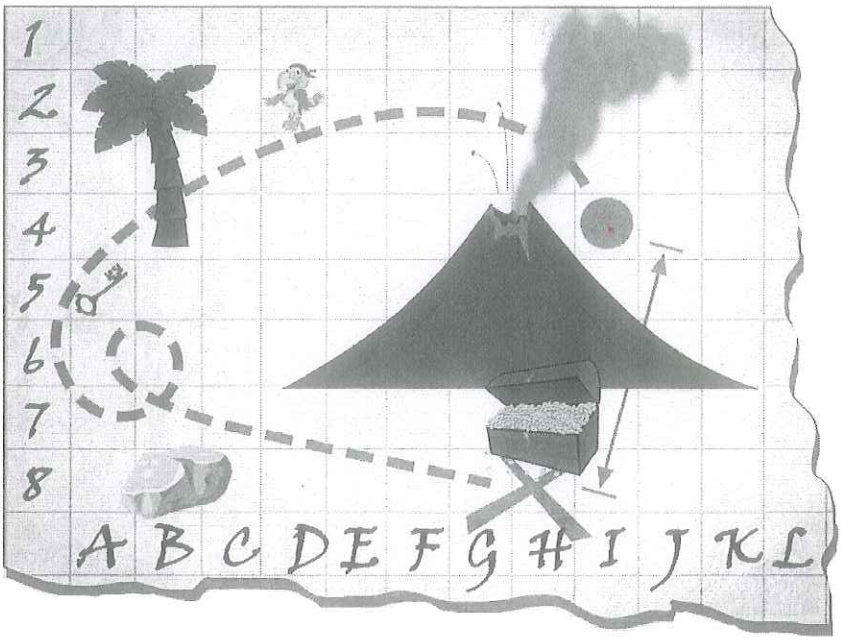
Math 60, Sections 4.1 and 4.2 Group Activity Name: Solutions

Section 4.1 Cartesian Coordinates

1. Write the location of each item on the map using a letter-number pair. Write the letter, then the number.



a. Starting point I4 or (I,4)

b. Parrot D2 or (D,2)

c. Palm Tree B4 or (B,4)

d. Key A5 or (A,5)

e. Rock B8 or (B,8)

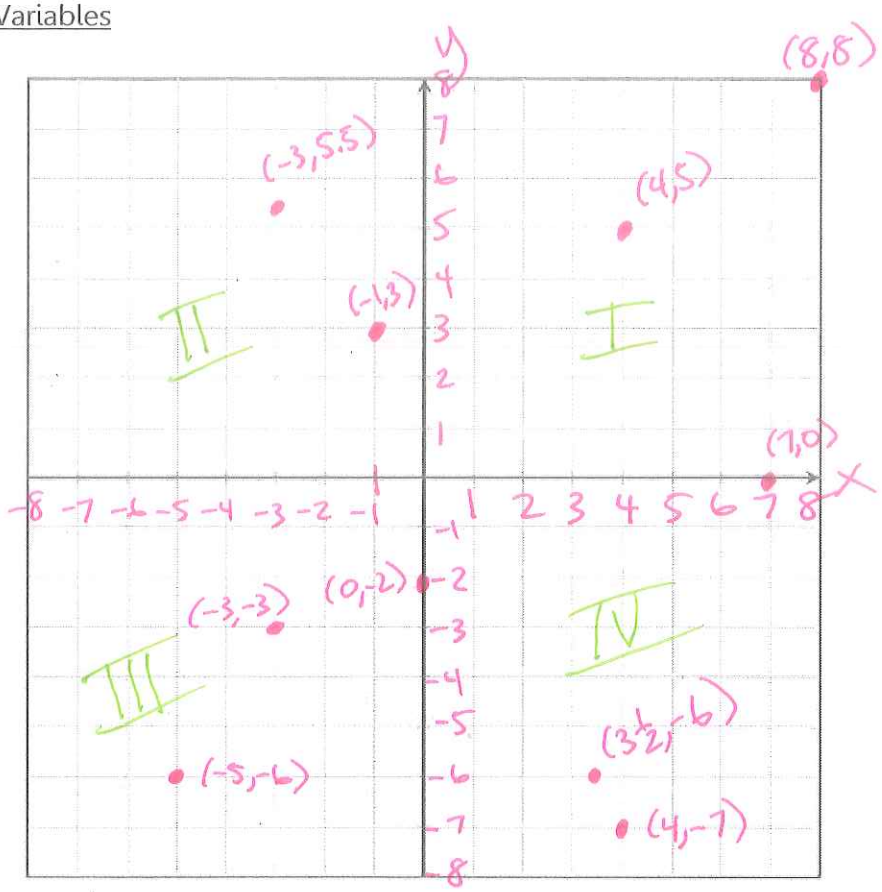
f. Treasure Chest H8 or (H,8)

