lesson twenty-two - student resource sheet

Lesson Objective: Develop the concept of slope as a rate of change, and determine slope by using either two points on a line or the graph of a line. Describe lines that have slopes that are positive, negative, zero, or undefined.

Vocabulary Box

slope – The steepness of a line expressed as a ratio. Example: In $y = -\frac{3}{4}x - 5$, $-\frac{3}{4}$ is the slope.

Please complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Find the slope of the line that contains each pair of points.

1. (2, 5) and (4, 4)

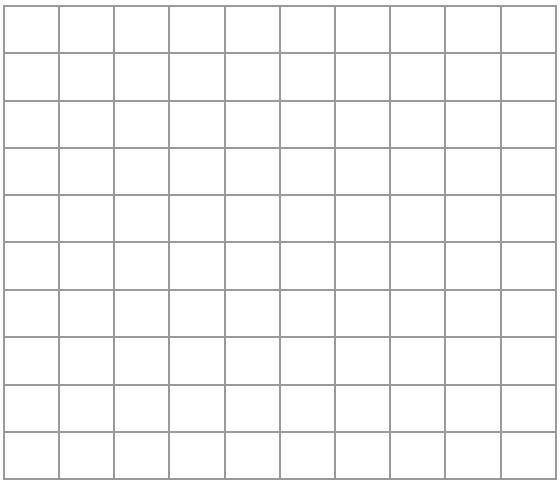
2. (–3, 2) and (4, –1)

3. (4, 2) and (–7, 2)

4. (5, 2) and (5, 3)

Directions: On the graph paper below, graph the following lines, find their slopes, and describe their directions.

1. A line with the equation $y = 2x$.

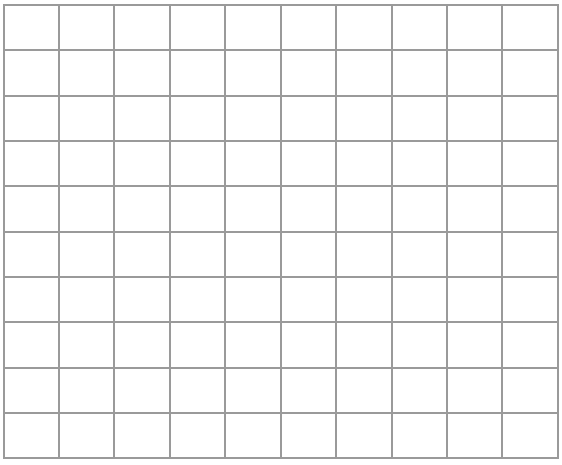


2. A line with the equation $y = -\frac{1}{4}x$

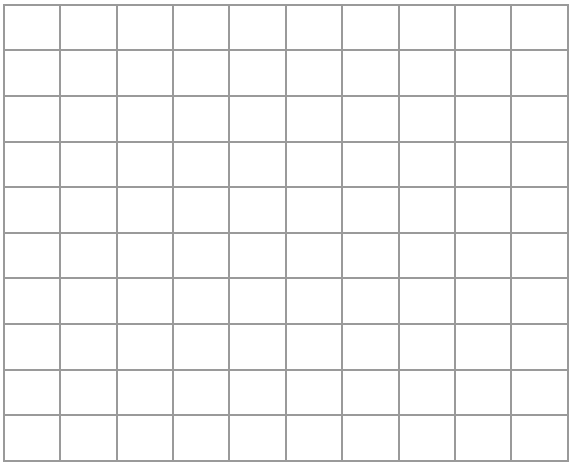
3. A line through the points (5, 1), (0, 1), and (3, 1).

4. A line through the points (2, 2), (2, –2), and (2, –4).

5. A line with the equation $y = -3x$.



6. A line with the equation $y = \frac{2}{7}x$.



7. A line through the points (0, 0), (0, 2), and (0, –3)

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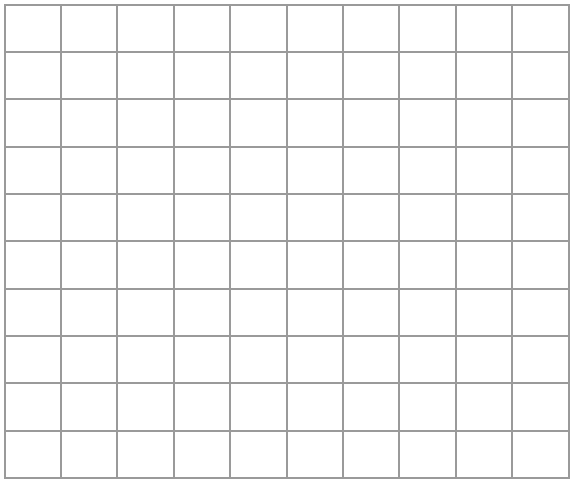
Directions: First, choose an appropriate scale to accommodate your graph. Then, on the graph paper below, graph the following lines, find their slopes, and describe their directions.

