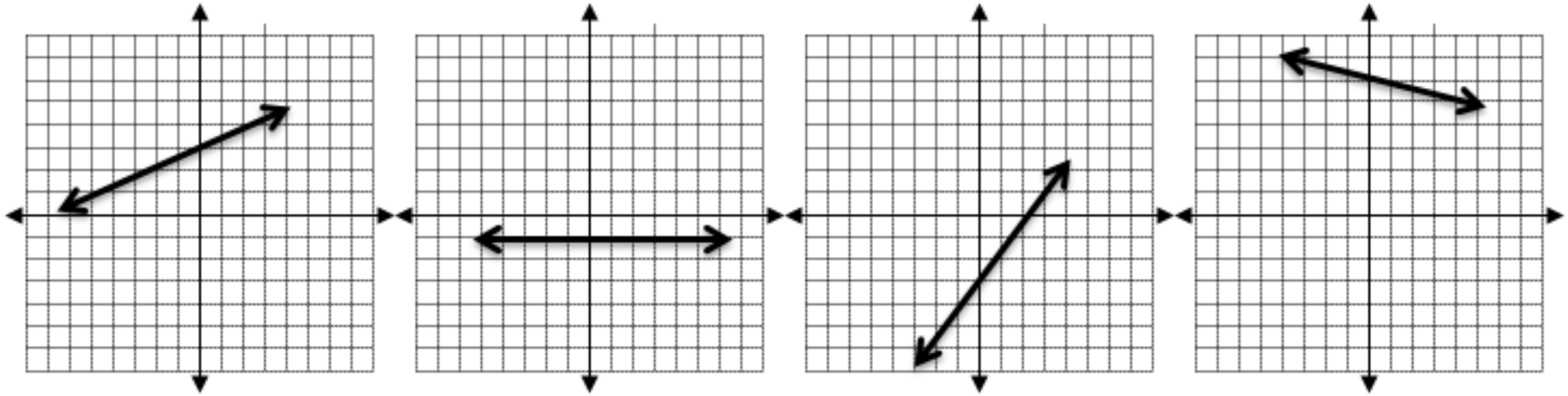
HW17

Signed Grade Report

*Unit Test 2 In-Class after returning from break

Lesson from Noelani Davis, https://betterlesson.com/lesson/560482/graphing-linear-functions-in-standard-form-day-1-of-2. Slightly modified.

# Y-Intercepts



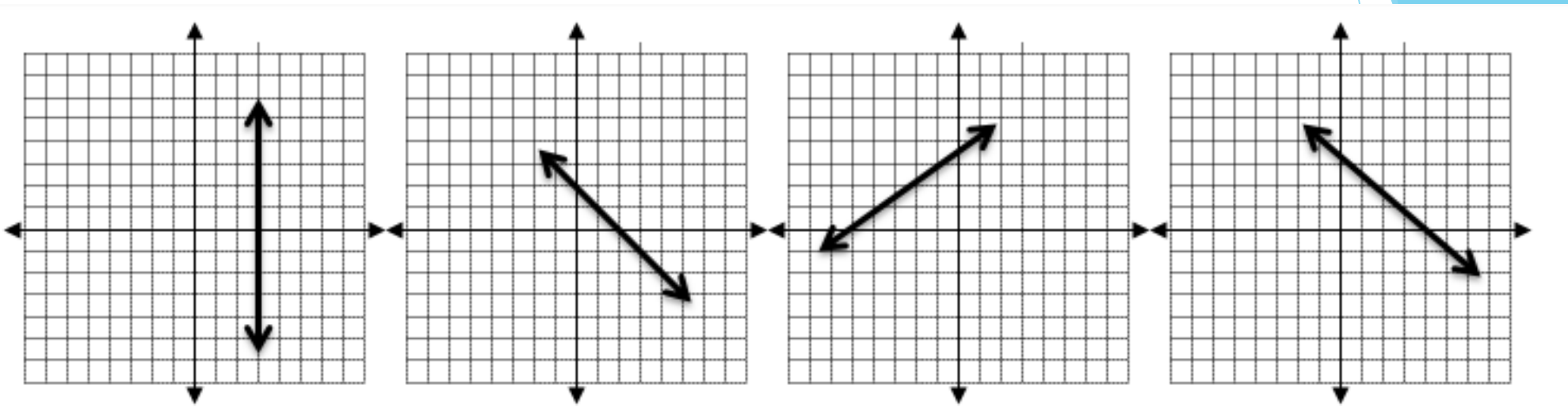
- What are the y-intercepts in each graph above?