<u>The Cartesian Coordinate System for Two Variables</u>

2. Label the axes, scale, and quadrants of the graph.

3. Plot and label each point.

a. $(4,5)$
b. $(-1,3)$
c. $(-5,-6)$
d. $(4,-7)$
e. $(7,0)$
f. $(0,-2)$
g. $(-3,5.5)$
h. $(8,8)$
i. $\left(3\frac{1}{2},-6\right)$
j. $(-3,-3)$



4. For each of the following conditions, state which quadrant the point would be in, or which axis the point would be on.

a. $x > 0$ and $y < 0$ — x-positive, y-negative — IV

b. $x > 0$ and $y = 0$ — x-axis

c. $x < 0$ and $y < 0$ — III

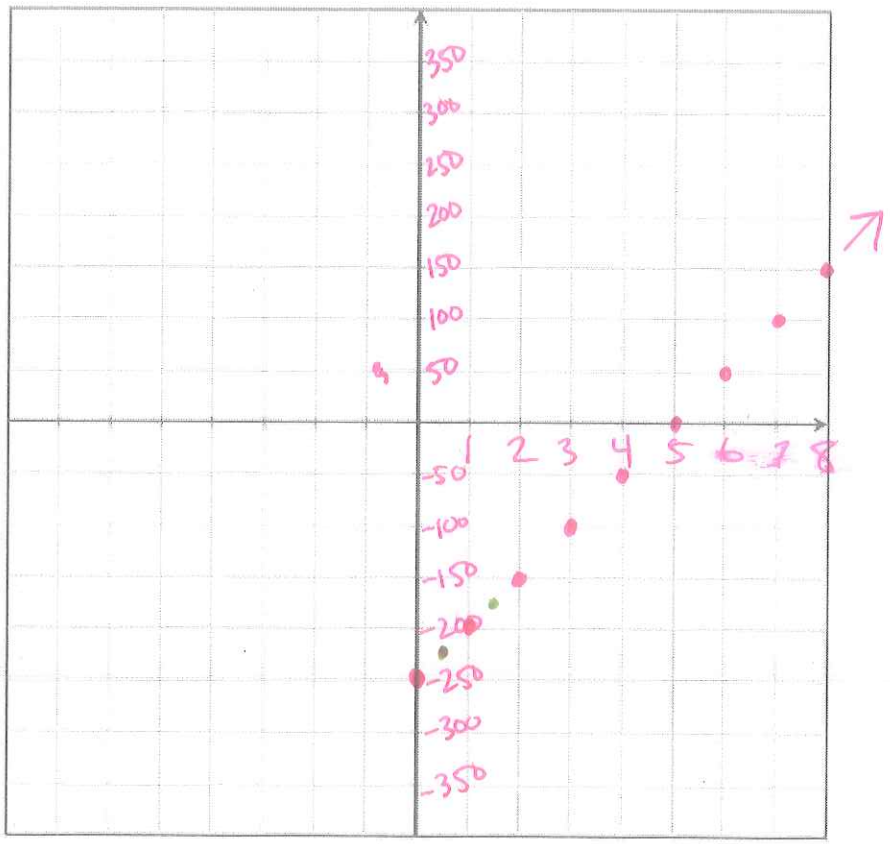
Section 4.2 Graphing Equations

5. Jamie charged $250 on a 0%-interest-for 6-month credit card. They decided to pay $50 per month until the balance is paid off, and then keep saving that amount in a savings account (we will ignore any interest for the time being.)

a. Complete the table for Jamie's balance each month. (Owing money is a negative balance)

b. Using a horizontal scale of 1 for months and a vertical scale of $50, plot Jamie's balance on the graph. Label the axes and scale.

Month x	Current Balance (Owed or Saved) y
0	$y =$ −250
1	$y =$ −200
2	$y =$ −150
3	$y =$ −100
4	$y =$ −50
5	$y =$ 0
6	$y =$ 50
7	$y =$ 100
8	$y =$ 150
x	$y =$ −250 + 50x



c. For this context, does it make sense to draw a line? Does it make sense to extend the pattern with arrows? They are only paying once a month, so we will only draw the dots. The pattern only continues to the right.

d. Look at the graph to determine which ordered pairs are solutions to the equation.