1. A line with the equation $y = 0.002x$.



2. A line with the equation $y = \frac{32}{25}x$.

Problem Solving

1. On the graph paper on the next page, carefully graph the line with the equation $y = 2x$. You will want to be as exact as possible so that you can complete the rest of this exercise. Identify the slope of the line, and write the slope as a fraction. From the fraction, identify the rise and the run.

2. Now, switch the rise and the run that you found in problem 1. Use the new rise and run to write a new slope. Use the new slope to write an equation of a line. Then graph the line.

3. Now, take the rise and the run that you found in problem 1. Negate only the rise and write a new slope. Use the new slope to write an equation of a line. Then graph the line.

4. Now, take the rise and the run that you found in problem 2. Negate only the rise and write a new slope. Use the new slope to write an equation of a line. Then graph the line.

5. The four lines that you have graphed make two pairs of perpendicular lines (lines that meet at right angles). List these two pairs of perpendicular lines.

6. Observe the slopes of each pair of perpendicular lines. Make any observations that you can about the slopes.

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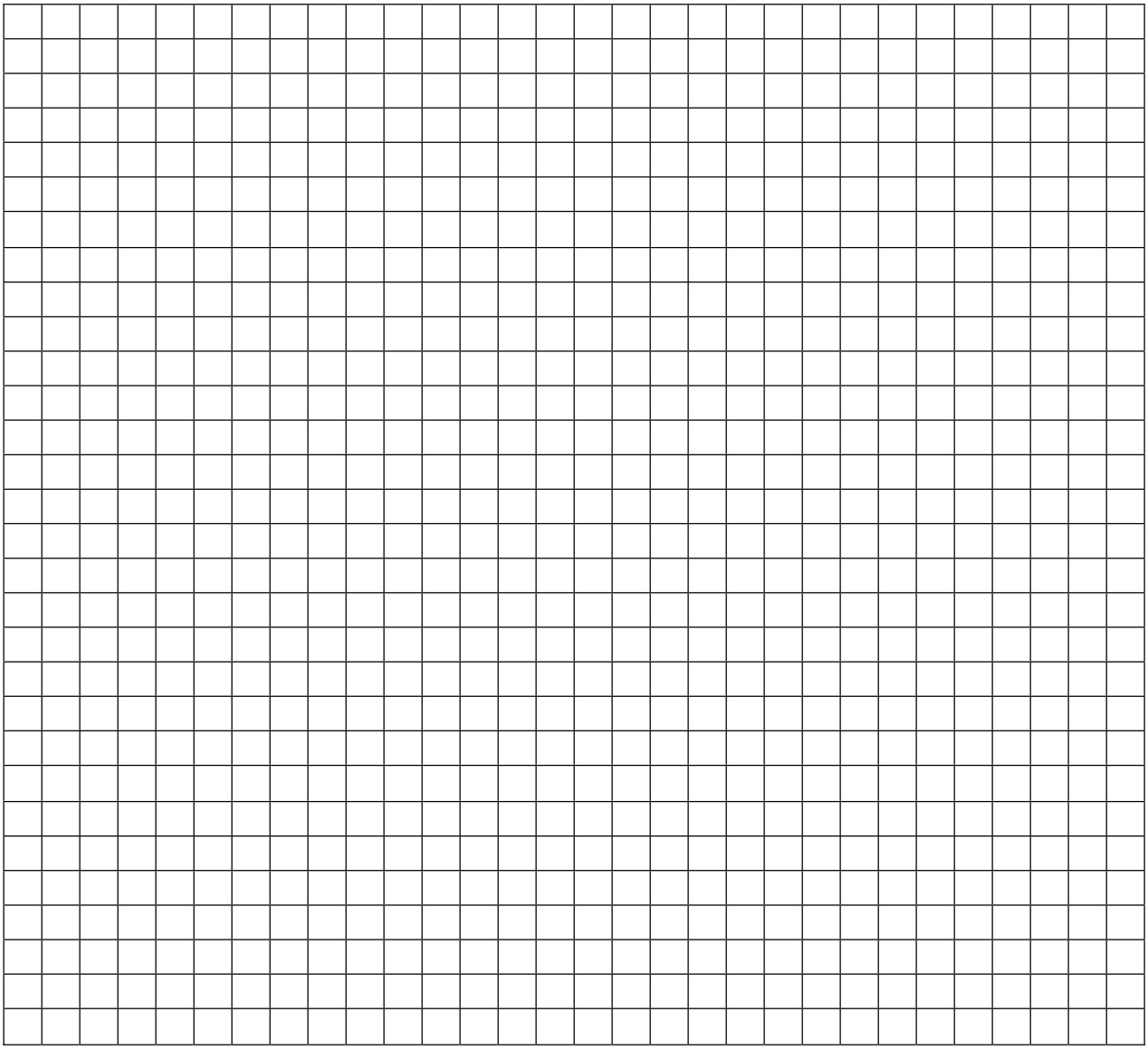
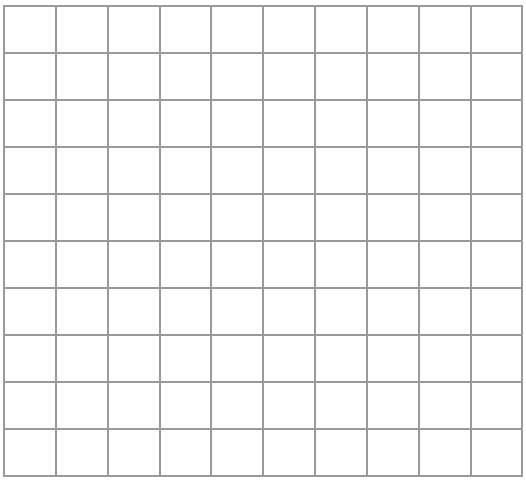


