

Appendix L:

Graphing Linear Equations

TERMINOLOGY

APPENDIX L

For each of the following terms, provide 1) a definition in your own words, 2) the formal definition (as provided by your text or instructor), and 3) an example of the term using a drawing or problem. A sample filled-out form is available in the Introduction.

Horizontal Line

Your definition	
Formal definition	
Example	

Vertical Line

Your definition	
Formal definition	
Example	

x-intercept

Your definition	
Formal definition	
Example	

y-intercept

Your definition	
Formal definition	
Example	

READING AND SELF-DISCOVERY QUESTIONS

APPENDIX L

1. How would you explain the process of graphing a linear equation to another student?
Look for three ordered pairs that are solutions to the equation. Plot those three points. Draw a line through the points. If the points are not in a straight line, check the method you used to find the points for errors.
2. Why should you use a minimum of three points when graphing a linear equation?
You use a minimum of three points to make sure that your solutions are correct.
3. When graphing a linear equation using the x- and y-intercepts, what number is used to find both of those values?
The number zero is used to find both of these values.
4. What kind of line is parallel to the x-axis? Write the equation for the line of your choice that fits this description.
A horizontal line, and an equation that has zero as the coefficient of x, that is to say, an equation in which x does not appear. For example, $y + 5 = 0$
5. What kind of line is parallel to the y-axis? Write the equation for the line of your choice that fits this description.
A vertical line, and an equation that has zero as the coefficient of y, that is to say, an equation in which y does not appear. For example, $x = 2$

CRITICAL THINKING QUESTIONS

APPENDIX L

1. You are asked to plot the relationship of hours worked per day (x) and wages earned per day (y) on a rectangular coordinate grid. The equation for this relationship is $y = 5x + \$88$. You create the table at right with three coordinates to plot on the graph.

X	Y
8	128
5	113
-1	83

- a) Are all three ordered pairs solutions to the linear equation? Why or why not?

Yes, the ordered pairs are solutions to the equation because each one satisfies the equation.

- b) In the context of the problem, do all three coordinates make sense? Explain your answer.

No. You cannot work -1 hours.

2. How can you tell that $y = 4x + 8$ is a linear equation?

The exponents of x and y are both 1.

3. How can using the x - and y -intercepts as coordinates simplify the process of graphing a line?

To graph an equation, you need three points. Finding the two points on the axes is simple because you can find them using 0 for a variable twice, once for x and once for y .

DEMONSTRATE YOUR UNDERSTANDING

APPENDIX L

1. If you graph a horizontal line, which element of the ordered pair (x or y) never changes for any point on the line? **The second coordinate or element never changes for points on a horizontal line.**
2. If you graph a vertical line, which element of the ordered pair (x or y) never changes for any point on the line? **The first coordinate or element never changes for points on a vertical line.**

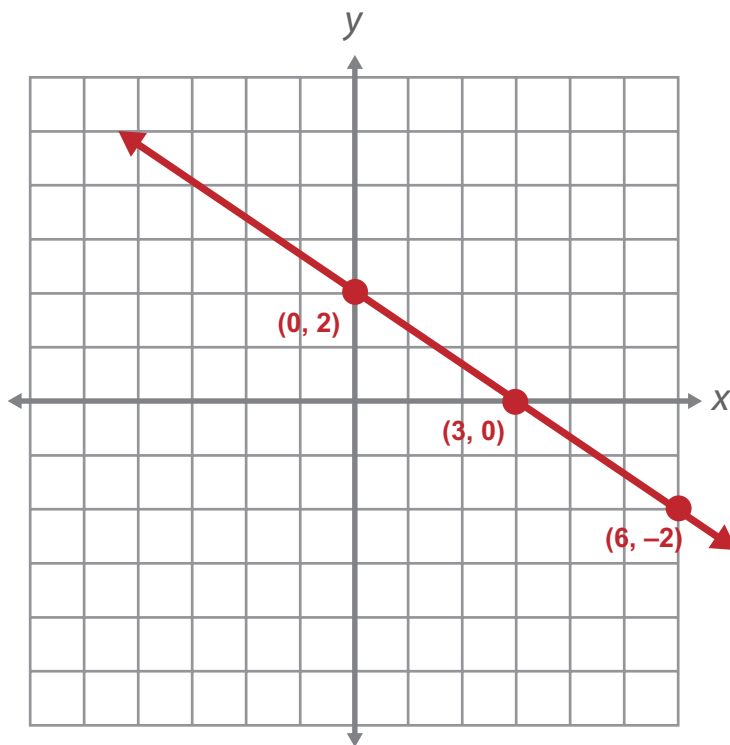
3. For each of the following linear equations, find three ordered pairs that are solutions and use them to graph the line.

a) $2x + 3y = 6$

ordered pairs

X	Y
0	2
3	0
6	-2

The ordered pairs used are an example; student pairs/values will vary but should all fall on the graphed line.