$(10, 250)$ is a solution

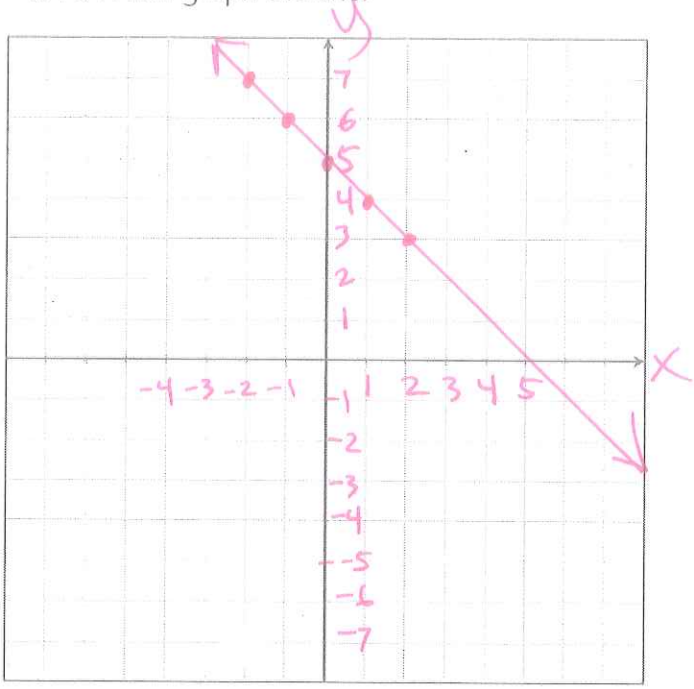
$(-1, -300)$ not a solution in this context

$(1.5, -175)$ not a solution in this context

$(5, 25)$ not a solution

6. Make a table of solutions to the linear equation $y = -x + 5$. Then graph the line.

x	$y = -x + 5$	(x, y)
-2	$y = -(-2) + 5 = 2 + 5$	$(-2, 7)$
-1	$y = -(-1) + 5 = 1 + 5$	$(-1, 6)$
0	$y = -0 + 5 = 5$	$(0, 5)$
1	$y = -1 + 5 = 4$	$(1, 4)$
2	$y = -2 + 5 = 3$	$(2, 3)$

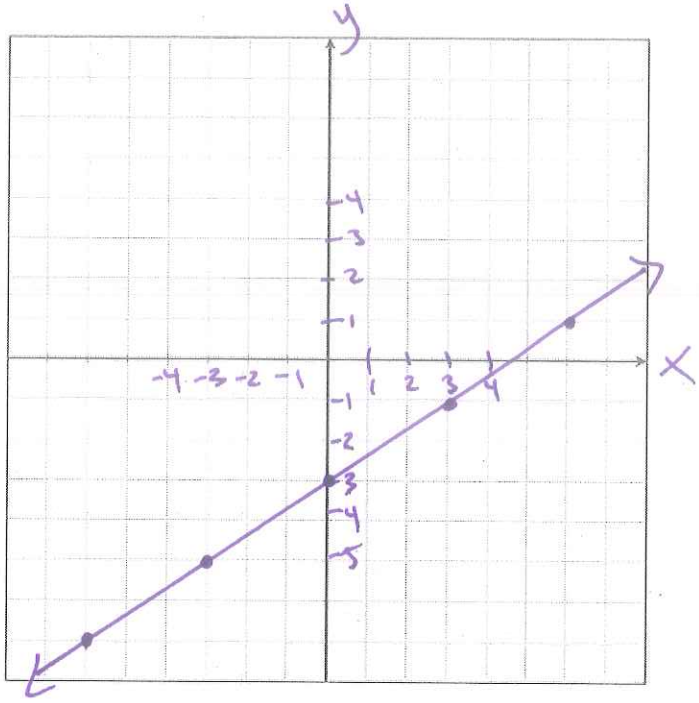


7. Make a table of solutions to the linear equation $y = \frac{2}{3}x - 3$. Then graph the line.

Hint: Choose your x-values wisely to avoid fractions☺ multiples of 3

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

x	~~$y = \frac{1}{2}x - 1$~~	(x, y)
-6	$y = \frac{2}{3} \cdot \frac{-6^{2}}{1} - 3 = -4 - 3$	$(-6, -7)$
-3	$y = \frac{2}{3} \cdot \frac{-3^{1}}{1} - 3 = -2 - 3$	$(-3, -5)$
0	$y = \frac{2}{3} \cdot 0 - 3 = 0 - 3$	$(0, -3)$
3	$y = \frac{2}{3} \cdot \frac{3^{1}}{1} - 3 = 2 - 3$	$(3, -1)$
6	$y = \frac{2}{3} \cdot 6^{2} - 3 = 4 - 3$	$(6, 1)$