$(0,3)$ $(0,-1)$ $(0,-3)$ $(0,6)$

- What do all four points have in common?

- What can we decide about y-intercepts based on what we notice?

# X-Intercepts



- What are the x-intercepts in each graph above?

$(3,0)$ $(2,0)$ $(-5,0)$ $(4,0)$

- What do all four points have in common?

- What can we decide about y-intercepts based on what we notice?

# Partner Discussion

- **Karen loves to read! She has already read 297 books. Karen is such an avid reader, she can finish reading 4 books per week.**
  - Write an equation that represents how many books Karen has already read.
  - Justify your response; how did you create this equation?
  - If Karen has already read 817 books, how many weeks had she been reading?
  - What would the point (19, 373) represent in the context of Karen?

- Remember our four steps, and the four pieces of work/evidence that we have to show:

1. Understand the Problem
    1. Define Variable: what is it, and what does it represent?
2. Devise a Plan
    1. Write Equation
3. Carry out the Plan
    1. Solve Equation
4. Analyze Solution
    1. Does the solution make sense? Check your units!

# Example One

- **Karen is going on a road trip with her family. They will be in the car for 20 hours. She decided to bring both books and magazines to occupy herself during the long ride. Karen can read one book in 4 hours, and one magazine in 2 hours.**
  - Write an equation that represents how many books and magazines Karen will be able to read during her road trip.

