MATH Chapter 2 Problems Silva Andrew

asilva14

October 2021

1 Linear Functions

2. Write an equation P(t), for the population after t years after 2005.

$P(t) = 2,500(t) + 69,000$

I found this one easy because it is just plugging in the information given into the y=mx+b formula.

6. Write an equation of how much the barista will have after n more customer during her shift.

$f(n) = \$0.50(n) + \$20$

I found this one easy also because it is very similar to the last one. It is just plugging in the information given into the y=mx+b formula.

12. Determine if the Function is Increasing or Decreasing.

$k(x) = -4x + 1$

The function is decreasing.

I found this one easy because it is just looking for the coefficient for x and determining if it is negative or positive.

14. Determine if the Function is decreasing or increasing.

$P(x) = \frac{(}{1})(4)x - 5$

The function is Increasing

I found this one easy also because it very similar to the last one by looking at the coefficient of x and then determine if its Decreasing or increasing based on the sign it has.

22. Find the slope given (9,10) and (-6,-12).

$\frac{6-8}{4--2} = \frac{-2}{6} = \frac{-1}{3}$

I found this one easy because it is just simply plugging in the points into the equation $\frac{y_2-y_1}{x_2-x_1}$

25. Find the rate of change.

$$\frac{0.9 - 1.4}{12 - 2} = \frac{-.5}{10} = \frac{.005}{1}$$

The rate of change was .005 miles for every 1 hour.

I had to look up the solution for this one. I had it almost correct. However, instead of reducing it to $\frac{.005}{1}$, I reduced it to $-\frac{1}{2}$ and realized it was incorrect. The only thing I am still confused about is why you put the 1.4 before the

.9. Wouldn't you put y_2 first not y_1? So you would get -.005 because it is a decreasing rate of change not increasing?

2 Graphs of Linear Functions

8. Sketch a line going through (-2,0),(0,-4).

Graphs still do not work for me.

I found this easy because it is just simply plotting the x-intercept and y-intercept. I remember from previous math classes that intercepts are the points where it cross either the x or y axis.

10. Sketch a line with a vertical intercept of (0,3) and a slope of $\frac{2}{5}$

Graphs still do not work for me.

I found this one easy because I understand that the Vertical intercept is the y intercept. So you just have to plot the y-intercept then you can use rise over run using the slope to figure out the second point.

12. Sketch a line going through the points (-3,-4) and (3,0).

Graphs still do not work.

I found this one easy because it is just plotting the points.

14. Sketch the graph of the equation $g(x) = -3x + 2$.

Graphs still do not work for me.

I found this one easy because I know that the coeffient of x is the slope, while the +2 is the y-intercept. This allowed me to plot the y-intercept. Then do rise over run to find the point $\frac{-3}{1}$

23.

A) Write an equation for $g(x)$

$g(x) = \frac{3}{4} * (x + 2) - 4$

B) Find the slope.

$Slope = \frac{3}{4}$

C) Find the Vertical Intercept.

$VerticalIntercept = (0, \frac{-5}{2}$

I had to look up the solution for this one. I was not sure how you simplified the $\frac{3}{4}(x + 2) - 4$. I understand that the slope is the y-intercept aka the b in $y = mx + b$. But I was putting -4 as the Vertical intercept but I wasn't sure, so I looked up the solution and realized I didn't simplify the equation.

30. Find the Horizontal and vertical intercepts of

Graphs still will not work for me.

$VerticalIntercept = (0, 4)$ $HorizontalIntercept = (-2, 0)$

I found this one easy because all I had to do was plot the y-intercept. Then I could use rise of run with the slope from the function to find the x-intercept.

37. Are the two line parallel, perpendicular, or neither?

Line 1: $\frac{-1-3}{4-2} = \frac{-4}{2} = \frac{-2}{1}$

Line 2: $\frac{5-3}{8-6} = \frac{2}{2} = 1$

It's neither because the slopes are not the same so it can;t be parallel. And the slope of the second line is not the negative inverse of the slope of the first line so it means it can't be perpendicular which means it must be neither.

I found this one easy because I understood what the question was asking. However, I did have a bit of trouble of figuring out if a line was perpendicular to another. Fortunately I found that to be perpendicular to the line it had to be the negative inverse of the slope of the first line. Once I realized this, I realized it had to be Neither.

42. Write an equation for a line that is parallel to $g(x) = 3x - 1$ and passing through the point (4,9).

$y = 3x - 3$

Still no graphs are working for me.

I found this one easy easy. I understand that the slope was the same. So I plotted the point it gave. Then from there I used rise over run to figure out where the line crosses the y-axis to find the y-intercept.

3 Modeling with Linear Functions

2.Assume the population is growing linearly.

A) $2134 - 1431 = 703$

B) 4 years.

C) $703/4 = 176$ people per year.

D) Population in $2000 = 903$ people.

