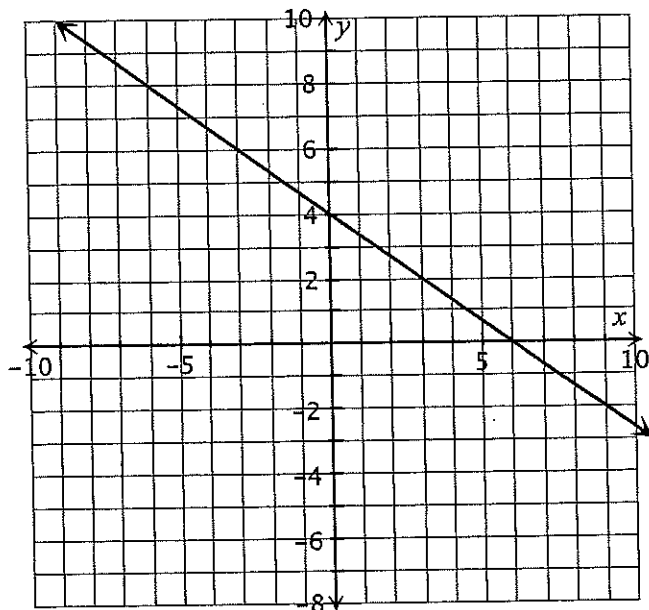


5. Use the graph below to answer the following questions.

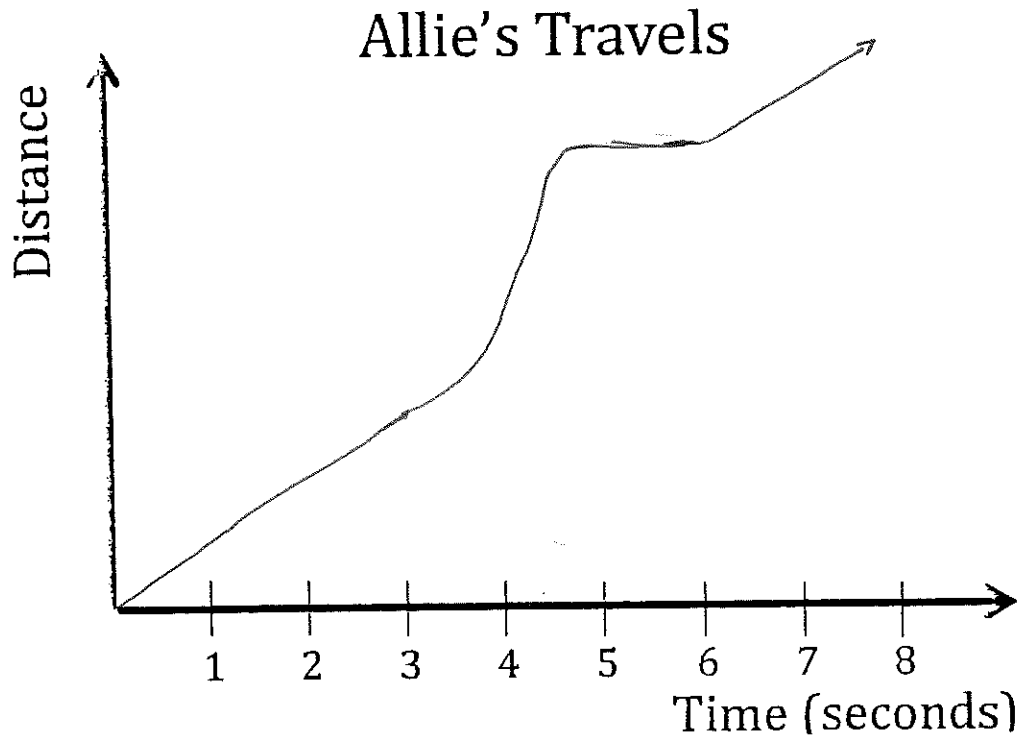


- What is the  $y$ -intercept of the line?
- What is the slope of the line?
- Write the equation of the line in  $y = mx + b$  form.
- Draw a line parallel to this line on the coordinate plane. Write the equation of your parallel line.
- Draw a line perpendicular to this line on the coordinate plane. Write the equation of your perpendicular line.

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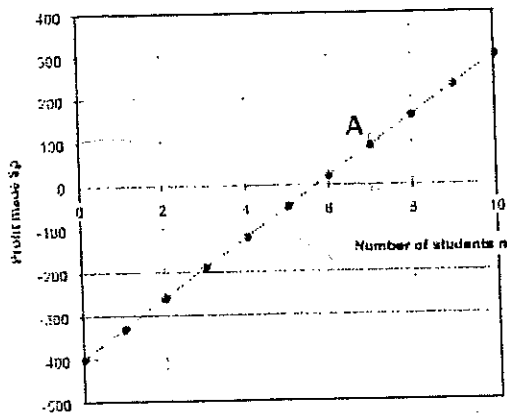
**Mid-Unit Review – Linear Functions**

1. A motion detector is set up. Allie starts next to it and walks away at a constant rate for 3 seconds. She starts to run away, but slips and falls. After 2 seconds on the floor she composes herself and walks away at her original rate. What would this look like on the graph below?