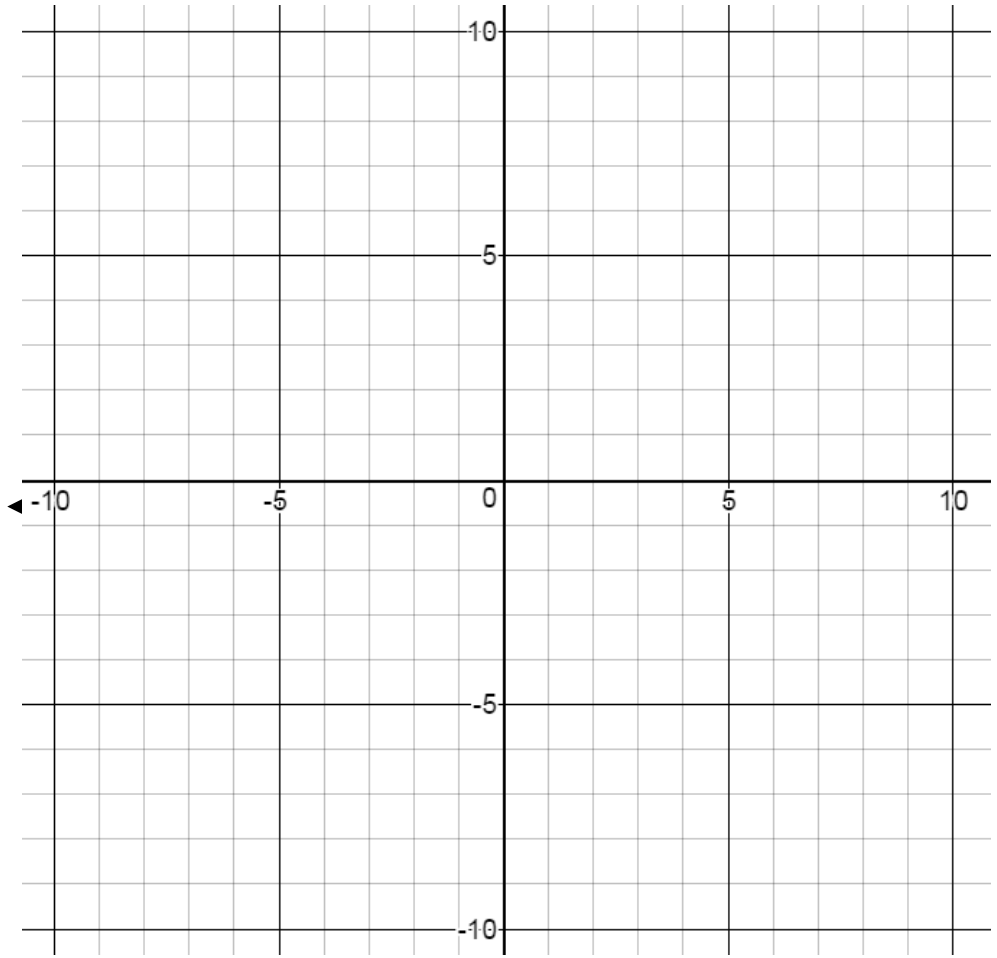
# Standard Form

- $Ax + By = C$

- $A$, $B$, and $C$ are integers
- $A$ and $B$ can be 0, but not at the same time.
  - Why?

# Example One

- **Karen is going on a road trip with her family. They will be in the car for 20 hours. She decided to bring both books and magazines to occupy herself during the long ride. Karen can read one book in 4 hours, and one magazine in 2 hours.**