E) $P = 176(t) + 903$

F) $176(14) + 903 = 2464 + 903 = 3,367$

I found this one easy because it is very similar to the first set of problems in this chapter. You take what they give you and plug it into the step that it is asking. Then taking information that I calculated I was able to plug it into other steps to complete the problem

9. How many minutes would you need to use to make the second plan preferable?

Plan 1 : $\$0.26 * 145 = \$37.70$

Plan 2 : $\$.11 * 145 = \$15.95 + \$19.95 = \$35.90$

You would have to use around 145 minutes per month to make the second plan more preferable.

At first I wanted to look up the solution for this one. I couldn't think of any way to solve it. I understood what it was asking I just couldn't see what I was supposed to be doing. I had to take my time with this one to eventually figure out that you had to find the equation for the monthly fee. Then from there I minutes * \$0.11 to find something around \$20. From there I did trial and error to find what number I could plug into x to get as close too 36 dollars. However it had to be more the \$35.90.

13. Find the area of a triangle bound by the y axis, the line $f(x) = 9 - \frac{6}{7}x$, and the line perpendicular to $f(x)$ going through the origin.

$9 - \frac{6}{7}x = \frac{7}{6}x$

$9 = \frac{7}{6} + \frac{6}{7}$

$9 = \frac{49}{42} + \frac{36}{42} = \frac{85}{42} = 2.02$

$\frac{9}{2.02} = \frac{2.02}{2} = 4.45$

Area $= \frac{1}{2} * 9 * 4.45 = 20.03$

Still no graphs will work.

I found this one a bit challenging. I asked for help in class and I thought I understood it well. However later that day I tried to attempt it on my own and was unsuccessful. I ended up figuring out that I was stuck on the part where you needed to set it equal to equal to each other to figure out the height of the triangle. After I found the height of the triangle I knew what to do. I need to work on remembering what to do in different situations dealing with graphs and lines.

17. If $b > 0$ and $m < 0$, then the line of $f(x) = b + mx$ cuts off a triangle from the first quadrant. Express the area in terms of m and b.

Area $= \frac{1}{2} * \frac{-b}{m} * b = \frac{1}{2} * \frac{-b^2}{mb} = \frac{-b^2}{2m}$

Graphs still won't work for me.

I attempted this one because it looked similar to the last one but wasn't exactly the same. I wanted to try and challenge my self on this one because I was unable to complete the last one. However, I was confused on how to get the Y axis. So I ended up looking up the solution and I am still a bit confused on why it is $\frac{-b}{m}$. But once I found the x-axis I was able to plug the information in to the formula for the area of a triangle. I need to practice more problems with finding the slope with variables instead of numbers to be more confident in what to do.

4 Fitting Linear Models to Data

2. Plot the points and sketch a line of regression.

Predicted - 5, 7, 6, 8, 10, 9 , 10, 7

Actual - 6, 6, 7, 8, 9, 9, 10, 6

Can not get it too graph.

I don't know what I'm doing wrong in Mathematica. I try and copy exactly what you and the YouTube videos are saying but for some reason it still just gives me an error when I go to graph something. I need to stay after class one day and have you show me what I am doing wrong. I've saved all the ones I attempted so you can see what I was doing.

6. Based on the data given, find the regression line and determine the correlation coefficient.

x - 4, 5, 6, 7, 8, 9, 10, 11, 12 ,13, 14, 15, 16, 17, 18

y - 44.8, 43.1, 38.8, 39, 38, 32.7, 30.1, 29.3, 27, 25.8, 24.7, 22, 20.1, 19.8, 16.8

No graph.

Like the last one, it would not graph for me so I could not find the regression line or determine the correlation coefficient.

7. Use the results given to predict the number of sit ups a person who watches 11 hours of TV can do.

$y = -1.341x + 32.234$

$y = -1.341 * 11 + 32.234 = \frac{17483}{1000} = 17.483$

A person that watches TV for 11 hours should be able to do around 18 sit ups.

I had to look up the solution for this one. I plugged in the a and b but for some reason I had trouble understanding to plug in the 11 hours into the formula. I think it's because I did not take my time to really get an understanding of the problem. Which made me miss read what the problem was asking. When I looked at the solution I realised it was just simply plugging 11 into x. I need to go slower when reading the problems.

13. Determine if the trend appears linear, If so and the trend continues, what years will the percentage exceed 35%.

$y = 0.4761x - 926,62$

$35 = 0.4761x - 926.62$

$961.6 = 0.476x = \frac{961.6}{0.476} = \frac{0.476x}{0.476} = x = 2020.17$

The trend appears to be linear, which mean in 2020 the percentage will exceed 35%.

I had to look up the solution to this one as well. I couldn't complete it because I could not get it to graph. The main issue I'm seeing I am having is figuring out how to graph it. I feel like I wasn't fully taught how to calculate graphs in any of my math classes. I feel like the teachers have always just went over it really quickly and I haven't been able to fully grasp it. I am good at learning things on my own, but for some reason I can not figure this out. I feel like I have everything correct but then when I go to run the script it just gives me different errors and the errors never are useful.

5 Absolute Value Functions

5. Sketch a graph of the Function $f(x) = 2|x + 3| + 1$

Can not Figure out graphing. I got an image to appear for this one but it is blank. No information is being shown on the graph and I don;t understand why.

