

'Reasoning from Evidence'

Emergency 911! Bay City - Example #2 (solution)

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The aim of this assessment is to provide the opportunity for you to:

- select appropriate methods to analyze a data set, including appropriate graphs and calculations
- read and interpret a graph
- use the data analysis to make a recommendation.

Last week there was an accident at the Waterfront Amusement Park in Bay City. A seat on one of the rides broke loose resulting in the death of two teenagers. The owners of the amusement park have charged that if ambulances had responded more quickly, the two teens would have survived. They have threatened to sue the Bay City 911 emergency service for failing to dispatch ambulances efficiently.



The Bay City Council has hired your firm to conduct an independent investigation of the City's 911 response. Upon completion of your investigation, you are to make a report to the City

Council on your findings along with any recommendations for improving the 911 emergency service in the neighborhood of the amusement park.

You start to work on this assignment. Your investigation has uncovered the following information.

- The 911 operators dispatch ambulances from two companies: Arrow Ambulance Service and Metro Ambulances.
- The 911 operators aren't always sure which company to send when an emergency call is received.
- Data on the response times of the two companies for an area of a one mile radius of the Amusement Park shows that it can take as little as 6 minutes or as long as 19 minutes. (The response time is the length of time from when a 911 operator receives an emergency call to when an ambulance arrives on the scene of the accident).

You need to continue your investigation by analyzing the response time data from the 911 log sheets for May. (The log sheets are shown on the next page).

Based on the information above and your analysis of the response time data, you conclude that the Bay City Council needs to establish a policy about which service to call.

Write a report to the Bay City Council advising them of your recommendations about which service the 911 operators should dispatch in the area around the amusement park.

You will need to prepare charts, graphs, calculations or other materials to include in your report to support your recommendations. Be sure to give clear reasons for the policy you are recommending.