8. How is graphing a model with context different than graphing the equation of a line without context?

when graphing an equation without context, like $y=-x+5$, we graph all 4 quadrants, draw a solid line with arrows. when graphing a word problem with context, look at the situation and decide whether negatives make sense, whether its discrete or continuous, and whether the pattern continues. ↔ → ←

9. Determine whether the following ordered pairs are solutions to the equation $3x-y=-1$

$(0,1)$ (x, y)

$3(0)-1 \stackrel{?}{=} -1$

$0-1=-1$

$-1=-1$

yes, $(0,1)$ is a solution

$(1,5)$

$3x-y=-1$

$3(1)-5 \stackrel{?}{=} -1$

$3-5 \stackrel{?}{=} -1$

$-2 \neq -1$

not a solution

$\left(-\frac{1}{3},0\right)$

$3x-y=-1$

$\frac{3}{1}\left(-\frac{1}{3}\right)-0 \stackrel{?}{=} -1$

$-1-0=-1$

$-1=-1$ ✓

this point is a solution

More Practice

10. Draw a dot at each of the following coordinates and write which quadrant the point is in, or which axis it is on.

a. $(-6,0)$ x-axis

b. $(4,-2)$ IV

c. $(-3,3)$ II

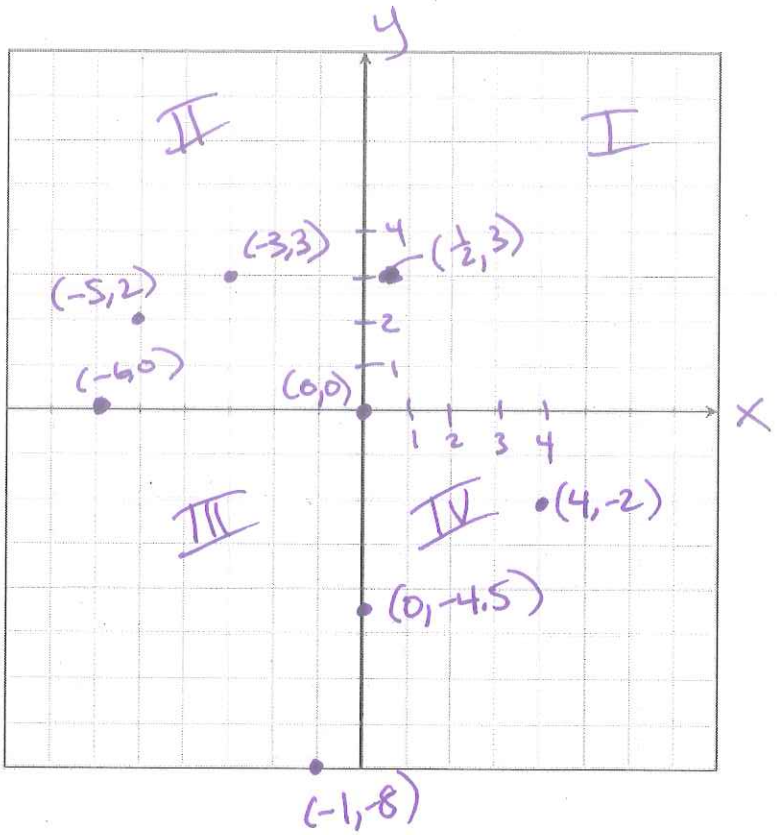
d. $(0,-4.5)$ y-axis

e. $\left(\frac{1}{2},3\right)$ I

f. $(-5,2)$ II

g. $(0,0)$ origin (x and y axes)