7. Sketch a graph of the Function $f(x) = 2|x + 3| + 1$

Couldn't even get an image to appear for this one. I need to stay after class for a few minutes so you can look over these and tell me what I'm doing wrong because I feel like over email won't help me too much.

12. Solve the Equation.

$|4x + 2| = 15$

$4x + 2 = 15 = 4x = 13 = \frac{4x}{4} = \frac{13}{4}$

or

$4x + 2 = -15 = 4x = -17 = \frac{4x}{4} = \frac{-17}{4}$

$x = \frac{13}{4}$ or $x = \frac{-17}{4}$

I was able to complete this one on my own. I found this one easy because it didn't have to do with graphing. I just understanding that absolute value means that it is x amount away from 0. Which mean it can be positive or negative. That is why you can get two different answers.

14. Solve the Equation.

$3|5-x| = 5 = |5-x| = \frac{5}{3}$
$5 - x = \frac{5}{3} = x = \frac{5}{3} - \frac{5}{5} = x = \frac{25}{15} - \frac{15}{15} = \frac{10}{15} or \frac{2}{3}$
or
$5 - x = -\frac{5}{3} = x = \frac{5}{3} - 5 = -\frac{25}{15} - \frac{15}{15} = -\frac{40}{15}$
$x = \frac{2}{3}$ or $x = \frac{8}{3}$

I found this one easy because it is very similar to the last one by just solving the equation. It has absolute values in it like the last one so it mean you get two answers. I feel like I have a strong understanding on these. I just got to make sure my signs carry over correctly. As well as just making sure my simple math is correct as well and I should be fine with these. I just need to take my time and I should be fine.

17. Find the horizontal and vertical intercept of the function.
$f(x) = 2|x+1| - 10 = x + 1 = 5$
$x + 1 = 5 = x = 4$
or
$x + 1 = -5 = x = -6$
$f(x) = 2|0+1| - 10 = 2|1| - 10 = 2(1) - 10 = 2 - 10 = -8$
Horizontal Intercepts - (4,0) and (-6,0)
Vertical Intercept - (0,-8)

I had to look up the solution for this one. I figured out the horizontal Intercepts fine. I was just confused on how to find the vertical Intercept. However, once I looked at the solution I realized you plug in 0 for x because you are looking for the y coordinate and y intercepts always have a 0 for their x coordinate.

20. Find the Horizontal and vertical intercepts.
$f(x) = -2|x+1| + 6 = |x+1| = \frac{-6}{2}$
$x + 1 = \frac{-6}{2} = x = \frac{-6}{2} - \frac{2}{2} = \frac{-8}{2} or -4$
or
$x + 1 = \frac{6}{2} = x = \frac{6}{2} - \frac{2}{2} = \frac{4}{2} or \frac{2}{1} or 2$
$f(x) = -2|0+1| + 6 = -2 + 6 = 4$
Horizontal Intercepts - (-4,0) and (2,0)
Vertical Intercept - (0,4)

After completing the last one I had a strong understanding of what to do. So I figured this one out on my own. The only thing I need to worry about is taking my time with adding and subtracting fractions. I don't want to rush and miss add them and get the wrong answer when working in a bio engineering field. So it is extremely important to start from the beginning at taking my time with fractions to get a strong understanding of how they work.

21. Solve each Inequality.
$|x+5| < 6$
$x + 5 = 6 = x = 1$
or
$x + 5 = -6 = x = -11$
which means $x < -11, -11 < x < 1, and x > 1$
$|-12+5| = |7| = 7$ Which is larger then 6, Not a solution.
$|0+5| = |5| = 5$ Which is less then 6, Means it's a solution.
$|2+5| = |7| = 7$ Which is larger then 6, Not a solution.

Answer: $-11 < x < 1$

I had to look up the solution to this one. I knew what inequalities were I just could not understand what the problem was asking. But after looking up the solution I realized it was asking what could x be to be less then 6. After looking at the solution I think I have a strong understanding of these problems.

22. Solve the Inequality.

$|x - 3| < 7$

$x - 3 = 7 = x = 10$

$x - 3 = -7 = x = -4$

which means $x < -4, -4 < x < 10, and x > 10$

$|-5 - 3| = |-8| = 8$ Which is larger then 7, Not a solution.

$|0 - 3| = |-3| = 3$ Which is less then 7, Mean it's a solution.

$|11 - 3| = |8| = 8$ Which is larger then 7, Not a solution.

Answer: $-4 < x < 10$

After looking up the solution to the last one I think I over came what I was confused on. I choose this one because it was similar to the last one. But looking back on it I should've tried something that looked a little more different even if I wasn't able to complete it on my own. I need to start working with as many different looking problems as I can so I can get stronger on all levels in math. I need to learn to stop getting scared when I don't know something and instead get more interested in things I don't know. It's just going to take time to get out of my shell for this. The only thing I had to take my time on was looking at the $< and >$ signs. I think I have some degree of dyslexia and dyscalculia because from time to time I have to go back read things because I'll notice that signs don't match up and I just get really confused over the simplest problems even though I know how to solve it.