  - Write an equation that represents how many books and magazines Karen will be able to read during her road trip.




Assuming Karen reads for the entire trip, can she read 4 books and 4 magazines? How do we know?

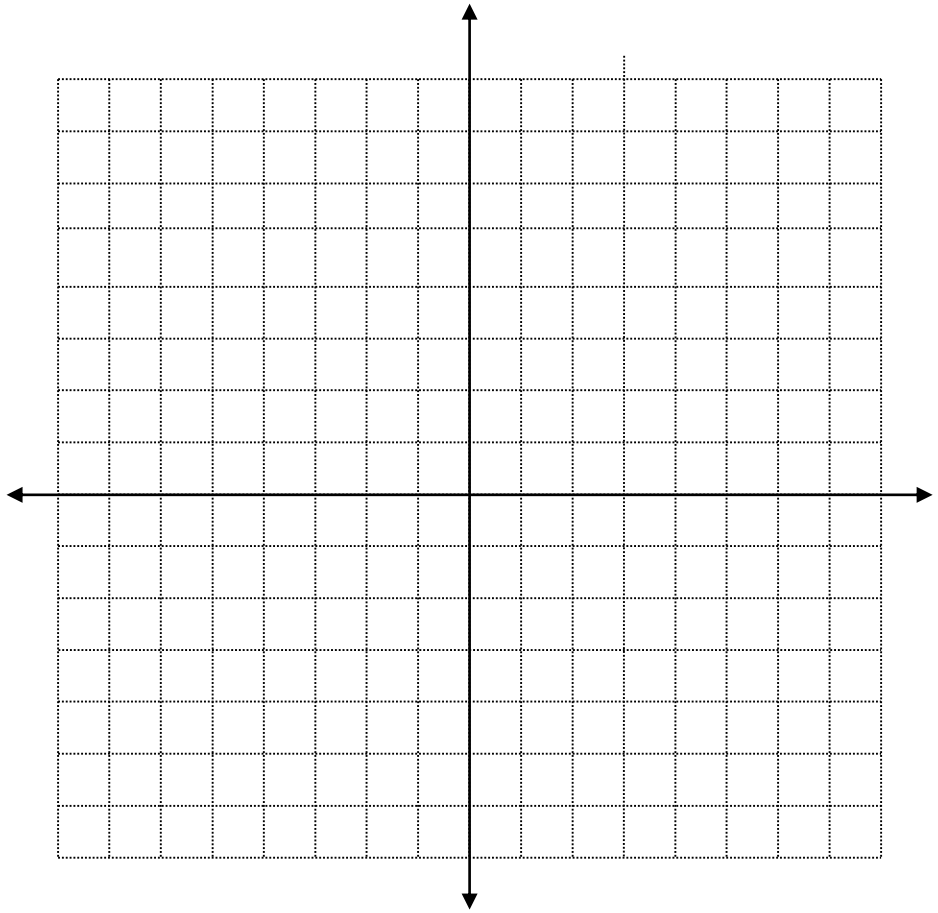
Can Karen read 3.5 books and 3 magazines? How can we tell?