h. $(-1,-8)$ III



11. Determine whether the following ordered pairs are solutions to the equation $y = -3x + 6$

$(1,3)$

$y = -3x + 6$

$3 \stackrel{?}{=} -3(1) + 6$

$3 \stackrel{?}{=} -3 + 6$

$3 = 3$ ✓

is a solution

$(-1,-3)$

$y = -3x + 6$

$-3 \stackrel{?}{=} -3(-1) + 6$

$-3 \stackrel{?}{=} 3 + 6$

$-3 \neq 9$

not a solution

$(2,0)$

$y = -3x + 6$

$0 \stackrel{?}{=} -3(2) + 6$

$0 = -6 + 6$

$0 = 0$

is a solution

12. Determine whether the following ordered pairs are solutions to the equation $y = -\frac{2}{3}x + 4$

$(3,-6)$

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

$-6 \stackrel{?}{=} -\frac{2}{3} \cdot \frac{3}{1} + 4$

$-6 \stackrel{?}{=} -2 + 4$

$-6 \neq 2$ not a solution

$(-3,6)$

$6 \stackrel{?}{=} -\frac{2}{3} \cdot \frac{-3}{1} + 4$

$6 \stackrel{?}{=} 2 + 4$

$6 = 6$

is a solution

$(0,4)$

$4 \stackrel{?}{=} -\frac{2}{3} \cdot 0 + 4$

$4 = 0 + 4$

$4 = 4$

is a solution

13. A car's gas tank holds 12 gallons of gas. The car uses fuel at an average rate of $\frac{0.06 \text{ gal}}{1 \text{ mile}}$. Make a table of solutions to the linear equation $y = 12 - 0.06x$. For this context, does it make sense to draw a line? Does it make sense to extend the pattern with arrows?

rate

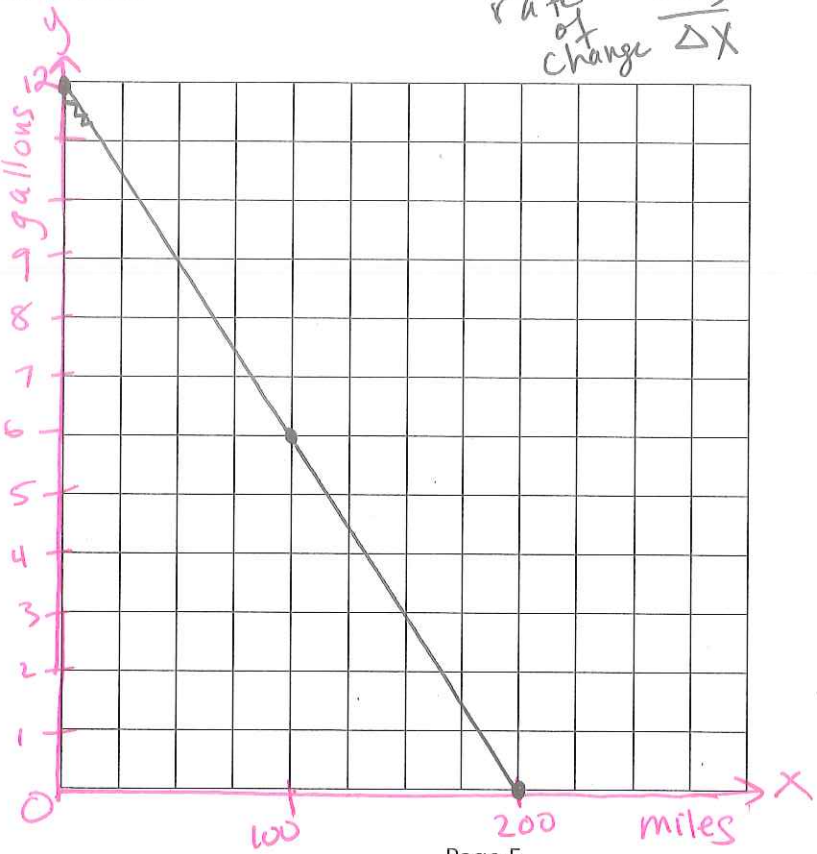
Hint: Choose your x-values wisely☺

x miles

y gallons

x	$y = 12 - 0.06x$	(x, y)
0	$12 - .06(0) = 12$	$(0,12)$
100	$12 - .06(100) = 6$	$(100,6)$
200	$12 - .06(200) = 0$	$(200,0)$ ↑ ran out of gas
300		
400		
500		

rate of change $\frac{\Delta y}{\Delta x}$



14. Make a table of solutions to the linear equation $y = -4x$. Then graph the line.

x	$y = -4x$	(x, y)
-2	$y = -4(-2) = 8$	$(-2, 8)$
-1	$y = -4(-1) = 4$	$(-1, 4)$
0	$y = -4(0) = 0$	$(0, 0)$
1	$y = -4(1) = -4$	$(1, -4)$
2	$y = -4(2) = -8$	$(2, -8)$