1. Find the slope of the line that contains the points (–1, 2) and (2, –7).

2. On the graph paper below, graph the line with equation $y = -3x$. Identify the line's slope and direction.

3. On the graph paper below, graph the line that contains the points (–5, 3), (–3, 3), and (0, 3). Identify the line's slope and direction.



lesson twenty-three - student resource sheet

Lesson Objective: Investigate and describe the effects of changes in *m* and *b* on the graph of $y = mx + b$, and graph a line using intercepts or slope-intercept form.

Vocabulary Box

intercept – The point where a line intersects the axis. The *x*-intercept of a line is the point where it intersects the *x*-axis; the *y*-intercept of a line is the point where it crosses the *y*-axis.

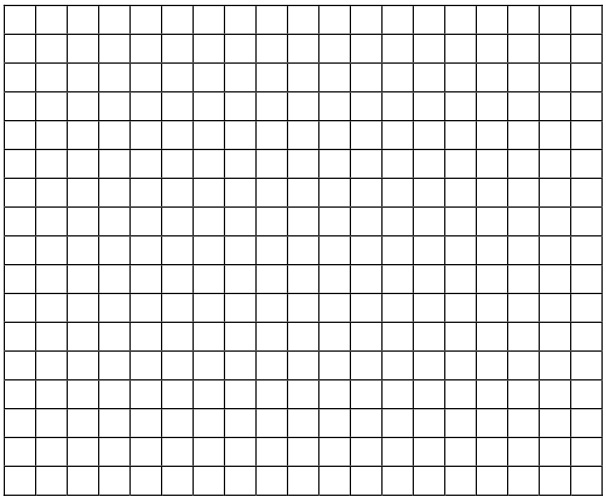
Guided Practice

Complete the following practice problems with your partner. Then your teacher will review the answers. Make sure that you show all important work.