# 2 Methods to Graphing Inequalities

- Solve for $y$ to get slope-intercept form
- Find the x- and y-intercepts

# Example Two

- **LeBron James scored 30 points in a game against the Suns. LeBron shot two pointers and three pointers, but missed all of his free-throws.**
  - Write an equation of the line in standard form to represent the different combination of points LeBron could have made.

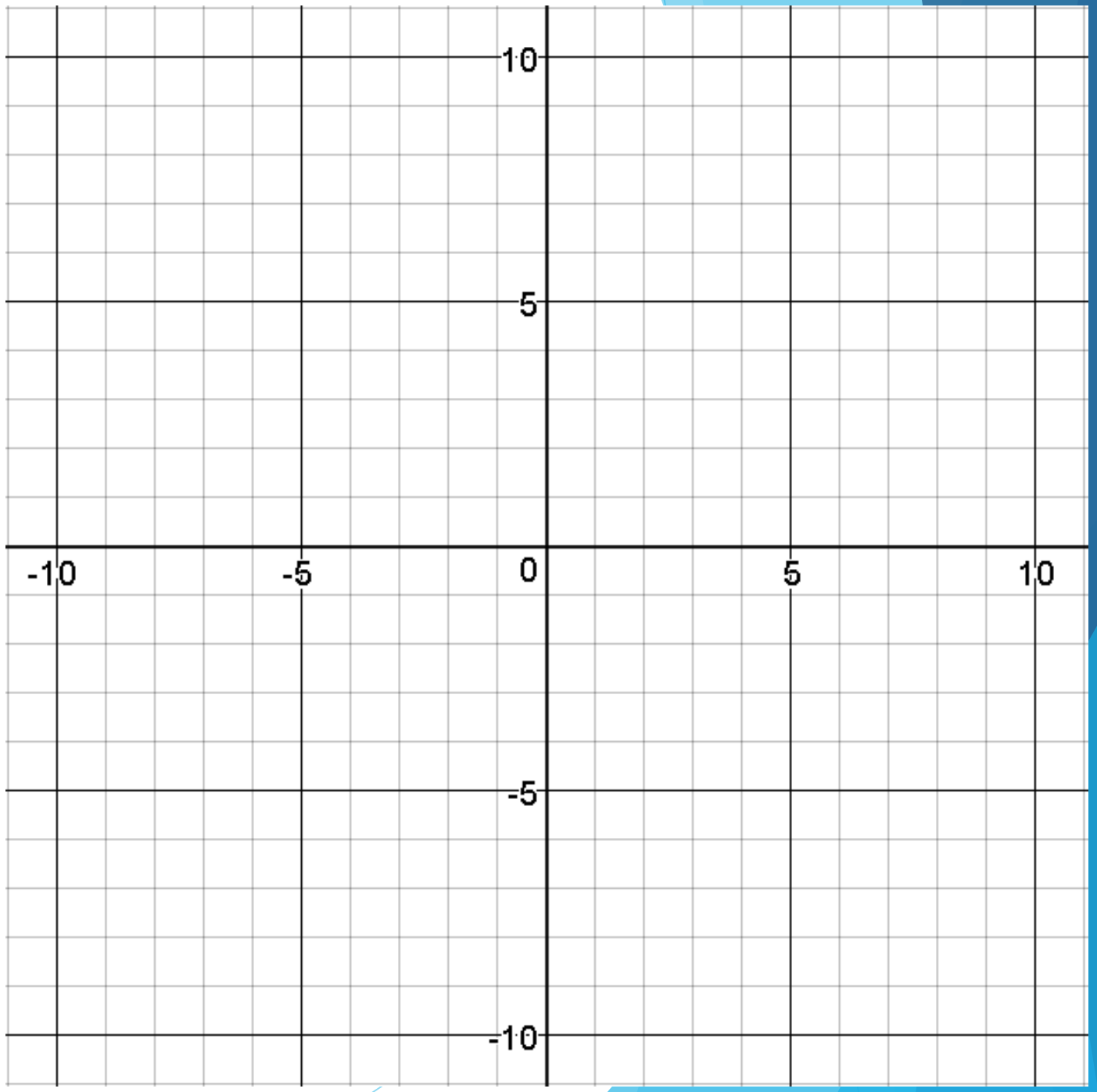


Could LeBron have made 7 two pointers and 8 three pointers? How do we know?

Could LeBron have made 12 two pointers and 2 three pointers? How can we tell?

