

1. Creating Examples

For each of the following properties, try to construct a data set of ten hypothetical exam scores that satisfies the property. Assume that the exam scores are integers between 0 and 100, inclusive. You may use your calculator.

- A. 90% of the scores are greater than the mean
- B. the mean is greater than twice the mode
- C. the mean is less than two-thirds the median
- D. the mean does not equal the median and none of the scores are between the mean and the median

2. Incorrect Conclusions

For each of the following arguments, explain why the conclusion drawn is not valid. Also include a simple hypothetical example that illustrates that the conclusion drawn need not follow from the information.

- A. A real estate agent notes that the mean housing price for an area and concludes that half of the houses in the area cost more than that.
- B. A businesswoman calculates that the median cost of the five business trips that she took in a month is \$600 and concludes that the total cost must have been \$3000.
- C. A company executive concludes that an accountant must have made a mistake because she prepared a report stating that 90% of the company's employees earn less than the mean salary.
- D. A restaurant owner decides that more than half of her customers prefer chocolate ice cream because chocolate is the mode when customers are offered their choice of chocolate, vanilla, and strawberry.

3. Properties of Averages

Suppose that an instructor is teaching two sections of a course and that she calculates the mean exam score to be 60 for section 1 and 90 for section 2.

- A. Do you have enough information to determine the mean exam score for the two sections combined? Explain
- B. What can you say with certainty about the value of the overall mean for the two sections combined?
- C. Without seeing all of the individual students' exam scores, what information would you need to be able to calculate the overall mean?
- D. Suppose that section 1 contains 20 students and section 2 contains 30 students. Calculate the overall mean exam score. Is the overall mean closer to 60 or to 90?
- E. Give an example of sample sizes for the two sections for which the overall mean turns out to be less than 65.
- F. If you do not know the numbers of students in the sections but do know that there is the same number of students in the two sections, can you determine the overall mean? If not, explain. If so, do.

G. Explain how it could happen that a student could transfer from section 1 to section 2 and cause the mean score for each section to decrease. What would have to be true about that student's score?