I. Directions: On the graph paper below, use the slope and *y*-intercept to graph each of the following lines.

1. $y = -4x + 5$

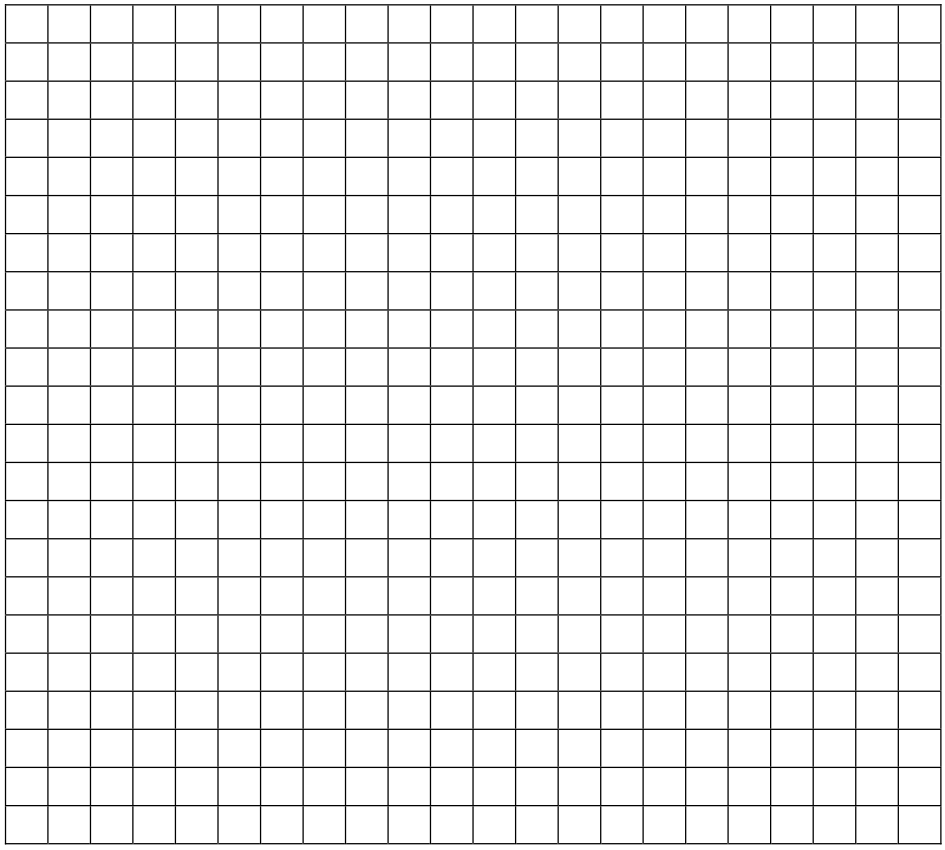
2. $y = \frac{5}{2}x - 3$



II. Directions: On the graph paper below, use the *x*-intercept and *y*-intercept to graph each of the following lines.

1. $4x + 6y = 12$

2. $3x - y = -6$



Summary/Closure

A. Vocabulary Words

1. A particular line contains the point (0, 4). Is the point (0, 4) the line's *x*-intercept or *y*-intercept? Explain.

2. The same line contains the point (–3, 0). Is the point (–3, 0) the line's *x*-intercept or *y*-intercept? Explain.

B. Summarize What We Learned Today

Directions: Write a linear equation in slope-intercept form, and use the slope and *y*-intercept to graph the line. Next, write a linear equation in standard form, and use the *x*-intercept and *y*-intercept to graph the line. Then, write a few sentences to explain each method. You will use this explanation as a personal reminder.

lesson twenty-four - student resource sheet

Lesson Objective: Investigate and describe the effects of changes in *m* and *b* on the graph of $y = mx + b$, and graph a line using intercepts or slope-intercept form.

Vocabulary Box

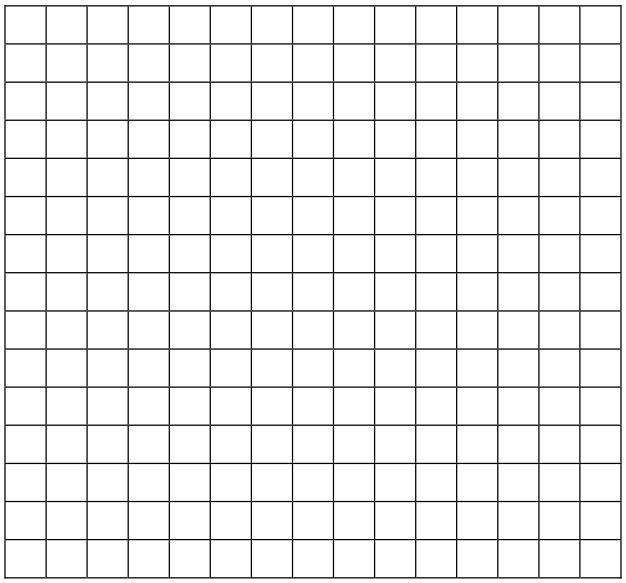
intercept – The point where a line intersects the axis. The *x*-intercept of a line is the point where it intersects the *x*-axis; the *y*-intercept of a line is the point where it crosses the *y*-axis.

