

BASIC MATH

The Complete Course Lesson Twenty Five

Statistics KA8425

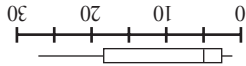
Teaching Guide & Worksheet

8. 181

7. 190

6. 192

5. Range = 26
IQR = 16



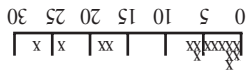
4. 15. The range

14. The mean

3. $UQ = 18$
 $LQ = 2$

13. $19\frac{1}{2}$

12. 272



11. $27\frac{1}{2}$

10. 62

9. $208\frac{1}{2}$

1. Mean = $8\frac{4}{5}$
Median = 5

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HOW TO USE THE VIDEO AND TEACHING GUIDE

1. The "STOP TO THINK" signal means pause to think.
2. The "STOP TO WORK" signal means work the problem(s).
3. Rewind the tape and watch the lesson again if the concept is not clear.
4. Use "Learning Strategies" section of the Teachers Guide as memory aids and topics for classroom discussion.
5. Students should complete the exercises on the worksheet to confirm their understanding of this lesson.

Instructors may duplicate the worksheets as needed

LEARNING STRATEGIES

WHAT IS STATISTICS?

- A. The gathering of data
 - 1. Sampling
 - 2. Taking a census of the population
- B. Displaying data
 - 1. Charts
 - 2. Graphs
 - 3. Numerical statistics
- C. Analyzing data
 - 1. Making decisions
 - 2. Making predictions

ANALYZING A DATA SET— THE HEIGHTS OF TALL BUILDINGS IN TWO DIFFERENT CITIES

- A. The line plot
 - 1. The line plot is used to compare sets of data
 - 2. The line plot is used to assess the distribution (pattern) of a set of data including clusters, gaps, and outliers
- B. Measures of tendency
 - 1. The mean is the sum of the data divided by the number of items of data in the sample
 - 2. The median is the middle number once the data have been placed in numerical order
 - 3. Finding the median if there are an even number of numbers: the median is the average of the two numbers in the middle of the data once the data have been placed in numerical order
 - 4. The median of 3, 4, 5, 6 is 4.5
 - 5. The mode is the number that occurs the most
 - 6. The mean can be changed significantly by a small number of divergent data
 - 7. The median is not as easily influenced by divergent data and is generally used to report the average of such data as family income or the price of a house
- C. Measures of variation
 - 1. The range is the difference between the largest number (upper extreme) and the smallest number (lower extreme)
 - 2. An outlier is a piece of data that is far enough removed from the others in the set to be examined for special consideration
 - 3. A quartile is the median of one half of the data
 - 4. The interquartile range (IQR) is the difference between the upper quartile and the lower quartile
 - 5. Standard deviation is a common measure of variation that will be left for a future course to discuss
 - 6. The range is affected by outliers
 - 7. The IQR is unaffected by outliers
 - 8. The standard deviation is affected by outliers but not to the extent that the range is
 - 9. No matter what measure of variation is used, the data set with the greater number for the variation measurement is usually the more diverse set

ANALYSIS OF THE DATA

- A. Box plot
 - 1. Using the five-number summary (lower extreme, lower quartile, median, upper quartile, and upper extreme), the box plot is constructed
 - 2. A rectangle is drawn whose width is the distance between the quartiles

- 3. A line segment, called a whisker, is drawn from each extreme to the side of the box closest to it
- 4. A vertical line segment is drawn in the rectangle at the median
- 5. The box plot on the graphing calculator
- B. Qualitative analysis
 - 1. Can we generalize the results to the population?
 - 2. Using the data to make a prediction
 - 3. Is there a difference between sets of data?
 - 4. Can we use the information from one set of data to make predictions about related data?
- C. Quantitative analysis will be left for a later course
- D. Analysis of the Democratic vote in the 1980 and 1984 presidential elections
 - 1. Analyzing the box plots of the Democratic percentages by state
 - 2. There is a minimal difference between the medians
 - 3. There are major differences in the variation
 - 4. Discussing the possible reasons for the differences in the actual election results

WORKSHEET STRATEGIES

Fifteen teachers were asked to tell how many years of teaching experience each had. The data collected were:

7	5	2	18	2
3	19	2	4	1
1	23	6	27	6

- 8. Find the lower quartile
- 9. Find the upper quartile
- 10. Find the range
- 11. Find the IQR
- 12. If a tenth lineman was added, what would his weight have to be for the new mean to be 200 pounds?
- 13. If the tenth lineman weighed enough for the mean to be 200, what would the median be?
- 14. If the player who weighed 158 actually weighed 185, which would change more, the mean or median?

The weights of the offensive linemen on a high-school football team were measured in August. They were: 206, 185, 177, 220, 188, 190, 158, 193, and 211.

- 5. Find the mean and median.
- 6. Construct a line plot on the given axis
- 7. Find the range and interquartile range
- 8. Find the mean weight
- 9. Find the upper and lower quartiles
- 10. Use the axis to construct a boxplot
- 11. Find the median weight
- 12. Which could change more, the IQR or the range?
- 13. Find the range and interquartile range
- 14. Find the mean weight
- 15. Which could change more, the IQR or the range?