

MTH 150: Chapter 2 Questions

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10/3/21

(Section 2.1 Questions)

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1 Question 1

$$P(t) = 4500 + 1700t$$

In recognizing that the problem is looking for the future number of resident in t years. I set the equation (population) = to the original population as of 2003. Considering the population grows 1700 a year. It is clear that the number 1700 will be multiplied by t(years) after the original 2003 population of 4500.

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2 Question 2

$$P(t) = 6900 + 2500t$$

Similarly to the previous question, the population in t years will be made available if the set population in 2005 is initially 69,000. Considering the population is increasing by 2500 a year, it is evident the original set pop. will be added to the rate of pop change.: $(2500(t))$.

3 Question 7

$$f(x) = 4x + 3$$

I recognize immediately that the question is calling for the slope of the equation. in doing so I have to implement the use of $y = mx + b$ to find it. the function an increasing function if $m > 0$; so if $m < 0$ it is a decreasing function. This equation is an increasing function because 4 is greater than 0.

4 Question 8

$$f(x) = 5x + 6$$

Similarly to the previous question in order to check the status of the function: whether increasing or decreasing, The m in the slope equation has to be evaluated as either greater then 0 or less than 0. The function is increasing due to the fact that 5 is greater than 0.

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5 Question 17

(2, 4) and (4, 10) Considering the function is calling for the slope of the equation and provides 2 points on the graph to verify said, slope: what I will do is use the slope formula. $(\frac{rise}{run} = \frac{y_2 - y_1}{x_2 - x_1})$ In this case I will use the point provided and place the integers in the correct place. $(\frac{10-4}{4-2} = \frac{6}{2} = 3 \frac{1}{4})$ the slope of the function = 3

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6 Question 18

Just like the previous equation the function calls for the slope of the equation. With this information I can use the points (1, 5) and (4, 11) to then input the results in the slope formula. $\frac{y_2 - y_1}{x_2 - x_1} = \frac{11 - 5}{4 - 1} = \frac{6}{3} = 2$

the slope of the line is -6

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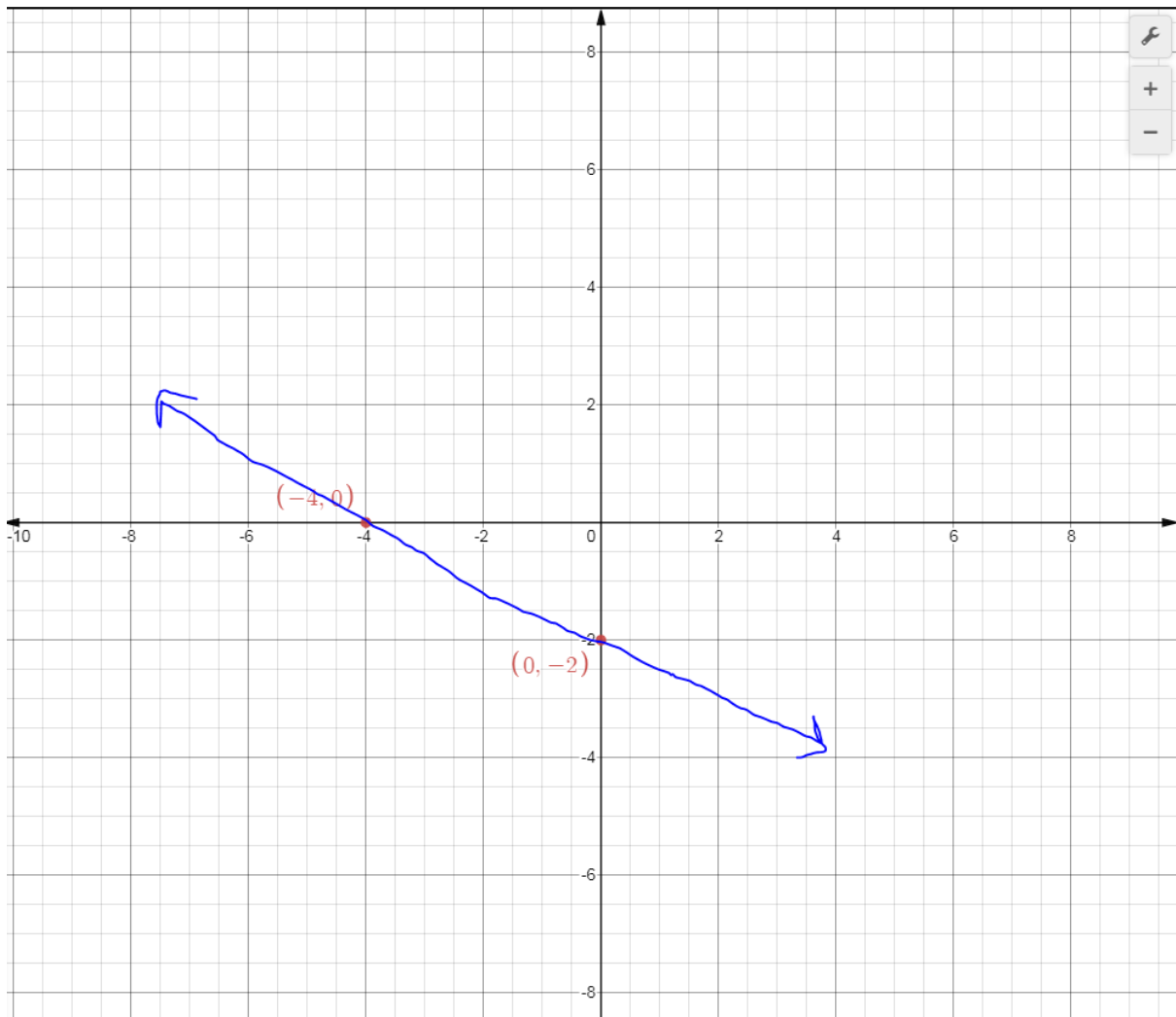
7 Question 25

$$2 \text{ min} = 1.4 \text{ miles} \quad 12 \text{ min} = .9 \text{ miles}$$

Firstly I isolate the reason behind the problem(what the question is asking). The question would like to know the rate at which Sonya has walked @ .9 miles from home after 12 minutes. What I will do first is create a function for the distance walked. after 12 minutes. To get this I will use the initial distance and set it it against the most recent distance walked.