Independent Practice

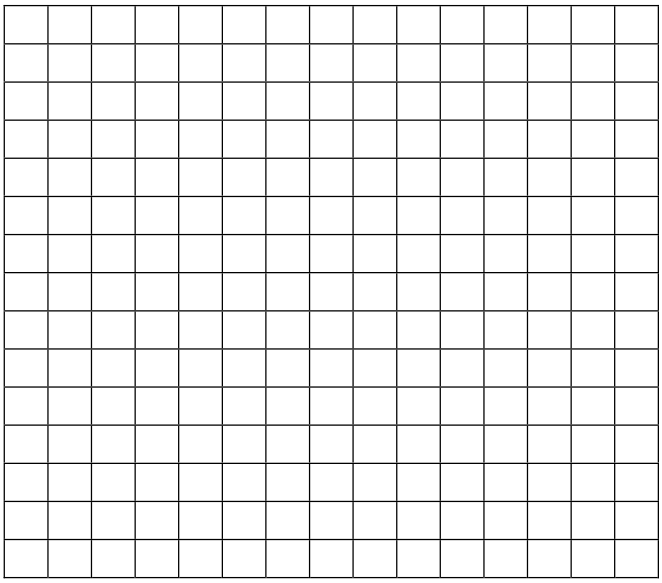
Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: For each equation, choose whether you will use slope and *y*-intercept or the *x*- and *y*-intercepts to graph the line. Then graph the line.

