

- Question 1

3 points

How Did I Do?

In the chart below you will find the statistics from 1983–2003 for the number of babies born, per 10,000 live births, with Down syndrome. Over those 20 years, you can see that there has been an increase.

Year	Down Syndrome at Birth per 10,000 Live Births
1983	9.5
1988	10.3
1993	10.8
1998	11
2003	11.8

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. Using a spreadsheet application, create a scatterplot of this data and then find a trendline which approximates the data in the form $y = mx + b$, where x is the number of years since 1983 and y is the number of Down syndrome births per 10,000 live births.

Enter your answer as an algebraic equation. Make sure your variables match those in the question.



- b. What does this model give as the 2016 rate of Down syndrome births per 10,000 live births?

Round to one decimal place.

For every 10,000 live births, babies were born with Down syndrome.

- c. Do you think your linear model accurately represents the growth in babies born with Down syndrome until 2016? Explain.

- Question 2

3 points

How Did I Do?

The data in the chart below is for the distance (in cm) to the *near point*, the point nearest the eye at which the eye can accurately focus, at a person's age.

Age (years)	Near Point (cm)
10	7.5
20	9
30	11.5
40	17.2
50	52.5
60	83.3

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. Use a spreadsheet application to create a linear regression model for the data in the form $y = mx + b$, where x is age and y is near point. (Hint: The y -intercept is where $x = 0$ years.)

Round each number in your model to one decimal place.

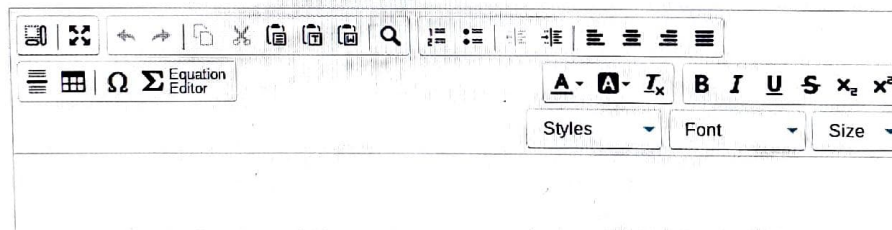
$y =$ 

- b. Using your model, predict the near point of someone who is 84 years old.

Round your answer to one decimal place.

Number cm

- c. Do you think your linear model accurately represents the increase in near point based on age? Explain.



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- Question 3

6 points

How Did I Do?

Every year, the Mauna Loa Observatory in Hawaii measures the levels of carbon dioxide (CO₂) in the atmosphere (see <http://www.esrl.noaa.gov/gmd/ccgg/trends/mlo.html> for the complete data sets). Below are the annual mean amounts, in parts per million, for the years 2000–2016:

Year	Annual mean CO ₂ (in ppm)
2000	369.55
2001	371.14
2002	373.28
2003	375.80
2004	377.52
2005	379.80
2006	381.90
2007	383.79
2008	385.60
2009	387.43
2010	389.90
2011	391.65
2012	393.85
2013	396.52
2014	398.65
2015	400.83
2016	404.21

Make sure that you fill in each answer area before checking "How Did I Do?".

- a. Create a scatterplot of the data using a spreadsheet application, then add a trendline (linear regression model) using the spreadsheet. Write the trendline in the form $y = mx + b$, where x is the number of years after 2000, and y is the annual mean CO₂. (Hint: Since x is the number of years after 2000, adjust the data when you enter it in the spreadsheet.)

Round each number in your equation to one decimal place.

Round each number in your equation to one decimal place.

$y =$   

b. What are the units for the input? What are the units for the output?

The input units are .

The output units are .

c. What is the slope? Explain what the slope tells us about the situation.





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d. Using your model, predict how much CO₂ there will be in the atmosphere at Mauna Loa in 2050.

Round to the nearest ppm.

ppm

How reliable do you think this number is? Explain your reasoning.