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{.9 - 1.4}{12 - 2} =$$

$$\frac{-0.5}{10} = \text{The rate of change for distance walked while Sonya was on her way home} = 0.05$$



(Section 2.2 Questions)

8 Question 7

Considering the problem called for a physical representation of the line at certain points. I will first use mathematics to get an imagine of the graph

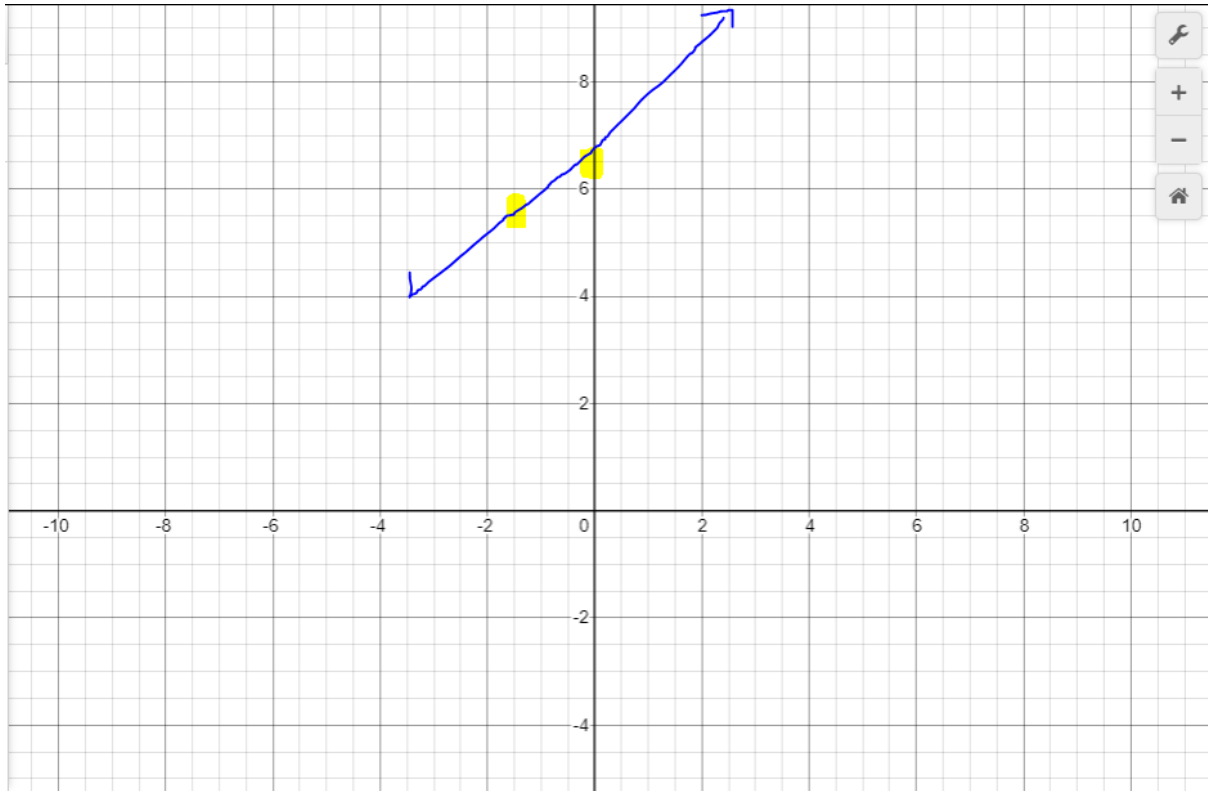
(image above)

9 Question 9

Similar to the previous question, I look to use the point provided by the equation. $(0,7)$. Given the points are both positive, the first point will be in the 1st quadrant-I will then use the provided slope $\frac{-3}{2}$

I go over to the left 3 points, and down two points. The graph below demonstrates the line for the following points and slope provided

(graph below)



10 Question 11

(-6,-2) and (6,-6) In order to the graph the line with the following points, I began graphing the individual points on the graph beginning with (-6,-2), following (6,-6) The results are below
 article

graphicx

Figure ??

11 Question 13

Graph line of equation $f(x)=-2x-1$ This equation alone allows us readers to intepret the line of the graph as going concave down This question prompted me to utilize the website, desmos which would allow me to formualte the graph using the equation. Here we can see the coordinates (-0.5,0) and (0,-1) which makes the line on graph for equation.

article

graphicx

Figure ??

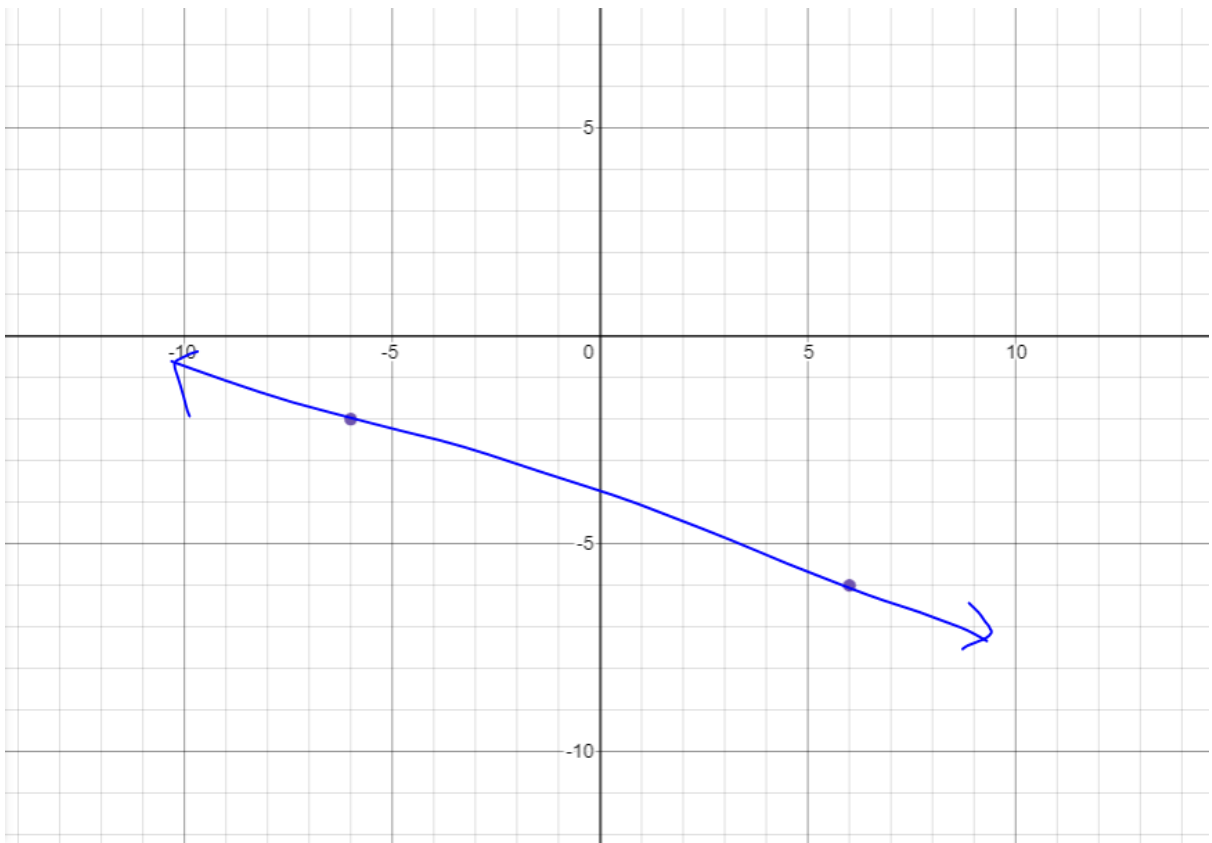


Figure 1: graph 3: Question 11.