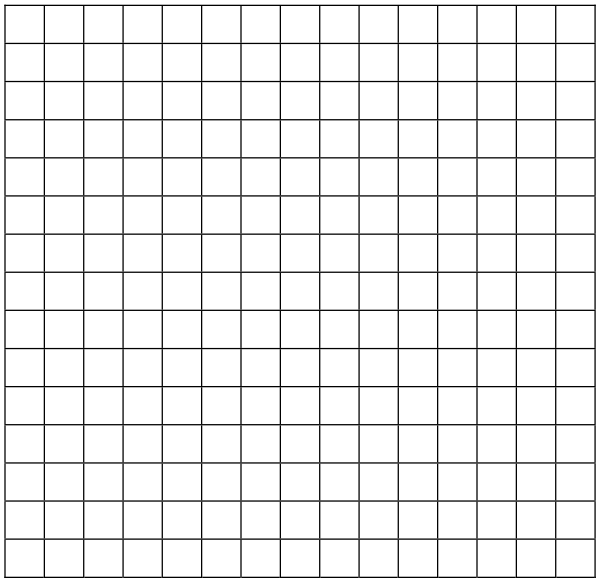
1. $y = -4x + 1$



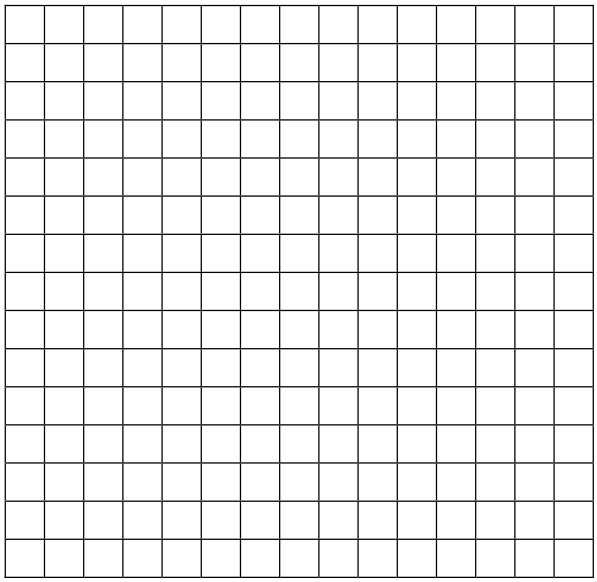
2. $y = x - 5$



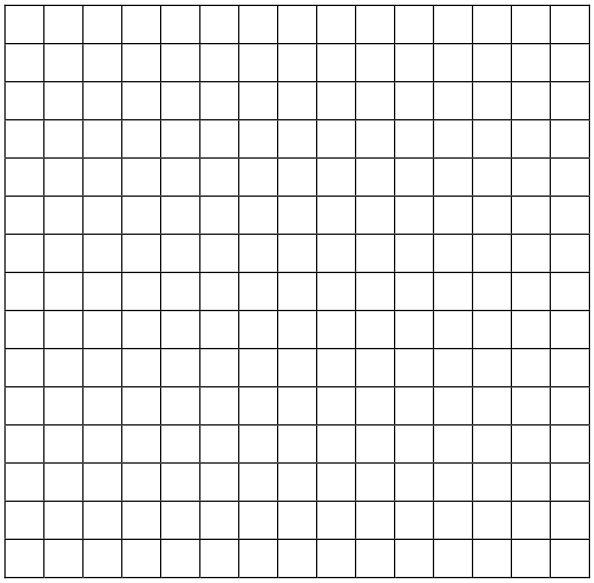
3. $4x - 5y = 20$



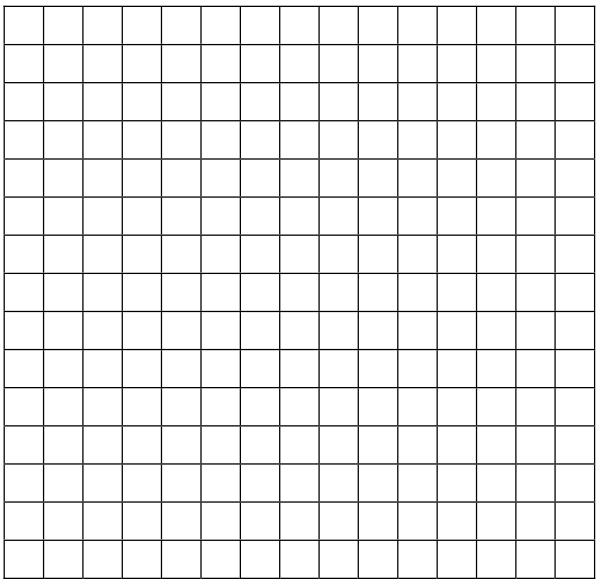
4. $x - y = -7$



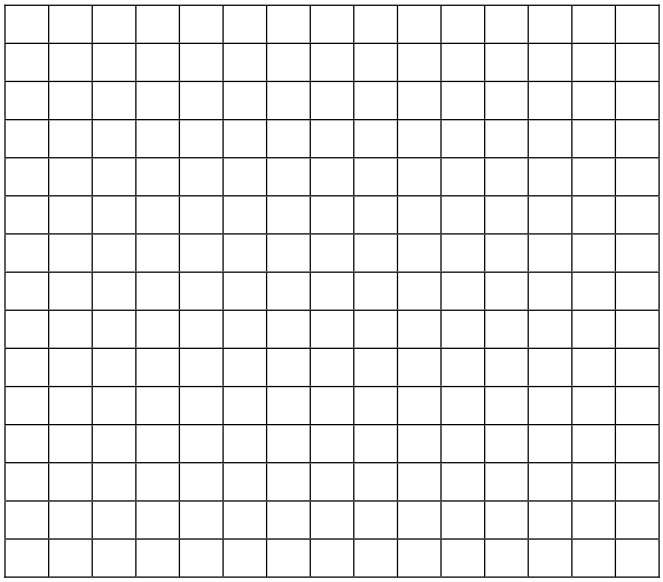
5. $y = \frac{3}{5}x - 10$



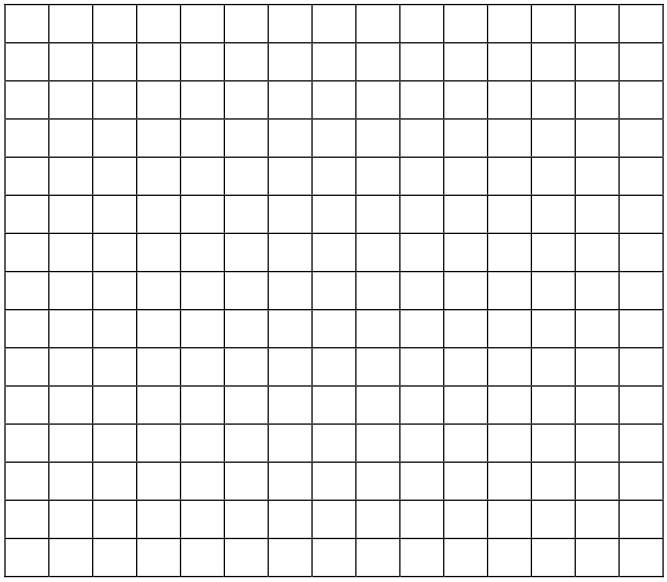
6. $-7x - 2y = 14$



7. $-2x + 3y = -12$



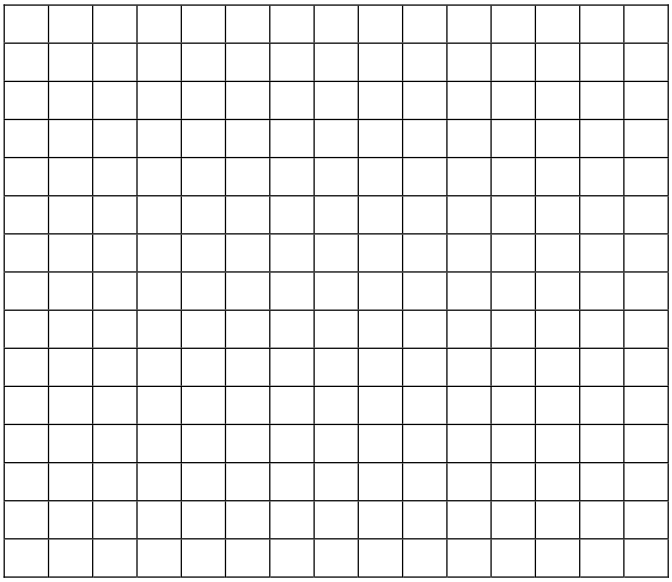
8. $y = -\frac{1}{3}x - 2$



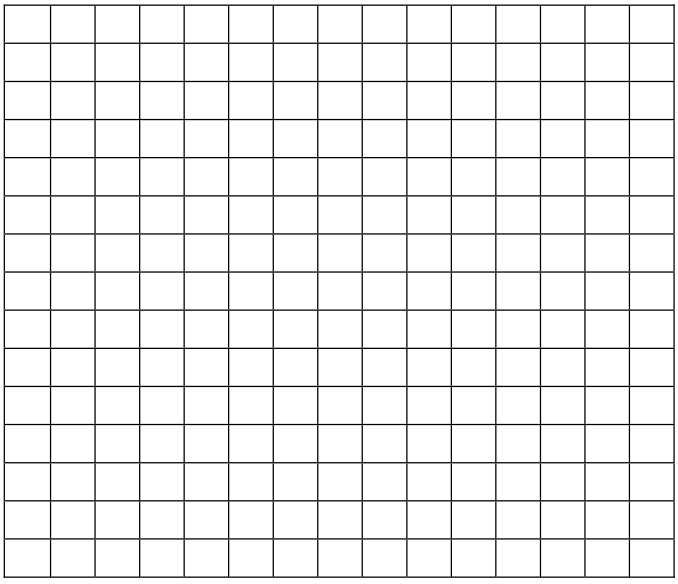
BONUS?

Directions: Complete each exercise.

1. Rewrite the equation from problem 7 above in slope-intercept form. Then use the slope and *y*-intercept to graph the line. Compare your graph to your graph of problem 7 above.