# Graph the equations in standard form.

1. $2x - 2y = 10$
2. $10x - 5y = -10$
3. $-5x + 4y = 16$
4. $3x + 2y = -4$

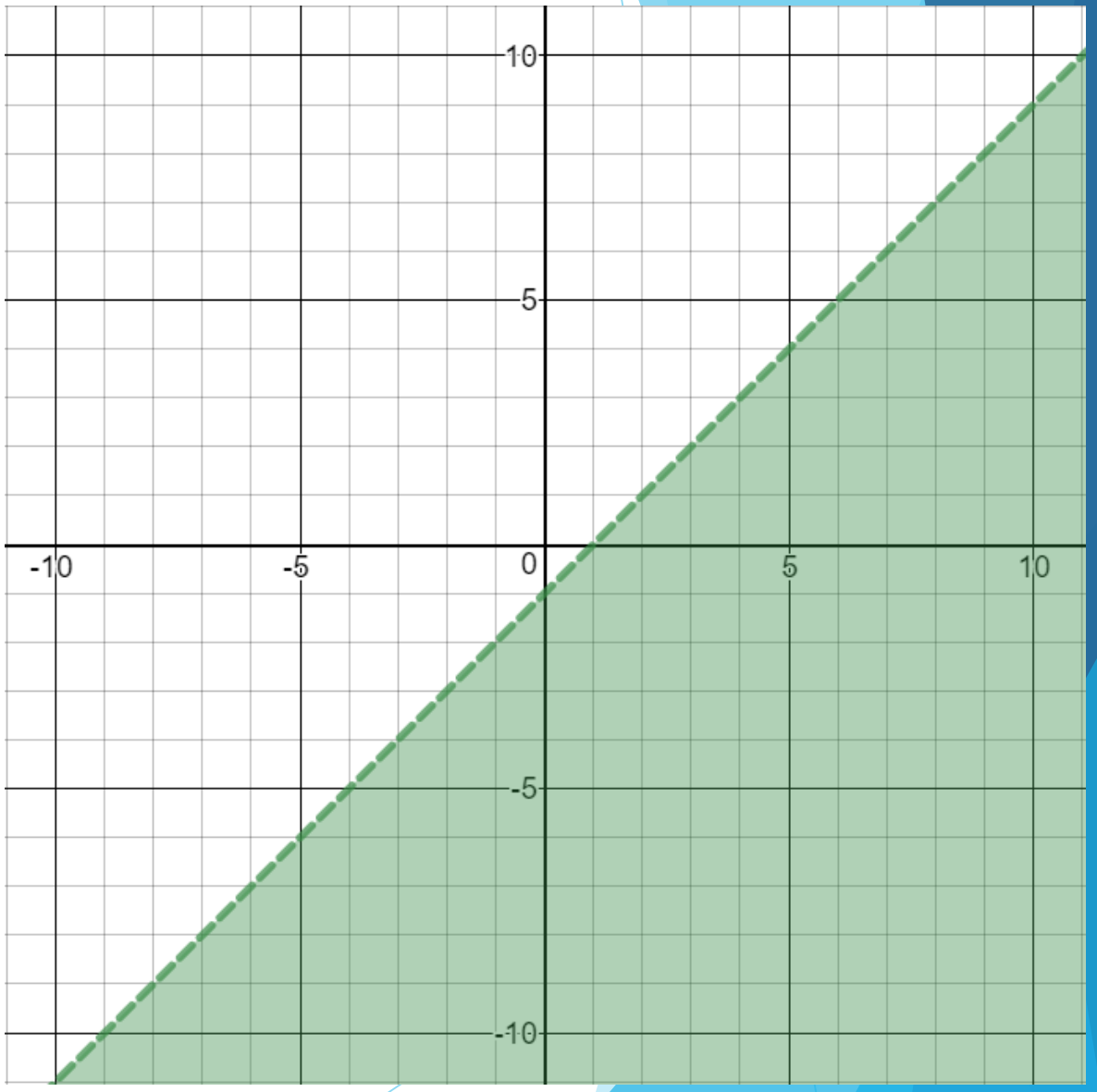


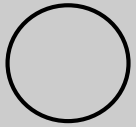
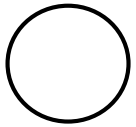
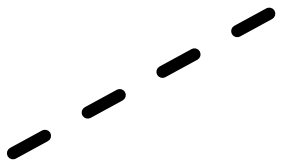
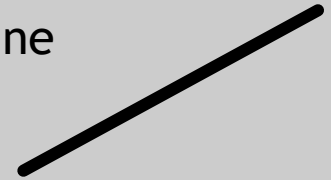
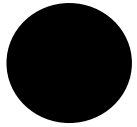
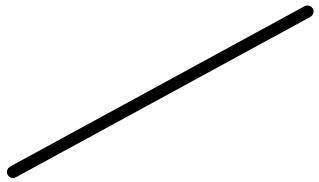
# 2.5 Two-Variable Inequalities

SWBAT graph 2-variable inequalities.

# Solutions to Inequalities

- Solutions to $y < x - 1$
  - $(0,0)$?
  - $(2, 0)$?
  - $(3, 2)$?
  - $(-1, -4)$?
  - Choose 3 more points and test whether they are solutions.