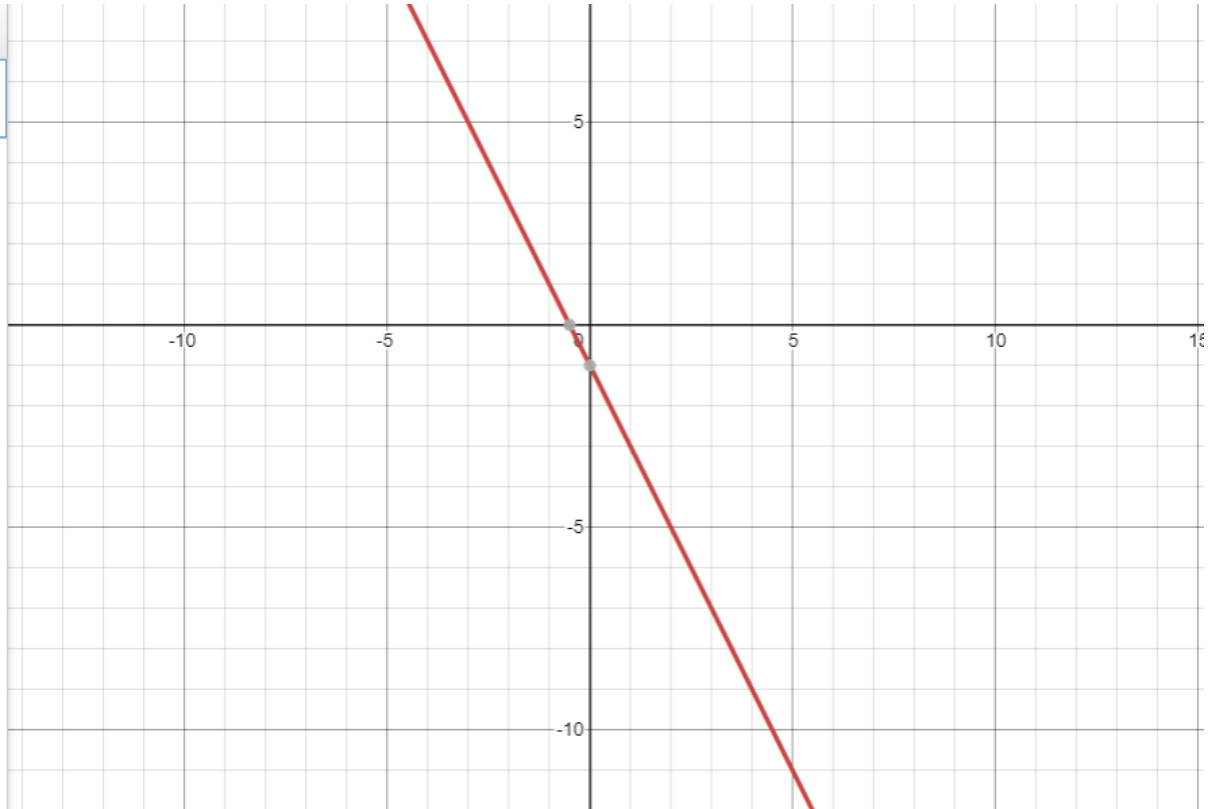


Figure 2: graph 4.question 13

12 Question 23

find $g(x)$:transformation

if $f(x)=x$ with, a vertical compression by $3/4$, a shift left by 2, and a shift down by 4 . I immediately recognize the equation calls for the vertical compression of a line in order to identify different types of linear functions. The instructions provide the slope given the vertical compression would remain consistent throughout the line.

- a). slope = $3/4$
- b). $g(x)= -4+3/4x$
- c).vertical intercept:(0,-4)
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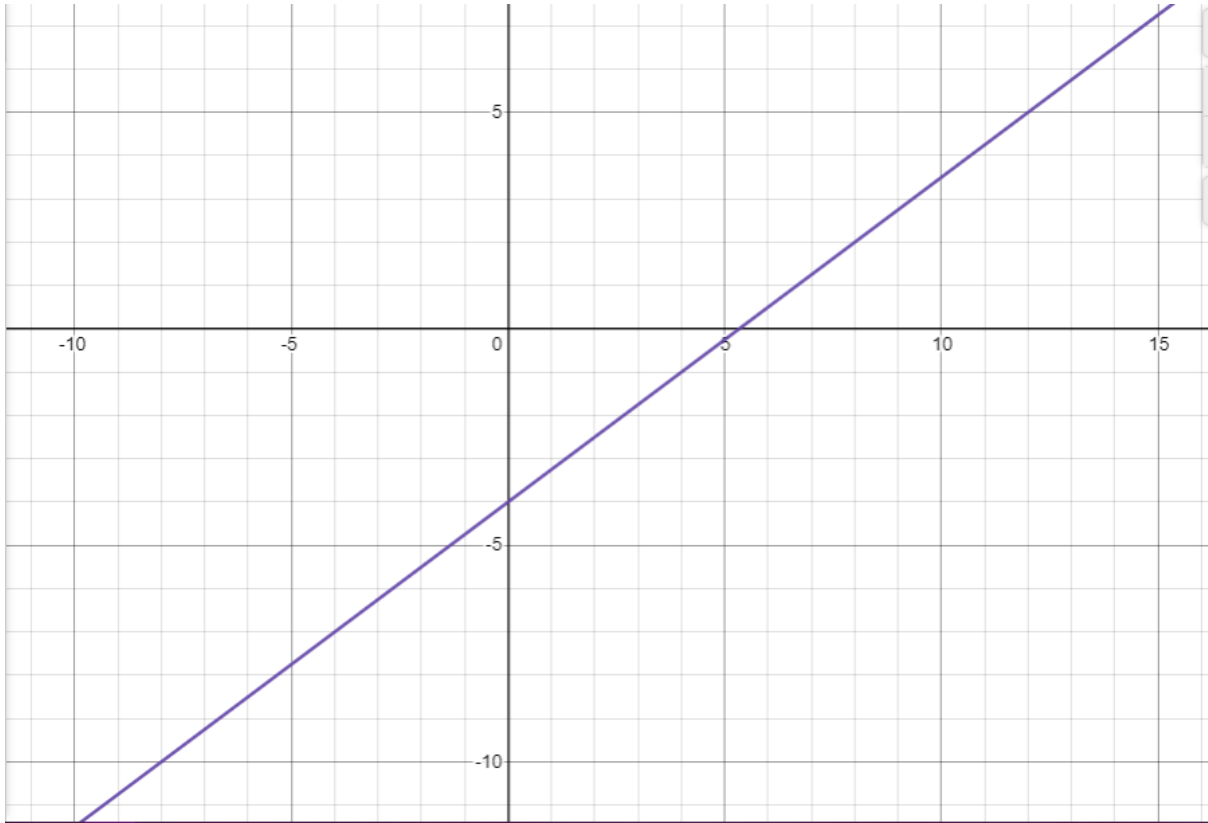