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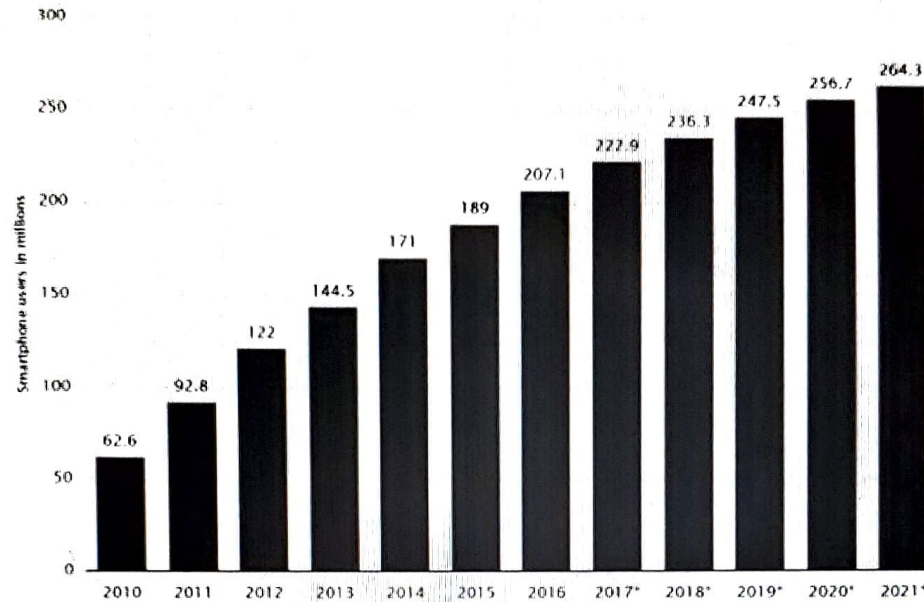
Questions

- Question 4

2 points

How Did I Do?

The graph below, which was created in 2016, shows the number of smartphone users in the U.S. (in millions) from 2010 to 2021.[†] (Note: Values for 2016–2021 were only projections.)



Make sure that you fill in each answer area before checking "How Did I Do?".

- a. Write the linear model for the data, in the form $y = mx + b$, where x is the number of years since 2010 and y is the number of smartphone users, in millions.

$y =$   

- b. Describe any issues (or problems) with these data that might significantly affect the model's reliability.



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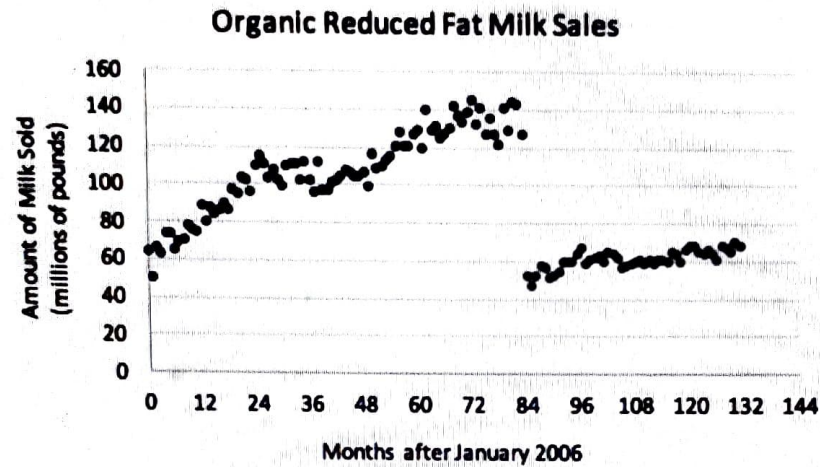
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[†]“Number of Smartphone Users in the United States from 2010 to 2021 (in millions),” accessed April 26, 2017.

- Question 5

1 point

The graph below displays the monthly data for organic reduced fat milk sales from 2006–2016 in the U.S. (where the horizontal axis measures months after January 2006, and the vertical axis measures the amount of milk sold (in millions of pounds))[†].



[†]Data from http://future.aae.wisc.edu/data/monthly_values/by_area/2063?area=US&grid=true&tab=sales

What trends can you identify in organic reduced fat milk sales?

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