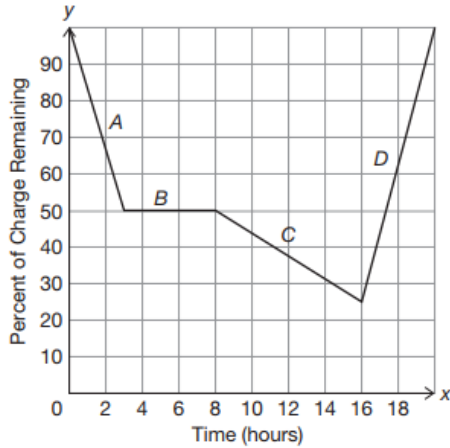


The graph shows the percent of the charge remaining on a cell phone battery over time.



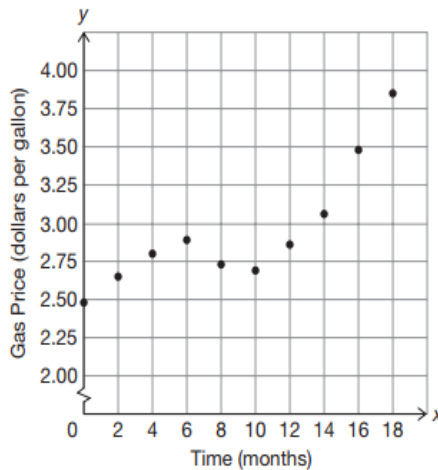
1. Describe the type of function shown in the graph.
2. Write a possible scenario that models the graph.

3. Determine whether each statement is true or false. If it is false, explain why it is false.
 - a) The cell phone battery died after 20 hours.
 - b) The cell phone battery lost 25% of its charge during an 8-hour period.
 - c) The cell phone was used the most between the 16th and 20th hours.
 - d) The cell phone battery was charged twice.
 - e) After the first 3 hours, the battery had half the charge it began with.
4. Write a function, $f(x)$ to model this problem situation.

$$f(x) = \begin{cases} & \text{when } 0 \leq x < 3 \\ & \text{when } 3 \leq x < 8 \\ & \text{when } 8 \leq x < 16 \\ & \text{when } 16 \leq x < 20 \end{cases}$$

The data in the table shows the average price for one gallon of gas in the U.S. over an 18-month period. A scatter plot of the data is also shown.

Time (months)	Average Gas Price in U.S. (dollars per gallon)
0	2.48
2	2.65
4	2.80
6	2.89
8	2.73
10	2.69
12	2.86
14	3.06
16	3.48
18	3.85



5. Calculate the linear regression equation for the data to the right.
Linear Regression:
6. Calculate an exponential regression equation for the data.
Exponential Regression:
7. Calculate a quadratic regression for the data.
Quadratic Regression:
8. Graph each regression on your calculator along with the scatter plot. Which, if any, of the regressions is a good fit for the data? Explain your choice.

For some data sets, a single function may not be the best way to model the data. For these data sets, piecewise functions may be used to model data. However, not all of the pieces of a piecewise function need to be linear.

9. Consider the interval that includes the data for the first 6 months. What type of regression is a good fit for the data over this interval? Explain why you would choose this regression type.

10. Write the regression equation that is a good fit for the data using function notation. Define the interval.
My regression & interval:

11. Consider the interval that includes the data from the 6th month through the 18th month. What type of regression equation is a good fit for the data over this interval? Explain why you would choose this regression type.

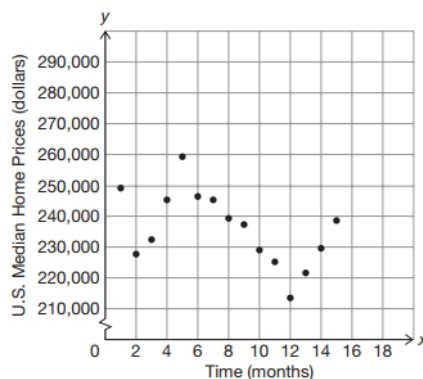
12. Write the regression equation that is a good fit for the data using function notation. Define the interval.
My regression & interval:

13. Write a piece wise function to modal all the data. The graph the function on the scatter plot provided.
Piecewise Function:

14. Describe why a piecewise function is a better fit for this data.

The table shows the median price of a single family home in the U.S. over a 15-month period. A scatter plot of the data is also shown.

Time (months)	U.S. Median Home Prices (dollars)
1	249,100
2	227,700
3	232,400
4	245,300
5	259,300
6	246,400
7	245,300
8	239,300
9	237,300
10	229,000
11	225,200
12	213,500
13	221,600
14	229,600
15	238,600



15. Determine a piecewise function to model the situation in function notation. Be sure to clearly define the intervals for each piece of the function. The function can have as many parts as you feel are necessary.

My piecewise function:

16. Graph your function on the same coordinate plane as your data.