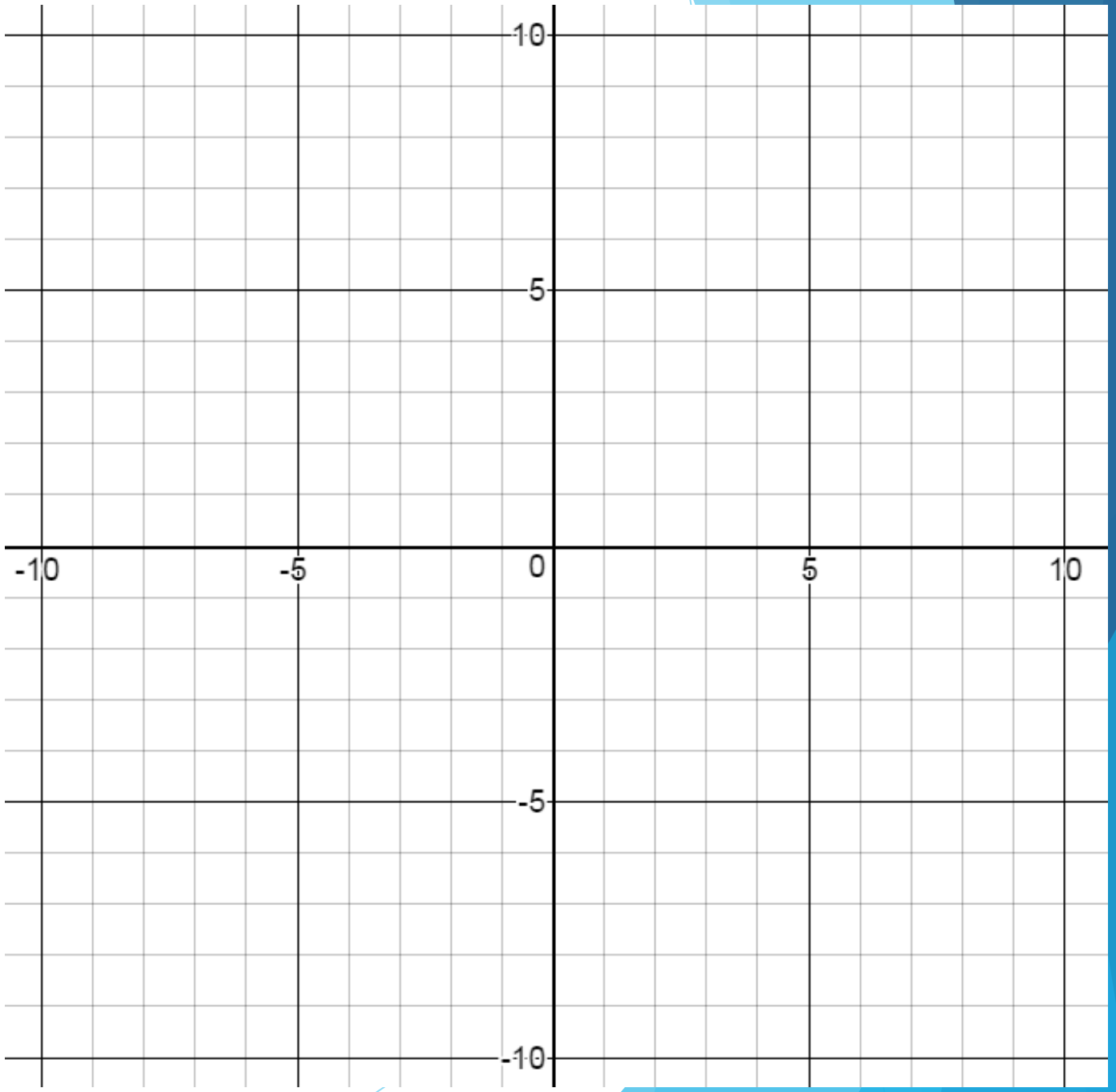
| English | Symbol | 1-Variable | 2-Variable (slope-intercept form) | |
|---|---|---|---|---|
| Greater than | $>$ |  | No solutions on line  |  Solutions above |
| Less than | $<$ |  |  |  Solutions below |
| Greater than or equal to | $\geq$ |  | Solutions on line  |  |
| Less than or equal to | $\leq$ |  |  |  |

# Graph the inequality.

$y > 2x + 1$

- Step 1: Plot points of line
- Step 2: Dotted line or solid line?
- Step 3: Arrows up or down?
- Step 4: Shade the side of the line with the arrows. These are the solutions.
- Step 5: Test point