Figure 3: graph 5. question 23

13 Question 29

$f(x) = -x + 2$ similar to the previous question, when a problem asks for the vertical or horizontal intercepts of a line, we now know it is asking for the point on the graph signifying the horizontal intercept when $x=0$ and for the vertical intercept, when $y=0$

horizontal intercept = $(0, 2)$ vertical intercept = $(2, 0)$

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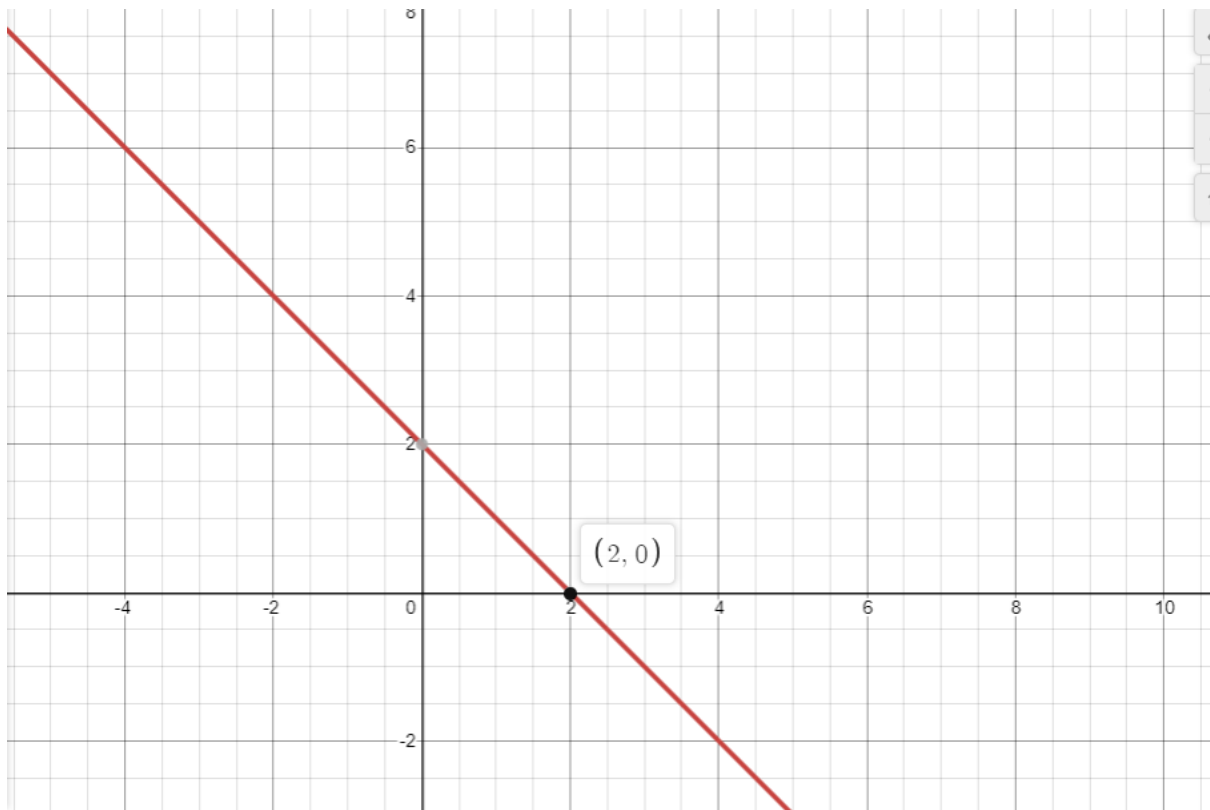


Figure 4: graph 6. question 29

14 Question 35

. Line 1: Passes through (0,6) and (3, 24)

Line 2: Passes through (-1,19) and (8, 71)

In recognizing that the slope needs to be find in order to further analyze the points on the graph I will use the slope formula to find slope and further evaluate the status of the 2 points on the line

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{24 - 6}{3 - 0} = \frac{18}{3} = 6$$

Slope:Line 1=6

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{71 - 19}{8 - (-1)} = \frac{52}{9} = 5.77$$

slope Line 2=5.77

The lines are neither perpendicular or parallel to one another. They are intersecting

Figure ??