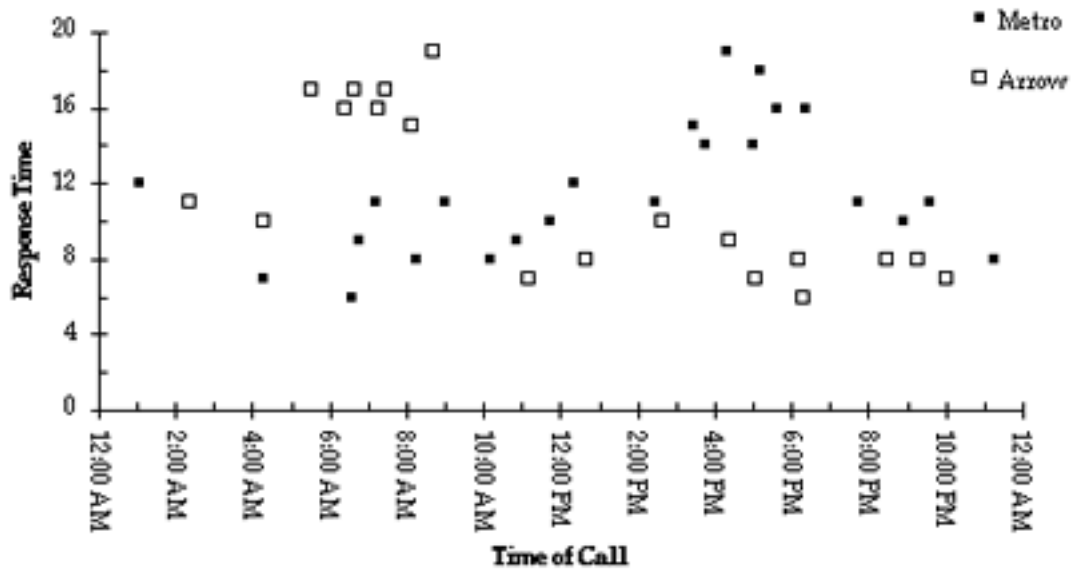
Emergency 911! Data sheet

| Date of call | Time of call | Company Name | Response Time in minutes |
|---------------------|---------------------|---------------------|---------------------------------|
| Wed., May 1 | 2:20 AM | Arrow | 11 |
| Wed., May 1 | 12:41 PM | Arrow | 8 |
| Wed., May 1 | 2:29 PM | Metro | 11 |
| Thurs., May 2 | 8:14 AM | Metro | 8 |
| Thurs., May 2 | 6:23 PM | Metro | 16 |
| Fri., May 3 | 4:15 AM | Metro | 7 |
| Fri., May 3 | 8:41 AM | Arrow | 19 |
| Sat., May 4 | 7:12 AM | Metro | 11 |
| Sat., May 4 | 7:43 PM | Metro | 11 |
| Sat., May 4 | 10:02 PM | Arrow | 7 |
| Sun., May 5 | 12:22 PM | Metro | 12 |
| Mon., May 6 | 6:47 AM | Metro | 9 |
| Mon., May 6 | 7:15 AM | Arrow | 16 |
| Mon., May 6 | 6:10 PM | Arrow | 8 |
| Tues., May 7 | 5:37 PM | Metro | 16 |
| Tues., May 7 | 9:37 PM | Metro | 11 |
| Thurs., May 9 | 5:30 AM | Arrow | 17 |
| Thurs., May 9 | 6:18 PM | Arrow | 6 |
| Fri., May 10 | 6:25 AM | Arrow | 16 |
| Sat., May 11 | 1:03 AM | Metro | 12 |
| Mon., May 13 | 6:40 AM | Arrow | 17 |
| Mon., May 13 | 3:25 PM | Metro | 15 |
| Tues., May 14 | 4:59 PM | Metro | 14 |
| Thurs., May 16 | 10:11 AM | Metro | 8 |
| Thurs., May 16 | 11:45 AM | Metro | 10 |
| Fri., May 17 | 11:09 AM | Arrow | 7 |
| Fri., May 17 | 9:15 PM | Arrow | 8 |
| Fri., May 17 | 11:15 PM | Metro | 8 |
| Mon., May 20 | 7:25 AM | Arrow | 17 |
| Mon., May 20 | 4:20 PM | Metro | 19 |
| Thurs., May 23 | 2:39 PM | Arrow | 10 |
| Thurs., May 23 | 3:44 PM | Metro | 14 |
| Fri., May 24 | 8:56 PM | Metro | 10 |
| Sat., May 25 | 8:30 PM | Arrow | 8 |
| Sun., May 26 | 6:33 AM | Metro | 6 |
| Mon., May 27 | 4:21 PM | Arrow | 9 |
| Tues., May 28 | 8:07 AM | Arrow | 15 |
| Tues., May 28 | 5:02 PM | Arrow | 7 |
| Wed., May 29 | 10:51 AM | Metro | 9 |
| Wed., May 29 | 5:11 PM | Metro | 18 |
| Thurs., May 30 | 4:16 AM | Arrow | 10 |
| Fri., May 31 | 8:59 AM | Metro | 11 |