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2. A music teacher is giving guitar class that lasts for 20 weeks. He is renting a studio for the class to be able to meet for \$400. He charges each student \$70 for the course. Use the graph below to answer the following questions.



- a. About how many students must take the class before the music teacher can make money?

Six students

- b. The music teacher would like to make \$100. How many students must he have?

Seven students

- c. Write the coordinates of point A.

(7, 100)

- d. Explain what point A on the graph means in the context of the problem.

With seven students enrolled, the music teacher will make \$100

- e. Explain how the graph would change if the teacher charged more for the classes.

The rate of change (slope) would increase, less students required to "Break even"

- f. Explain how the graph would change if the studio rental fee was \$200 instead of \$400.

y intercept would be at (0, -200)

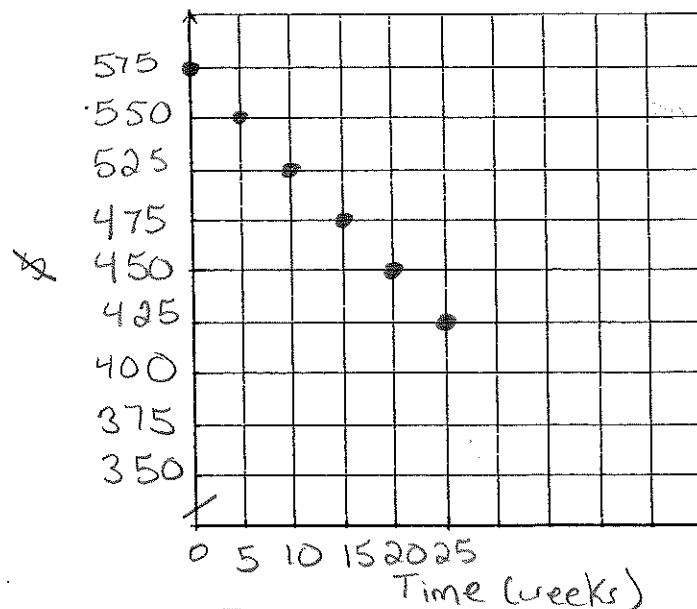
x intercept would be around 3 students

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3. Shawn has \$575 in the bank and each week he withdraws \$25 out of his account.
- a. Complete the following table.

Time (weeks)	Money in the bank
0	575
5	550
10	525
15	500
20	475
25	450

- b. Graph the function. Make sure to label and scale your axes.



- c. Is this an increasing or a decreasing function?
- d. What is the rate of change or slope for the function? Specify the units.

$$\frac{-25 \text{ dollars}}{5 \text{ weeks}} = \frac{-5 \text{ dollars}}{1 \text{ week}}$$

- e. What is the y-intercept of the function?

575

- f. Write the equation of this function in  $y = mx + b$  form.

$$y = -5x + 575$$

- g. How long will it take for Shaun to have \$100 in the bank? Show your work.

$$100 = -5x + 575$$

$$-575 \quad -575$$

$$\frac{-475}{-5} = \frac{-5x}{-5}$$

$$95 = x$$

95 weeks

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4. An airplane is at an altitude of 1,200 feet. It begins to ascend at a rate of 925 feet per minute. go up

a. Is this an increasing or a decreasing function?

b. What is the rate of change or slope for the function? Specify the units.

c. What is the y-intercept of the function?  $\frac{925 \text{ FE}}{1 \text{ minute}}$

1,200

d. Write the equation of this function in  $y = mx + b$  form.

$$y = 925x + 1,200$$

e. How long will it take the plane to ascend to 16,000 feet? Show your work.

16 minutes

$$16,000 = 925x + 1,200$$

$$-1,200 \quad -1,200$$

$$\frac{14,800}{925} = \frac{925x}{925}$$

16 = x

5. Match the function on the left with its identical representation on the right.

Note: One function on the left will not be used.

A.  $y = 50x - 100$

B.  $y = 2x - 4$

C.  $y = -0.5x + 4$

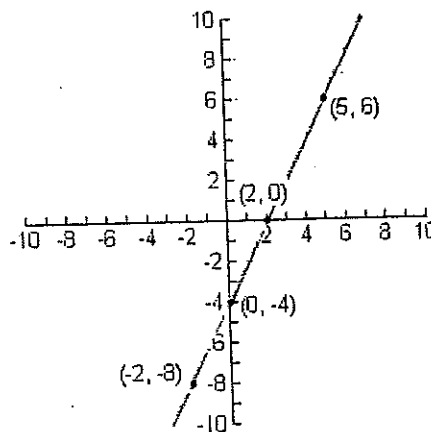
D.