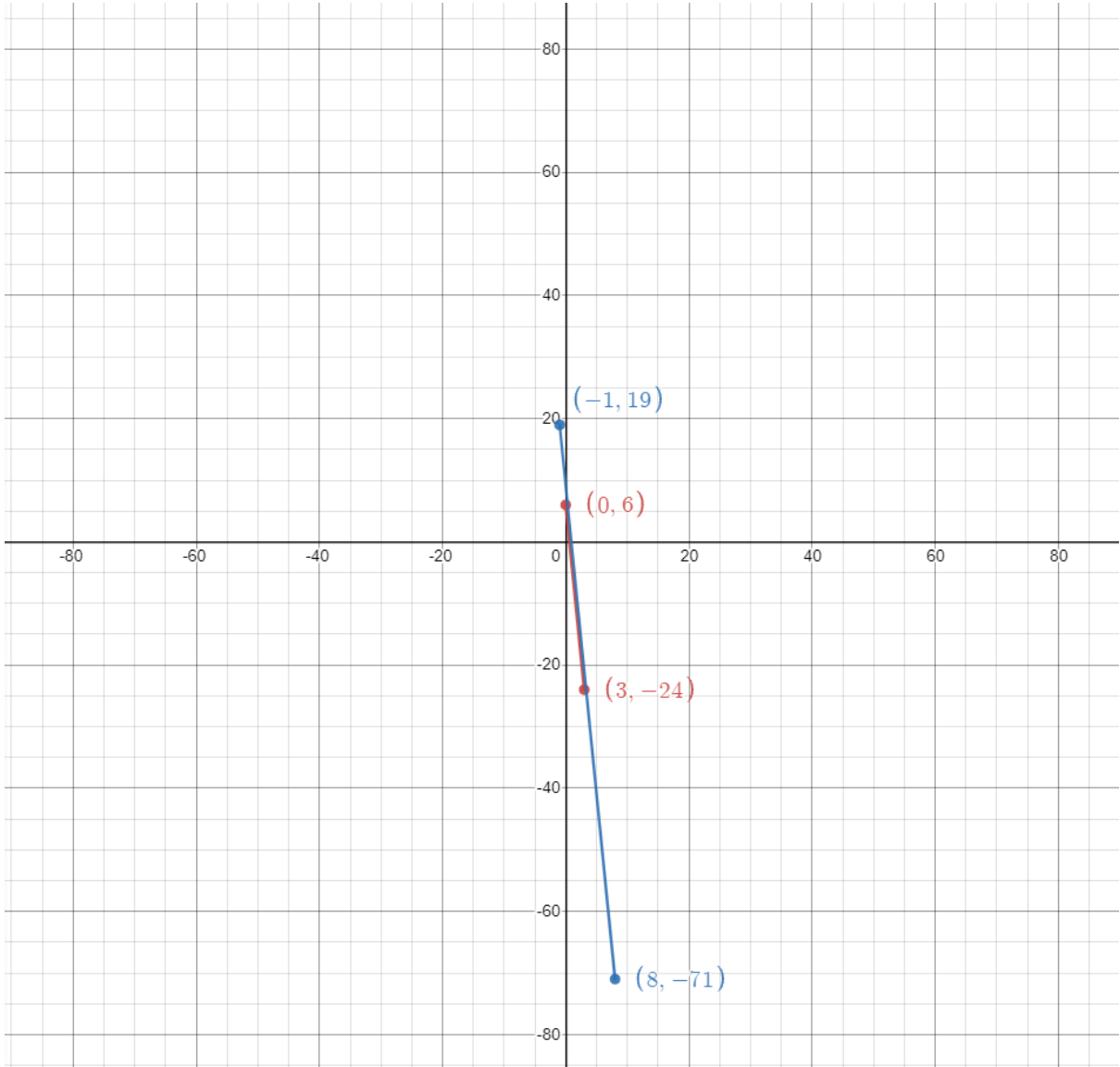


Figure 5: question 35

15 Question 41

In order to find the equation of the line, passing through points: $(2, -12)$ and parallel to $f(x) = -5x - 3$
The original line has a slope of -5 , the line parallel to this line will have a slope of $1/5$. Considering we are looking for the line with the same distance apart, $g(x) = b - 1/5x$, I will then input the points to the proper location in the function. $(2, -12)$

Figure ??

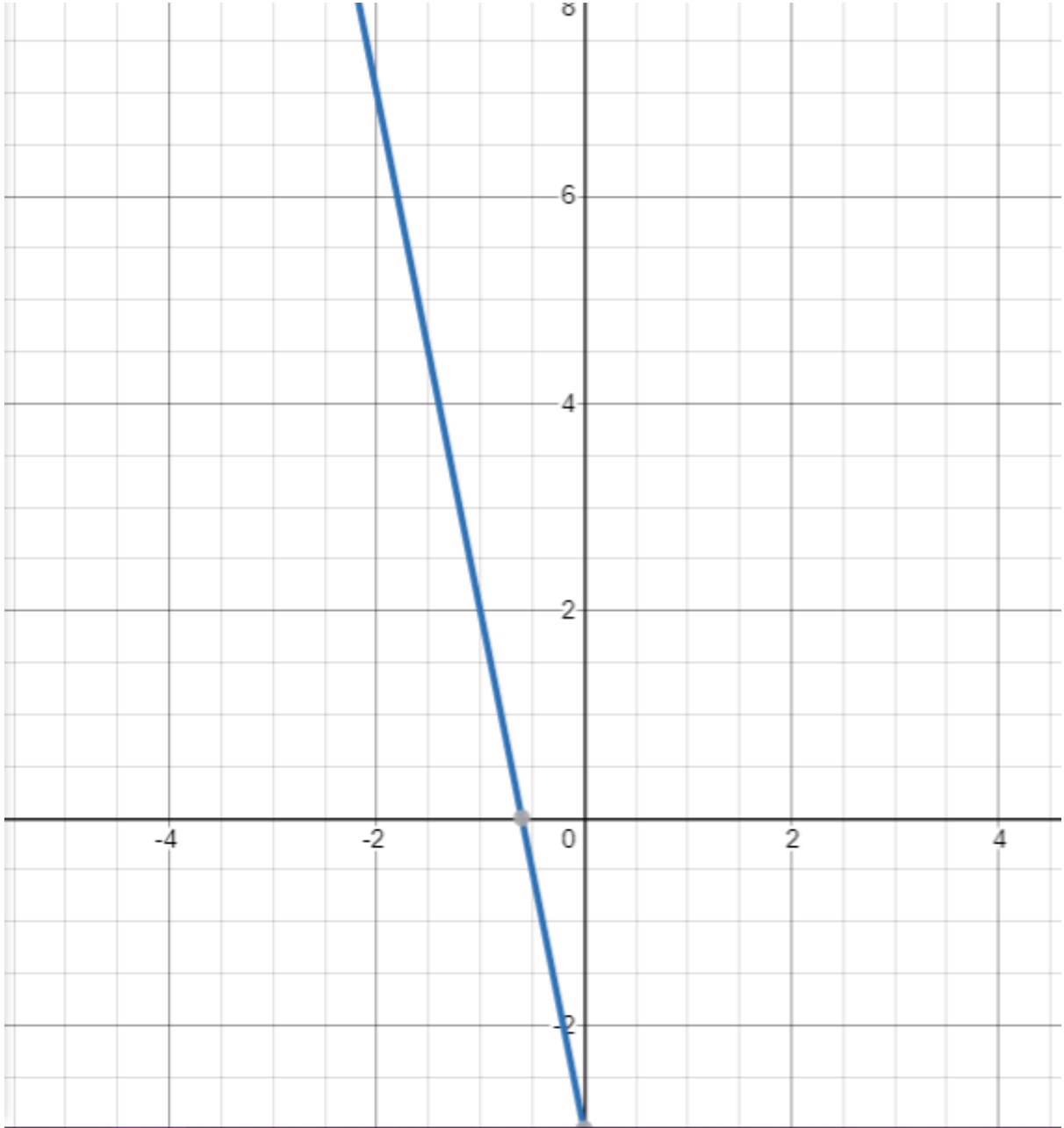


Figure 6: graph 7.question 41

(Section 2.3 Questions)

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16 Question 1

In order to find the change in population from 2004 to 2008. I first detail the exact population in those years. 2004=1001 2008=1697

- a) the change in population between 2004 and 2008 is
- b) Considering the population grew between the years of 2004 and 2008, I am able to state the population grew within four years: from 1001 to 1697.
- c). A corresponding equation for this time span to represent the average rate of growth - I first need to solve for- I subtract 1001 from 1697 and divide it by the years passed (4). $\frac{1697-1001}{4} = 174$. The population grew about 174 people per year.
- d). In order to find the population in 2000 we can use the formula where time is representing the years passed. $P(t) = 1001 + 174(-4)$ In 2000 the population was 305.
- e) $P(t) = 305 + 174t$ where the current population in 2000 becomes the base of the corresponding years population f) In 2011 the population was $2011 = 1697 + 174(3)$ where $t =$ the time between 2008 and 2011. With this the equation is solved for po

17 Question 2

2003 population=1431 2007population= 2134

- a) In order to determine how much the population grew in between 2003 and 2007, I will subtract $2134 - 1431$.