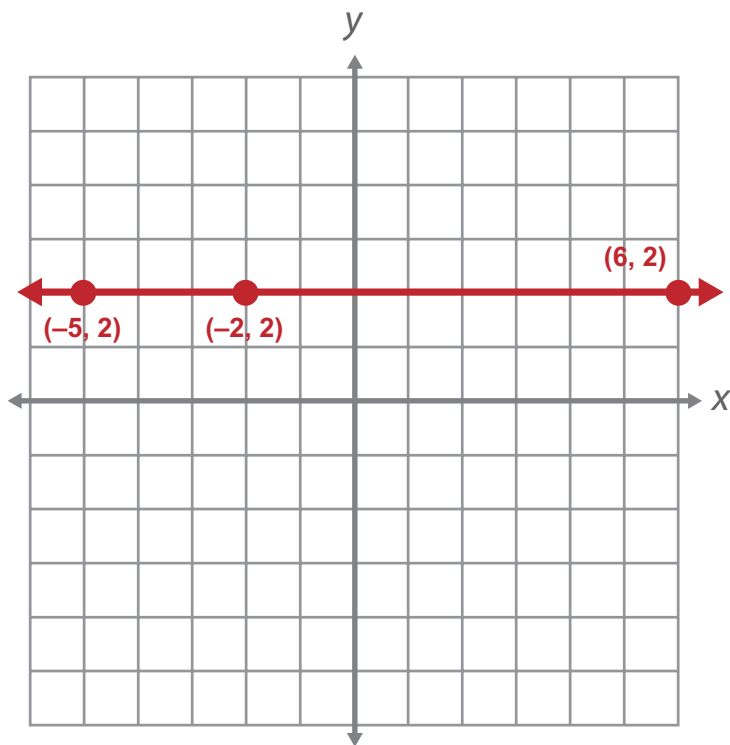


b) $2y - x = -x + 4$

ordered pairs

X	Y
-5	2
-2	2
6	2

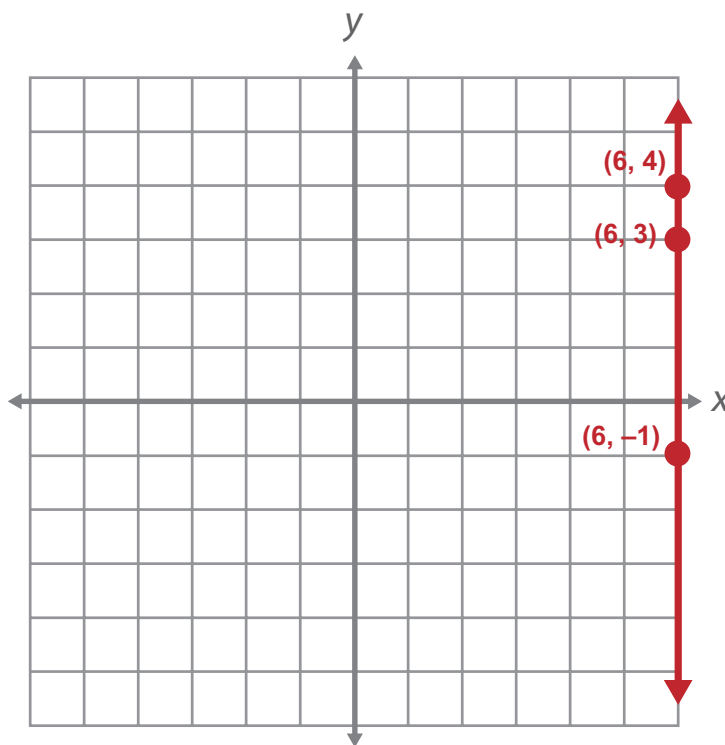
The ordered pairs used are an example; student pairs/values will vary but should all fall on the graphed line.



c) $\frac{1}{3}x = 2$

ordered pairs

X	Y
6	4
6	3
6	-1



IDENTIFY AND CORRECT THE ERRORS

APPENDIX L

Identify the error(s) you find in each of the following worked solutions. Describe the error made and solve the problem correctly in the appropriate spaces provided.

