

- Question 1

5 points

How Did I Do?

Just like cell phones, most car values decrease over time. For example, in 2004, a new Toyota Prius sold for \$20,300. In 2012, the Kelley Blue Book value for the same car was estimated to be \$9,900. The 2004 Toyota Prius *depreciated* over time. Use this information to answer the following problems.

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

- a. What is the slope of a linear model that represents the value of the Prius over time?

dollars per year.

- b. Create a linear model of the value of the Prius, where V is the value, and t is the number of years after 2004. What input values make sense for t ?

Ω

Σ

Equation Editor

A

A

I_x

B

I

U

S

x

x^2

Styles

Font

Size

Words: 0

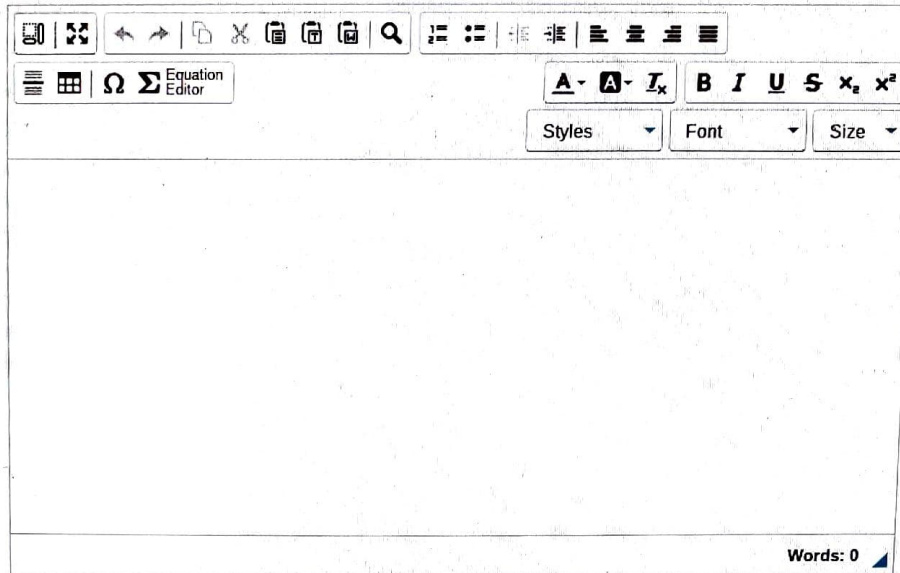
- c. What is the vertical intercept of the graph of the model?

(0,)

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(0,)

What does it represent in the context of this problem?



d. Use your model to estimate the value of the Prius in 2013.

\$

- Question 2

19 points

How Did I Do?

You have just discovered that your bathtub faucet has a leak. You don't have the funds to get this fixed right away, so you decide to use the water that leaks out to water your houseplants.

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

- a. Assume that you left a large measuring cup under the leaking faucet from 10:00 p.m. until 6:00 a.m. the next morning. In the morning, you find the measuring cup filled to the 3-cup mark. Now assume you put a large empty pot under the faucet. Fill in the table below to show the total amount of water you would find in the pot if you took measurements every two hours over a 24-hour period. Then, on a separate piece of paper, or using a spreadsheet application, make a graph of the amount of water that leaked from the faucet over time by plotting these points.

How Did I Do?

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

- | Hours | Amount of Water (Cups) |
|-------|------------------------|
| 0 | Number |
| 2 | Number |
| 4 | Number |
| 6 | Number |
| 8 | Number |
| 10 | Number |
| 12 | Number |
| 14 | Number |
| 16 | Number |
| 18 | Number |
| 20 | Number |
| 22 | Number |
| 24 | Number |

What do you notice about the graph?

The interface includes a toolbar with icons for undo, redo, copy, paste, and search. Below the toolbar is a row of buttons for text formatting: bold (A), italic (A), underline (A), and subscript (x₂). To the right of these are buttons for font style (B), font color (I), font size (U), and font weight (S). Below these are three dropdown menus labeled 'Styles', 'Font', and 'Size'. The main area is a large empty rectangle for plotting. At the bottom right, it says 'Words: 0'.

b. What is the significance of the vertical and horizontal intercepts? Explain the meaning in the context of this situation.

The interface is identical to the one above, featuring a toolbar with editing icons, a row of text formatting buttons (bold, italic, underline, subscript), font style/color/weight buttons, and three dropdown menus (Styles, Font, Size). The main plotting area is empty. At the bottom right, it says 'Words: 0'.

- Round to the nearest hundredth of an hour (2 decimal places).

d. What is the rate of change of the corresponding linear model? In other words, how fast is the water leaking from the faucet?

e. Write an equation modeling the quantity of water that has leaked from the faucet over time. Be sure to define the variables you use, including units.

[illegible]

- e. Write an equation modeling the quantity of water that has leaked from the faucet over time. Be sure to define the variables you use, including units.

- f. Using your model, how much water would leak out in 15 hours and 15 minutes?

Round your answer to the nearest hundredth of a cup (2 decimal places).

Number	cups
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- Question 3

4 points

How Did I Do?

Obesity among adults in the United States is increasing. We want to investigate how the percentage of men who are obese is growing. The table below shows the percentage of U.S. men who were obese (based on BMI) for each year given.[†]

Year	Percentage of U.S. Men Who are Considered Obese
2000	27
2002	28
2004	31
2006	33

How Did I Do?