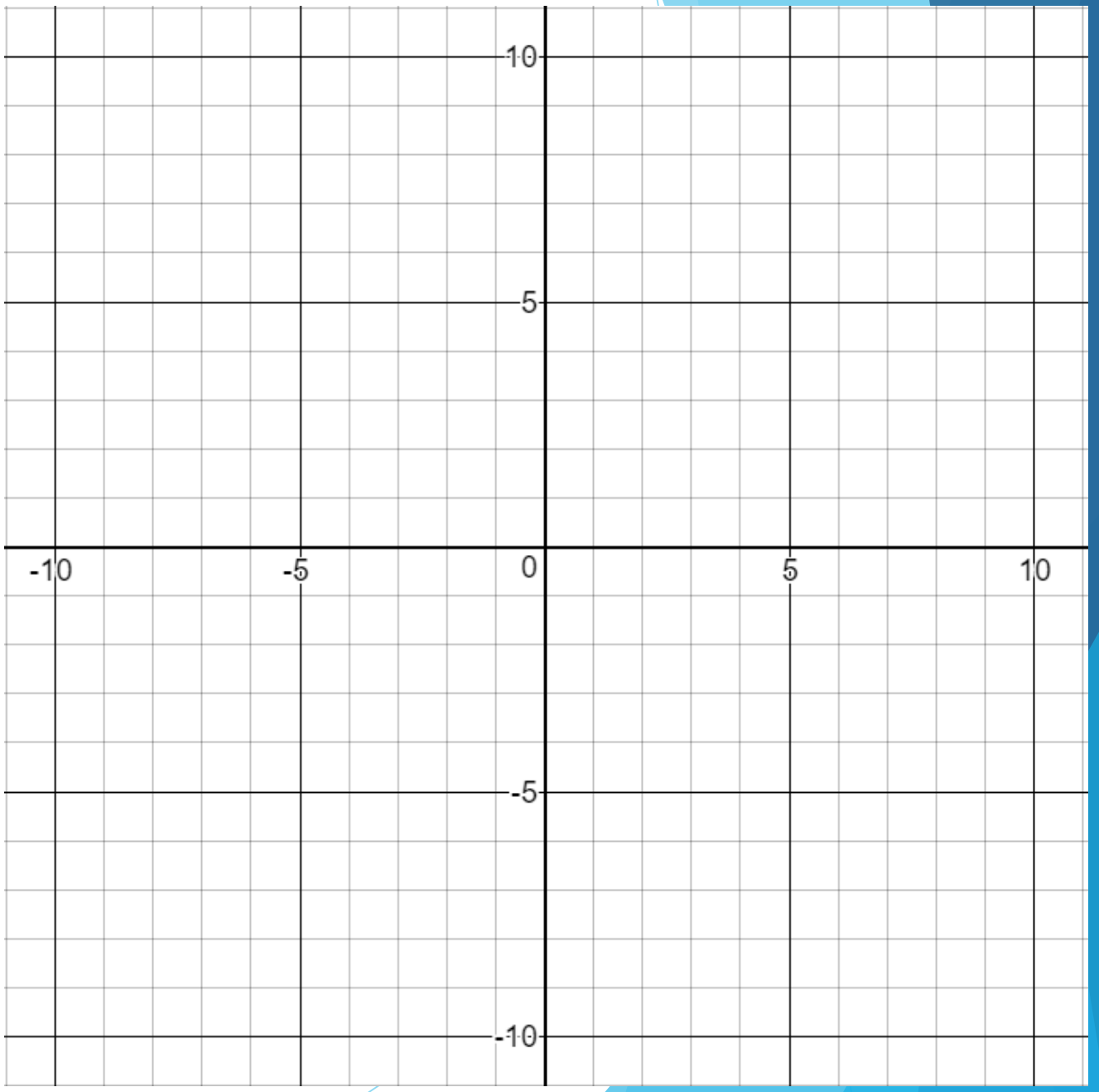
Please note: these steps *only* work for slope-intercept form! If in standard, skip steps 3 and 4.



# Graph the inequalities.

Do not put more than one inequality on a grid.

1. $y \leq x + 3$
2. $y > 3x - 4$
3. $y > -2x + 4$
4. $y < \frac{1}{2}x - 1$
5. $y \geq -\frac{4}{3}x + 2$
6. $y \leq -\frac{1}{2}x$



# Graph the inequalities.

Do not put more than one inequality on a grid.

1. $3x - 2y > 4$
2. $x + 3y \leq 5$
3. $8x - y \geq -4$