Problem

1. Write an equation for the graph at right.

Worked Solution

(What is wrong here?)

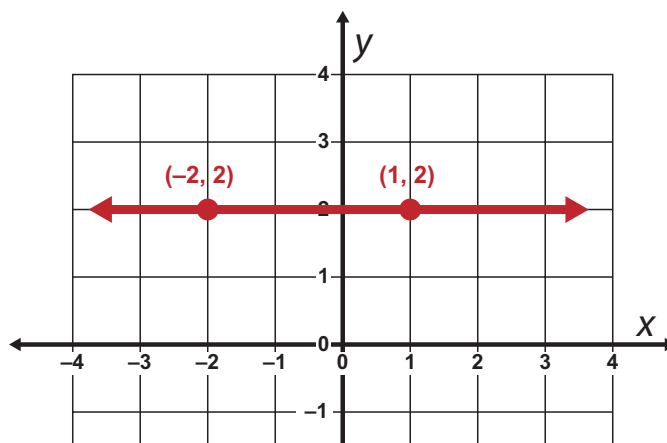
$$x = 2$$

Describe Error

Student's solution is for an x -value remaining constant (a vertical line). In the graph, the y -value remains constant, so the equation should describe a horizontal line with a y -value of 2.

Correct Process

$$y = 2$$



Problem

2. For the following equation, find three ordered pairs that are solutions and use these to graph the line:

$$3x - y = 2y + 6$$

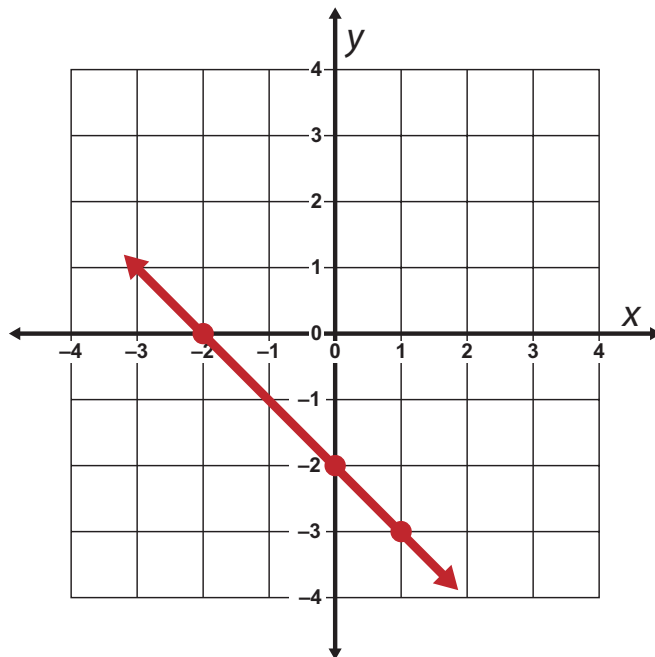
Worked Solution (What is wrong here?)

$$\begin{array}{r} 3x - y = 2y + 6 \\ -2y \quad -2y \\ \hline 3x - 3y = 6 \\ -3x \quad -3x \\ \hline -3y = -3x + 6 \\ \frac{-3}{-3}y = \frac{-3}{-3}x + \frac{6}{-3} \end{array}$$

$$y = -x - 2$$

ordered pairs

X	Y
1	-3
0	-2
-2	0



Describe Error

The expression $\frac{-3}{-3}$ is computed incorrectly as -1 . The equation should be $y = x - 2$.

Correct Process

$$\begin{array}{r} 3x - y = 2y + 6 \\ 3x - y = 2y + 6 \\ -2y \quad -2y \\ \hline 3x - 3y = 6 \\ -3x \quad -3x \\ \hline -3y = -3x + 6 \\ \frac{-3}{-3}y = \frac{-3}{-3}x + \frac{6}{-3} \\ y = x - 2 \end{array}$$

ordered pairs

X	Y
1	-1
0	-2
-2	-4