The population growth is 703.

- b). It took the population a total of 4 years to get from 1431 to 2134. This is determined because the difference between the years of 2003 and 2007.
- c). $P(t) = \frac{2134 - 1431}{4} = 175$ The average growth in population is 175 people per year.
- d) In 2000 the population was $P(t) = 1431 - 175(3)$ where 3 represents the year difference between 2000 and 2003. e). for the years following 2000, the population is $P(t) = 2134 + 175(t)$
- f). $P(t) = 2014$ $2014 = 2134 + 175(11)$ where 11 stands for the years passed between 2003 and 2014.

intersect can be found by

18 Question 13

in order to get the area of any triangle one must use the formula $a^2 + b^2 = c^2$

$f(x) = 9 - \frac{6}{7}x$ considering the format of the equation I assume the base of the equation is 9 considering the formula $y = mx + b$. I can also assume that the height of the triangle will be the value at the point where the two lines intersect

Considering we are looking to solve the equation of a line that is perpendicular to that above. One can take note of the fact that equation will have to be the opposite, in order for the lines to intersect. With that in mind. The line perpendicular to the function is:

$g(x) = \frac{7}{6}x$ because the slope will be the opposite reciprocal. The point on the graph where the line where the lines of the two functions equal to one another and solving for x . $9 - \frac{6}{7}x = \frac{7}{6}x$ $x = 4.44$

To input in the new found height into the area formula. $\frac{1}{2}(4.44)(9) = \text{area} = 19.98$.

19 Question 14

in order to get the area of any triangle one must use the formula $a^2 + b^2 = c^2$

$f(x)=12-1/3x$ considering the format of the equation I assume the base of the equation is 9 considering the formula $y=mx+b$. I can also assume that the height of the triangle will be the value at the point where the two lines intersect

Considering we are looking to solve the equation of a line that is perpendicular to that above. One can take note of the fact that equation will have to be the opposite, in order for the lines to intersect. With that in mind. The line perpendicular to the function is:

$g(x)=3/1x$ because the slope will be the opposite reciprocal. The point on the graph where the line where the lines of the two functions equal to one another and solving for x . $12-\frac{1}{3}x=\frac{3}{1}x$ $x=3.6$

To input in the new found height into the area formula. $1/2(3.6)(12)=$ area

area=21.6.

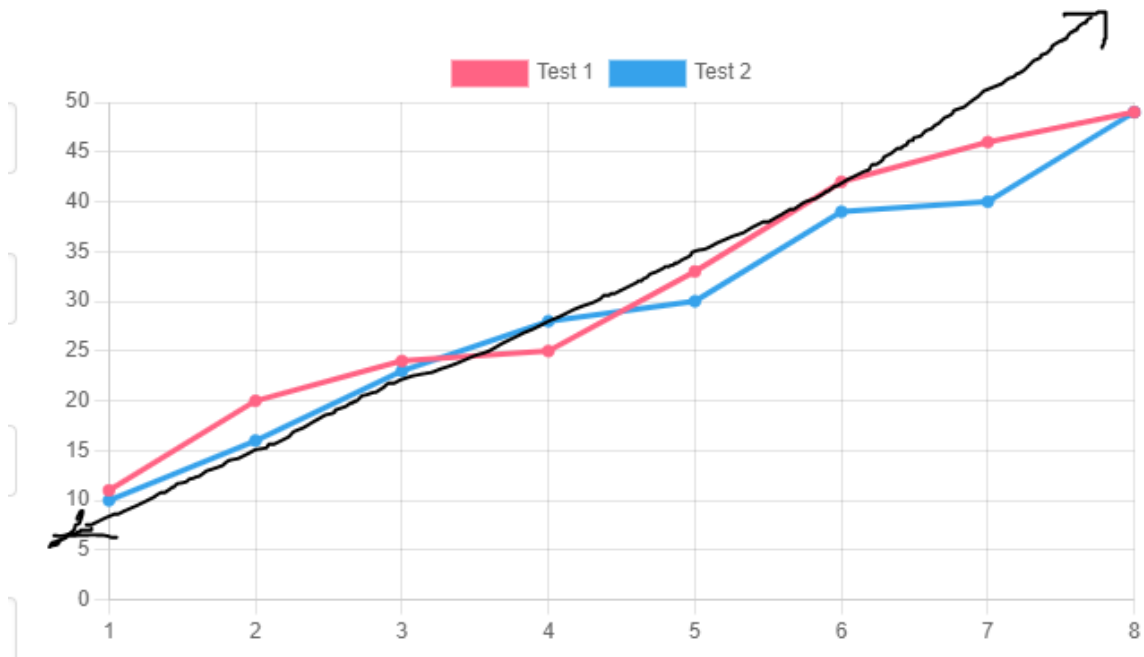


Figure 7: Section 2.4 question 1

(Section 2.4 Questions)

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20 Question 1

In plotting the points First quiz: 11, 20, 24, 25, 33, 42, 46, 49

Second Quiz: 10, 16, 23, 28, 30, 39, 40, 49

I began using an online line plot graph, which would further assist me in analyzing the points and how they differ.

Figure ??

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21 Question 5

As this question is asking for the correlation coefficient. It is looking for an easy way to get some idea of how close to a line the data falls After having used a correlation calculator, the correlation of the function is -0.99

which further suggests a negative (decreasing) relationship= considering The closer the value is to 0, the more scattered the data

22 Question 7

The problem provides the issue at hand- how many sit ups can a person do having watched 11 hours of TV, $y=ax+b$ signifies the formula which will be used to find the average .