2. Rewrite the equation from problem 2 above in standard form. Then use the *x*- and *y*-intercepts to graph the line. Compare your graph to your graph of problem 2 above.



lesson twenty-four - student resource sheet

Directions: Complete each exercise based upon the following problem.

Roland has 60 tickets to use on rides at the fair. Some of the rides cost 3 tickets each, and the rest of the rides cost 4 tickets each. How many of each ride can Roland take by using his 60 tickets?

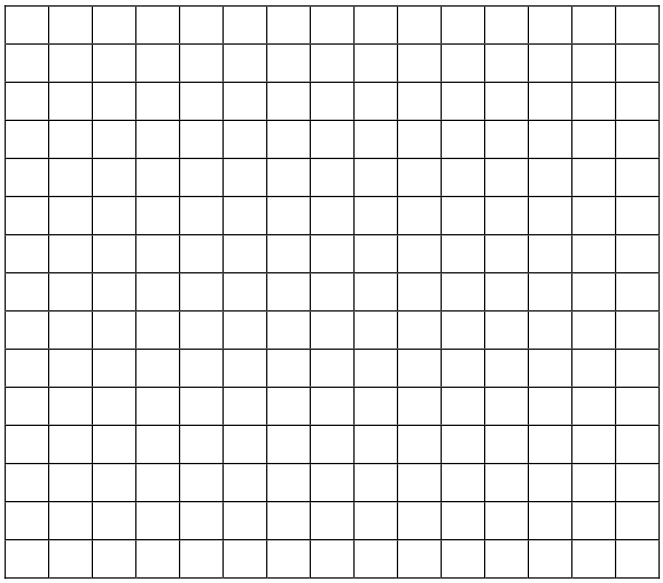
1. Let x = the number of rides that cost 3 tickets each. Write an expression that represents the number of tickets that Roland will need, to ride any number of 3-ticket rides.

