

## Making Predictions from Data

Court recently purchased a new SUV from *YOU CAN ALWAYS TRUST US CAR DEALER*. The manual indicated that the SUV will get 18 miles per gallon. As a new owner he kept records of how many gallons he used and miles he went each time he filled his gas tank. The table below shows the first 20 entries from his record book. Graph the data on a coordinate grid. Let  $x$  represent the number of gallons of gas used and  $y$  represent the number of miles traveled.

Record	1	2	3	4	5	6	7	8	9	10
Gallons	3.5	5	5.5	5.4	6.4	6.5	7.8	7.8	8.8	10
Miles	75	90	88	110	175	150	133	152	172	180

Record	11	12	13	14	15	16	17	18	19	20
Gallons	9.5	10.6	11.2	11.6	12.8	13.4	14	15	15.3	16.5
Miles	195	199	213	251	204	265	240	270	288	253

- With  $x$  representing the gallons of gas used and  $y$  representing the miles traveled, write an equation that would represent the number of miles traveled for any number of gallons used if the manual is truly correct. Draw this line on your graph.
- How does this line help you find the number of times that Court's car got exactly 18 miles per gallon?
- How much gas did Court's car use on the shortest trip shown of the chart? Based on the location of this point in relationship to the line you drew in question 1, what does this tell you about the gas mileage during that short trip?
- How much gas did Court's car use on the longest trip shown of the chart? Based on the location of this point in relationship to the line you drew in question 1, what does this tell you about the gas mileage during that short trip?
- Court's dad suggested that he calculate the miles per gallon for each recorded time. Create a table that computes the miles per gallon achieved in Court's SUV during the 20 recorded time.

Record	1	2	3	4	5	6	7	8	9	10
MPG										

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MPG										

- Notice several of the points are below the line. Describe what has happened between the fuel consumption and mileage for these ordered pairs in terms of the company's predicted fuel consumption of 18 mpg.

7. Notice that other points are above the line. Describe what has happened between the fuel consumption and mileage for these ordered pairs in terms of the company's predicted fuel consumption of 18 mpg.
8. How can you tell when the SUV gets better mileage than indicated by the manual? How can you tell when the SUV got less mileage than indicated by the manual?
9. Compare the MPG chart to the graph. Describe how better and worse mileage is illustrated in both.
10. Based on the graph and the MPG chart, describe why you believe or do not believe the claim of the manufacturer that the car gets 18 mpg.
11. If you were to select a record where Court's car used the most gas to travel the least distance, which record would you choose. Explain your reasoning. What do you notice about this point on your graph and the MPG chart?
12. If you were to select a record where Court's car traveled the most distance for the least gas used, which record would you choose. Explain your reasoning. What do you notice about this point on your graph and the MPG chart?
13. Court would like to analyze the MPG performance of his new SUV. Find the median, quartile 1 and 2 for the MPG data. Find the inter-quartile range. Determine if any of extreme values are outliers. (More than  $1.5 \times$  inter-quartile range below quartile 1 or above quartile 3.) Create a box and whisker plot for the MPG chart.
14. Describe what this graph describes about the performance of Court's SUV.
15. Suppose Court starts out on a 320 mile trip with a full tank of gas (18.5 gallons). After traveling 320 miles he notices a sign on the expressway that says the next service area is 20 miles. Based on the data in the charts and graph, describe whether you believe Court will make it to the next service station before running out of gas. Describe how you found your answer.