$$a=-1.341$$

$$b=32.234$$

$$r^2=0.803$$

$$r=-0.89$$

Plugging in the values the equation provides leaves me with the following:

$$y=1.341(11)+32.234$$

A person who watches 11 hours of TV can do 17.494 push ups

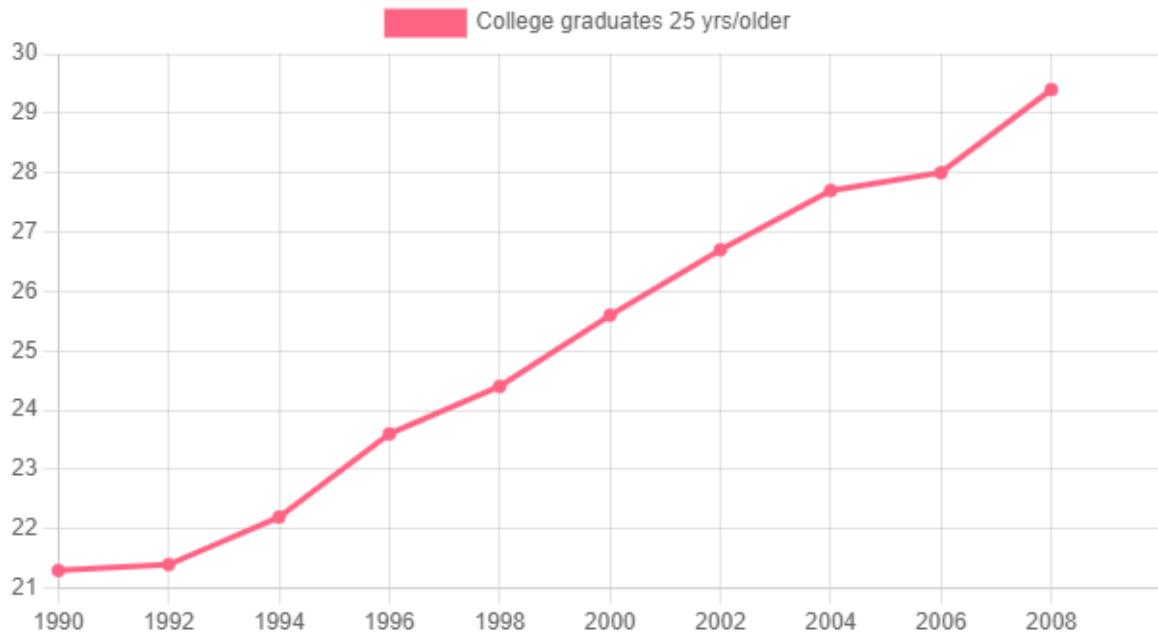


Figure 8: Section 2.4 question 13

23 Question 13

my first step in determining if the of college students over the age of 25- which have accumulated over the year. In order to see if the data values show a linear trend. I plot the points:

The year in which the percentage exceed 35

Figure ??

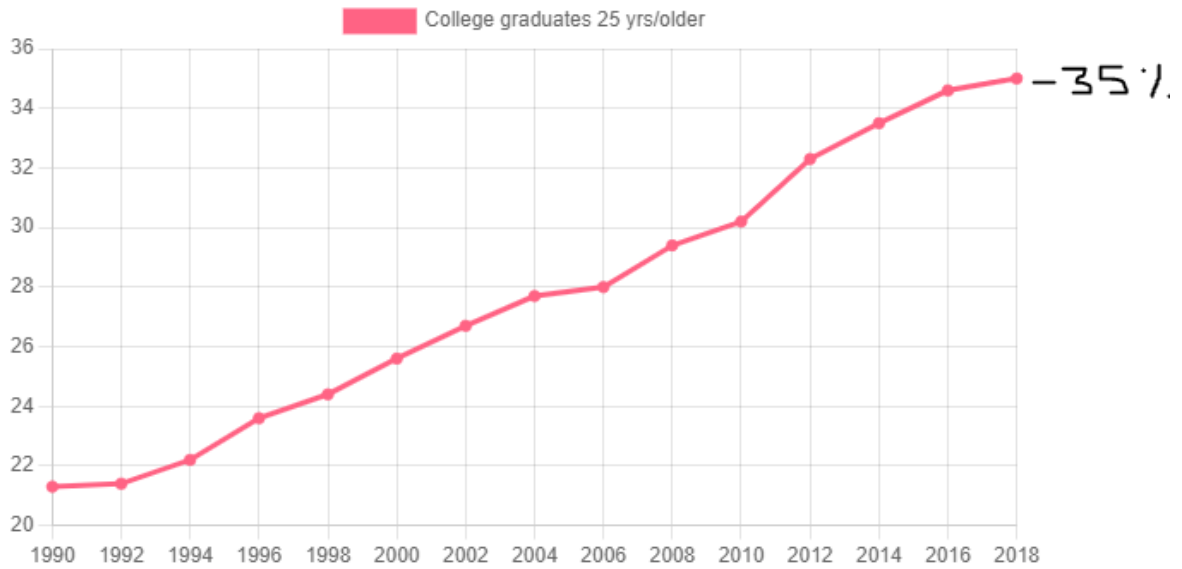


Figure 9: Section 2.4 question 13 @35 percent

(Section 2.5 Questions)

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24 Question 5

$f(x) = -x - 1$ In order to sketch this graph I utilized the resource desmos, which allowed me to view the graph sketched as well as show me any stretches along either Axis