2. Let y = the number of rides that cost 4 tickets each. Write an expression that represents the number of tickets that Roland will need, to ride any number of 4-ticket rides.

3. Write an expression that represents the total number of tickets that Roland will need, to ride any number of 3-ticket and 4-ticket rides.

4. Now write an equation that includes the above expressions and represents the possible numbers of 3-ticket and 4-ticket rides that Roland will be able to ride by using his 60 tickets.

5. On graph paper, graph the line represented by this equation.



6. What is the *x*-intercept of this line?

7. Interpret the *x*-intercept.

8. What is the *y*-intercept of this line?

9. Interpret the *y*-intercept.

10. If Roland rides eight 3-ticket rides, how many 4-ticket rides can he ride?

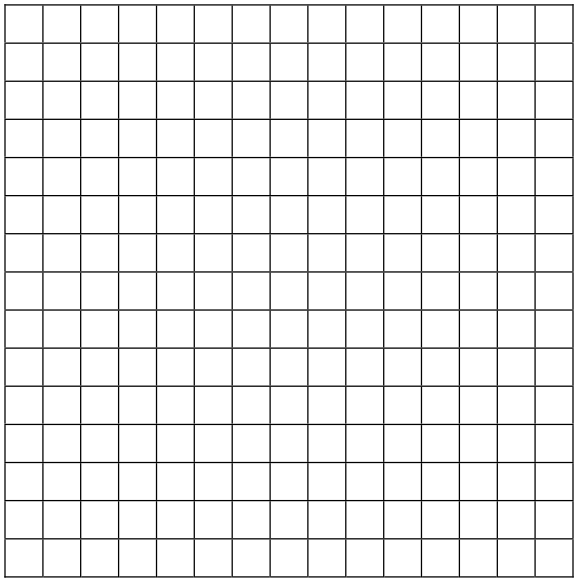
11. If Roland rides three 4-ticket rides, how many 3-ticket rides can he ride?

12. Find two other possible combinations.

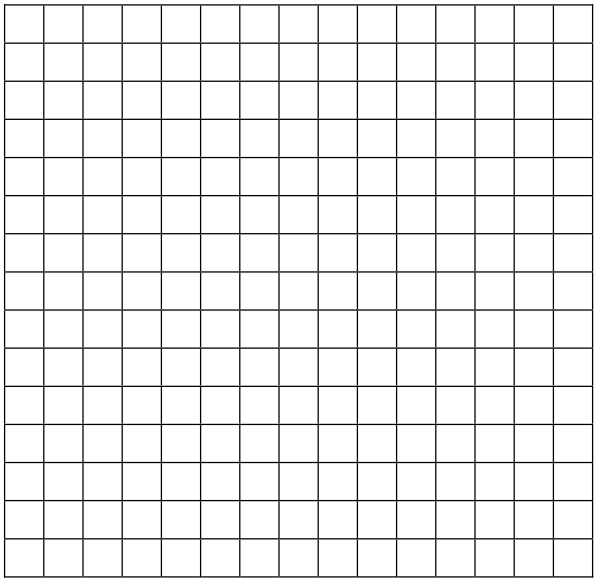
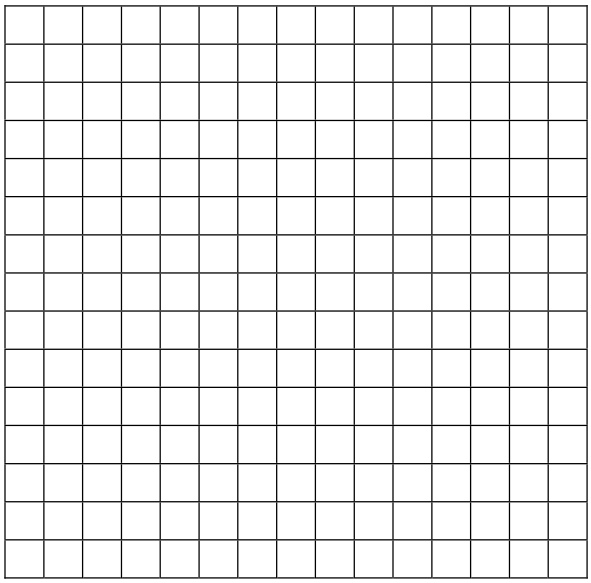
lesson twenty-four - student resource sheet

Directions: For each equation, choose whether you will use slope and *y*-intercept or the *x*- and *y*-intercepts to graph the line. Then graph the line.

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



2. $3x - 2y = 18$



3. $y = 4x + 1$