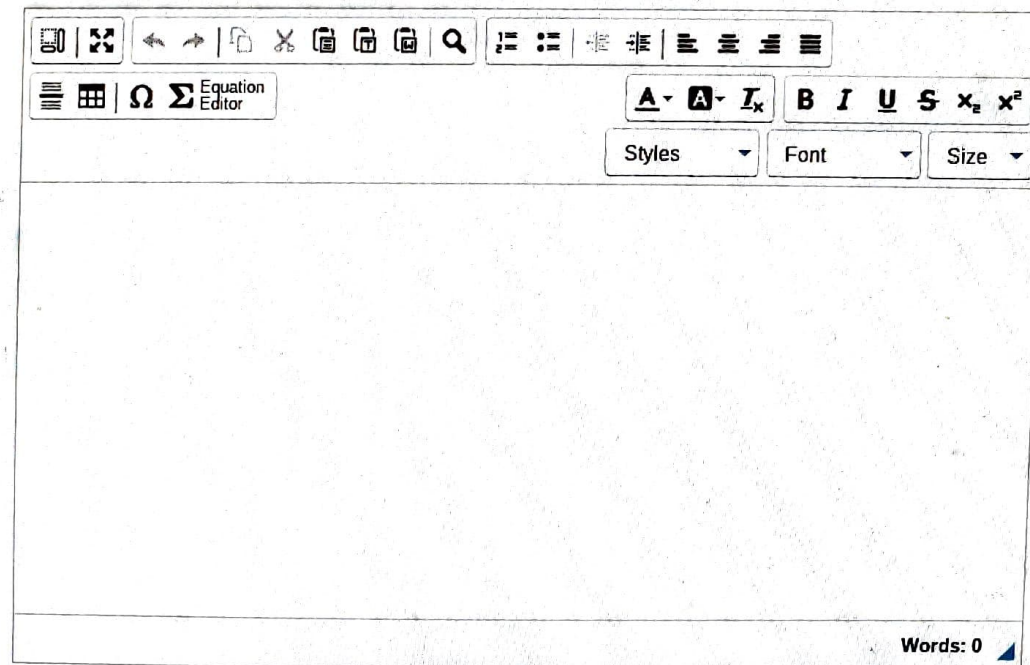
Year	Percentage of U.S. Men Who are Considered Obese
2000	27
2002	28
2004	31
2006	33
2008	32
2010	35

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

- a. Use Google Sheets (or Excel) to create your linear model (trendline) for the data? (Hint: First create a scatterplot.)
Adjust the year to be the number of years after 2000.

[illegible]

- b. What is the slope of the linear model (trendline)? What does the slope mean?



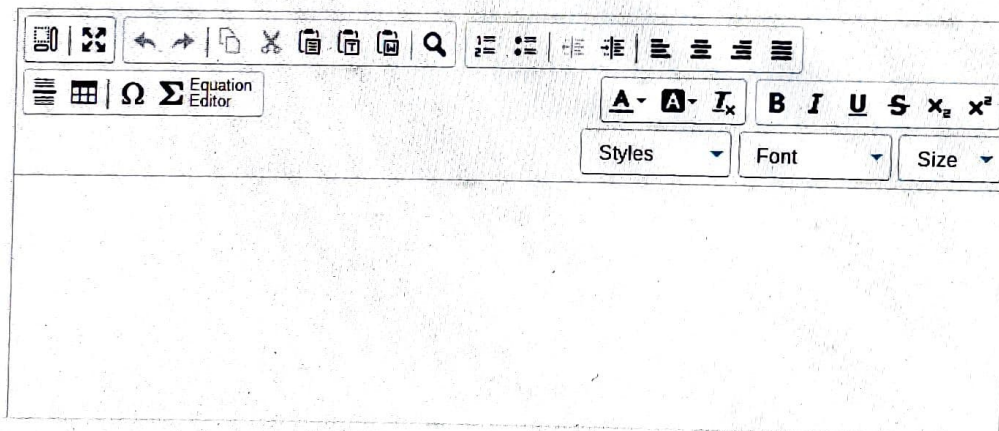
The image shows a screenshot of an Equation Editor interface. At the top, there is a toolbar with various icons for editing equations, including undo, redo, insert, delete, and search. Below the toolbar, there are buttons for mathematical symbols like Ω and Σ , and a label "Equation Editor". To the right, there are buttons for text formatting: **A** (font color), **A** (background color), I_x (italic), **B** (bold), *I* (italic), U (underline), S (strike through), x_2 (subscript), and x^2 (superscript). Below these are three dropdown menus labeled "Styles", "Font", and "Size". The main area of the editor is a large, empty rectangular box. In the bottom right corner, there is a small text box that says "Words: 0".

- c. Using the trendline, predict the percentage of U.S. men that will be considered obese in 2018.

Round to the nearest whole number.

Number %

- d. Using your model, what percentage of U.S. men will be considered obese in the year 2100. Is the model reliable for this calculation?



The image shows a screenshot of an Equation Editor interface, identical to the one above. It features a toolbar with editing icons, a row of mathematical and text formatting buttons, and three dropdown menus for "Styles", "Font", and "Size". The main editing area is a large, empty rectangular box. The bottom right corner displays "Words: 0".

- c. Using the trendline, predict the percentage of U.S. men that will be considered obese in 2018.

Round to the nearest whole number.

Number %

- d. Using your model, what percentage of U.S. men will be considered obese in the year 2100. Is the model reliable for this calculation?

Words: 0

[†]Cheryl D. Fryar, Margaret D. Carroll, and Cynthia L. Ogden, "Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2009–2010," *Health E-Stat*, September 2012, accessed April 8, 2017.