x	y
0	100
1	150
2	200
3	250
4	300
5	350

W. Laura lights a 4 inch candle that burns at a rate of  $\frac{1}{2}$  inch per hour.

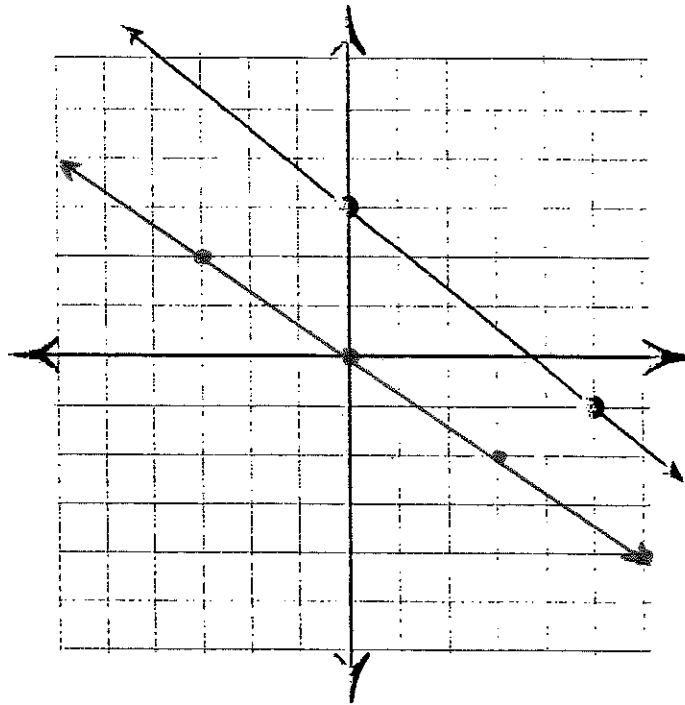
X. Jose the plumber charges \$50 per hour to fix your plumbing and a service fee of \$100.

Y.



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6. Use the coordinate plane below.



a. What is the y-intercept for this line?

$$(0, 3)$$

b. What is the slope of this line?

$$\frac{3 - (-1)}{0 - (-6)} = \frac{4}{-6} = -\frac{2}{3}$$

f. Write the equation of this line in  $y = mx + b$  form.

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

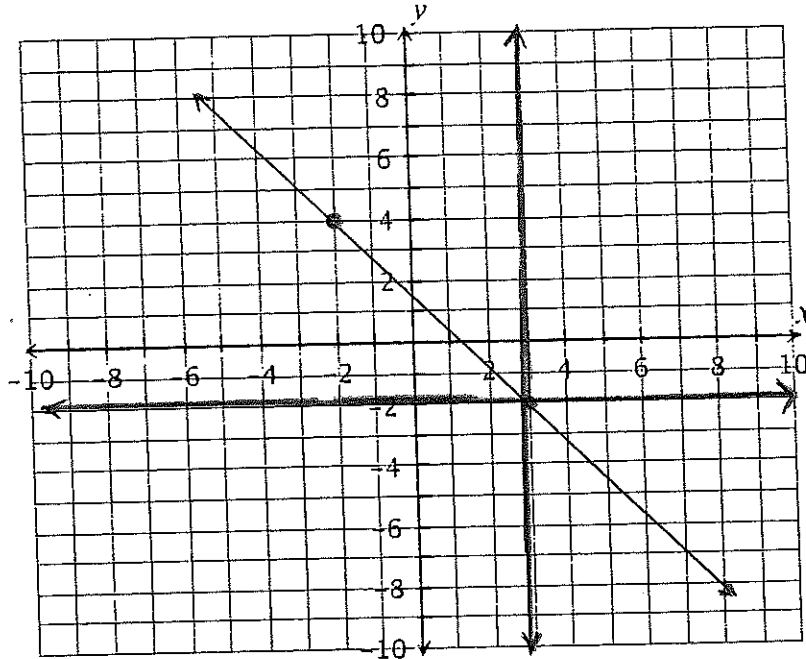
c. Draw a line that is parallel to this line on the coordinate plane.

d. Write the equation of your parallel line in  $y = mx + b$  form.

$$y = -\frac{2}{3}x + 0$$

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7. Use the coordinate plane below.



- a. Place a point on  $(3, -2)$  and label it point A.
- b. Draw a horizontal line through the point  $(3, -2)$ . What is the equation of this horizontal line?
- c. Draw a vertical line through the point  $(3, -2)$ . What is the equation of this vertical line?
- d. Place a point on  $(-2, 4)$  and label it point D. Draw a line through  $(3, -2)$  and  $(-2, 4)$ .
- e. Find the slope of the line through the two  $(3, -2)$  and  $(-2, 4)$ . Explain how you found it.

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-2)}{-2 - 3} = \frac{6}{-5}$$

- f. What is the slope of a line that is perpendicular to the line drawn through  $(3, -2)$  and  $(-2, 4)$ .

opposite reciprocal of  $-\frac{5}{6}$  is  $\left(\frac{6}{5}\right)$

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