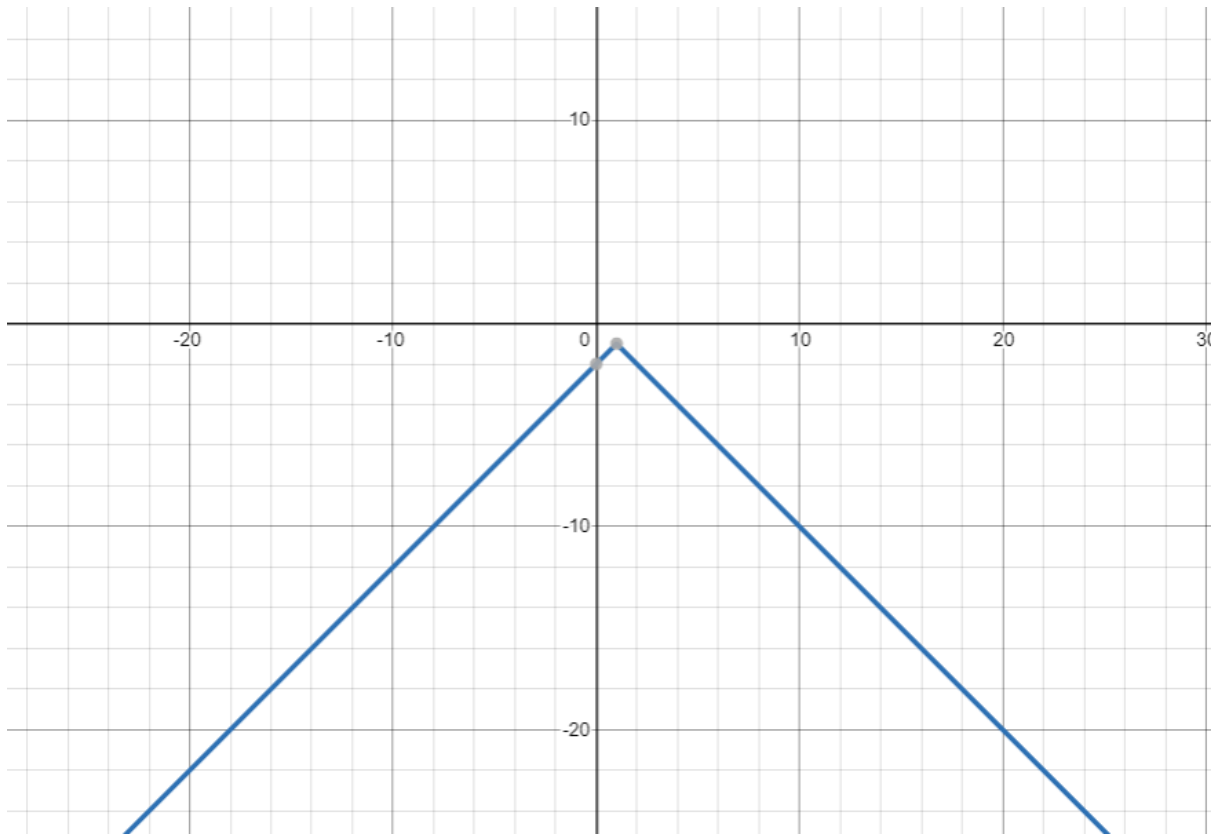


Figure 10: Section 2.5 question 5

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25 Question 6

Similar to the question above I utilized this graphing tool demos which allows me to see the shift over the x axis whereas the previous function had the opposite affect(graph was stretched).

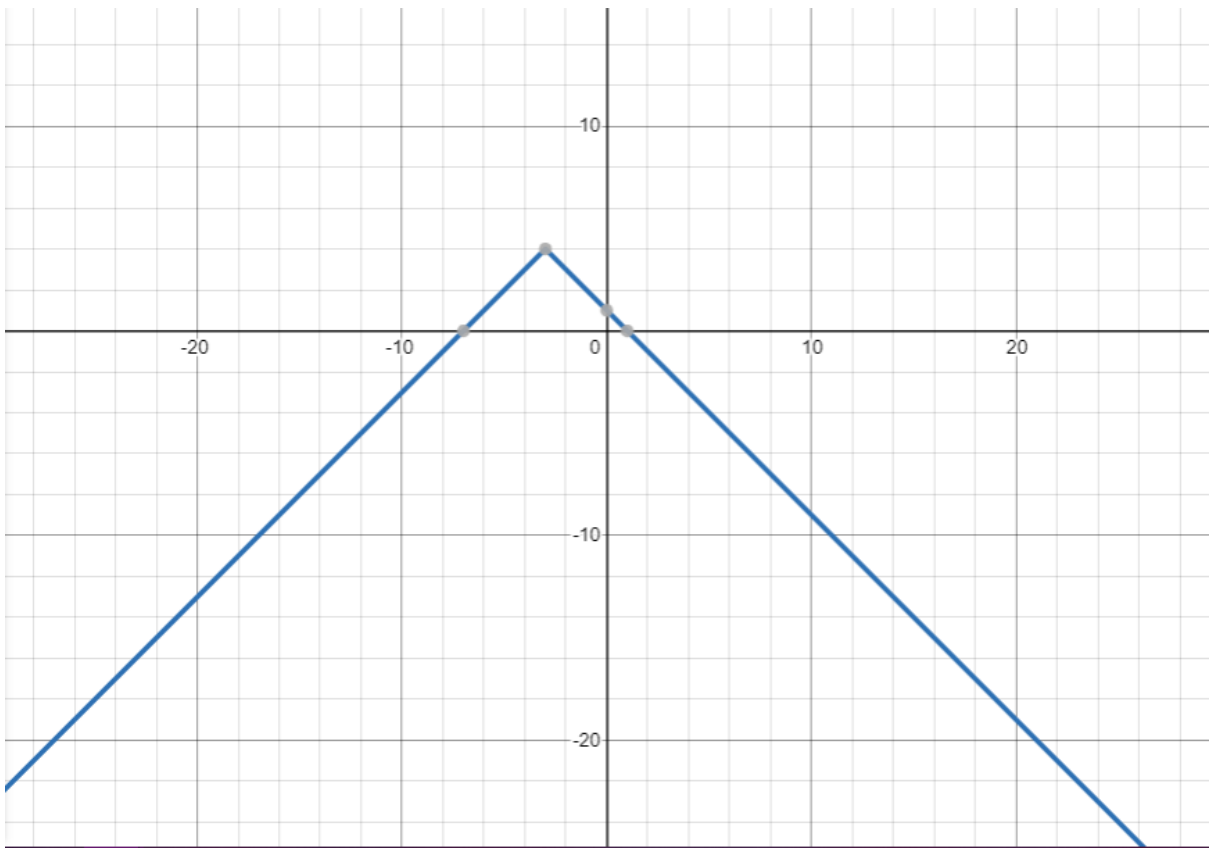


Figure 11: Section 2.5 question 6

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26 Question 11

$-5x-2=11$ we can notice that the absolute value will be equal to eleven, if the quantity inside the absolute value were 11 or -11.

This allows for the questions to be solved in two different ways:

$$5x-2=11$$

$$+2=+2$$

$$5x=13$$

$$x= 2.6$$

OR

$$5x-2=(-11)$$

$$+2=(+2)$$

$$5x= -9$$

$$x=-1.8$$

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27 Question 12

Much like the previous question the absolute value of the function exists below. we can notice that the absolute value will be equal to fifteen, if the quantity inside the absolute value were 15 or -15. This allows for the questions to be solved in two different ways:

$$-4x+2=15$$

$$4x+2=15$$

$$-2=-2$$

$$4x=13$$

$$x=3.25$$

OR

$$4x+2=(-15)$$

$$-2=-2$$

$$4x=-17$$

$$x=-4.25$$

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28 Question 17

$$f(x) = 2|x + 1| - 10$$

In order to find the horizontal and vertical intercepts, The horizontal intercepts will occur when $f(x) = 0$. I will first isolate the absolute value on one side of the equation. Leaving:

$$0 = 2|x + 1| - 10$$

$10 = 2|x + 1|$ You are then left with the following steps, solve where the equation is set to equal both positive 10 and negative 10

$$10 = 2|x + 1| \quad 5 = |x + 1|$$

I am unaware of which steps to take to further simplify the equation.

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29 Question 18

$$f(x) = 4|x - 3| + 4$$

Just like the equation above In order to find the horizontal and vertical intercepts, The horizontal intercepts will occur when $f(x) = 0$. I will first Isolate the absolute value on one side of the equation.

Leaving:

$$0 = 4 - |x - 3| + 4$$

$$0 = 4|x - 3| + 4 \quad 4 = 4 - |x - 3|$$

$$4 = |x - 3| \quad \text{divide both sides by 4}$$

$$f(x) = |x - 3|$$

$f(x) = |x - 3|$ You are then left with the following.