Emergency 911! Bay City - Sample Solution

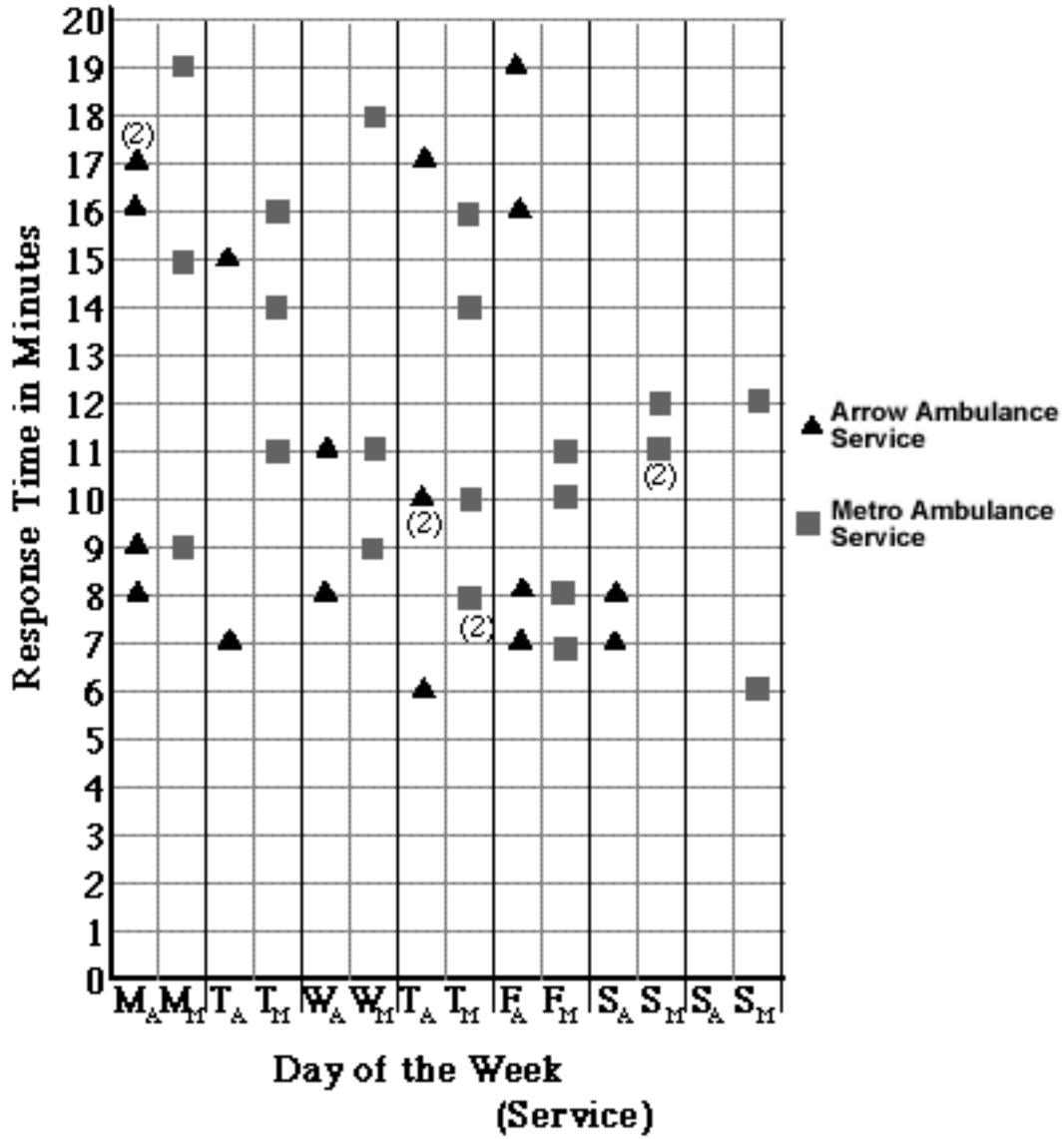
Calculating mean response times for each ambulance service is a reasonable start to analyzing the data. However, the mean response time for Arrow Ambulance Service is 11.36 minutes. The mean response time for Metro Ambulances is 11.56 minutes. The difference of 0.2 minute is not significant and suggests some further investigation of the data is warranted.

A likely choice would be to select response time and time of call to see if there is a relationship between these variables. A scatter plot graphing the response times for given times at which the calls were placed is an appropriate graphical representation.



An analysis of the scatter plot suggests that Metro Ambulances tends to have a quicker response time during the a.m. hours and Arrow Ambulance Service tends to have a quicker response time during the p.m. hours. Given this further analysis, a reasonable policy recommendation would be to have 911 operators dispatch Metro Ambulances between the morning hours of 12 midnight until 12 noon and to dispatch Arrow Ambulance Service during the afternoon and evening hours of 12 noon until 12 midnight.

A more complete solution would take into account whether there might be other relationships that might affect a policy recommendation. Further analysis of the data could consider the relationship between response time and the day of the week in which a call is recorded. A scatterplot of these data are presented next.



An analysis of this scatterplot suggests that the day of the week in which a call is received by a 911 operator has no effect on the response time.