

Learning Goal: For the distribution of a quantitative variable, describe the overall pattern (shape, center, and spread) and striking deviations from the pattern.

Specific Learning Objectives:

- Find the mean and median from different representations of data.
- Develop number sense with mean and median by creating different data sets with a given mean or median.

- 1) Here are two sets of exam scores, one for a class that has 4 students and one for a class that has 15 students.

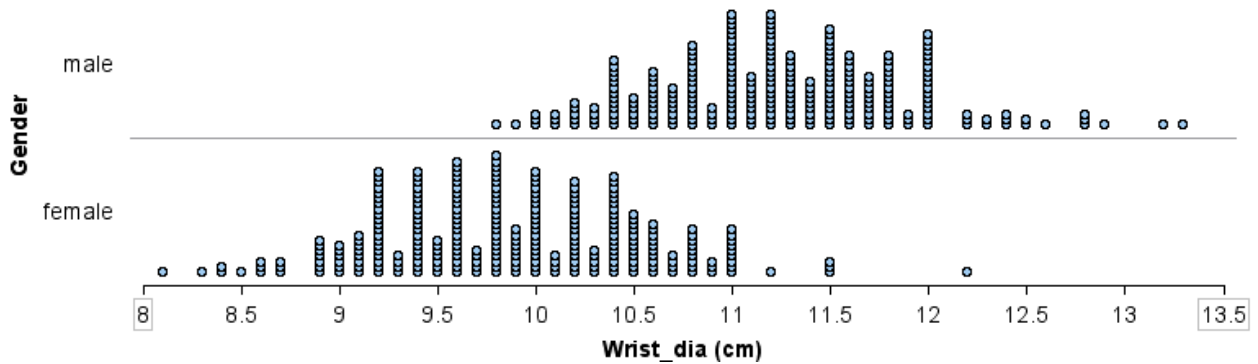
Class A: 80, 90, 90, 100

Class B: 60, 65, 65, 70, 70, 70, 75, 75, 80, 80, 80, 80, 80, 85, 100

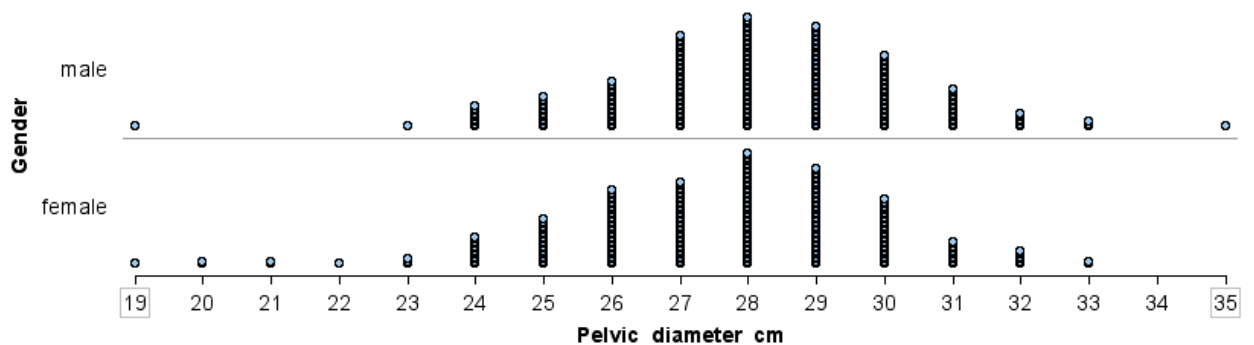
- a) Without doing any calculations, which class do you think will have a larger mean? Why?

- b) Now calculate the mean for each class. Which is larger? Why does this make sense?

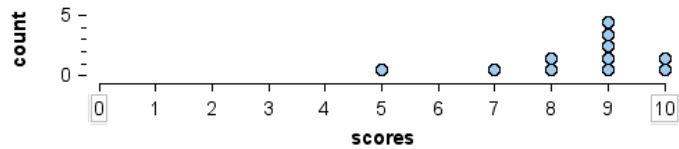
- 2) For this data, is the mean wrist measurement for men (larger than, smaller than, or about the same as) the mean wrist measurement for women? (Obviously, you can't calculate the means, so jot down notes about how you thought about this.)



- 3) For this data, is the mean pelvic diameter for men (larger than, smaller than, or about the same as) the mean pelvic diameter for women? (Obviously, you can't calculate the means, so jot down notes about how you thought about this.)



- 4) The dot plot gives quiz scores for a small class.



- a) What is the mean? Show your work or explain how you got your answer.
- b) What is the median? Show your work or explain how you got your answer.
- c) Which measure (the mean or the median) is the better way to represent typical performance on this quiz? Why?

- 5) This table gives quiz scores for a different class.

- a) What is the mean? Show your work or explain how you got your answer.

Scores	Number of students
5	1
6	3
7	5
8	3
9	1

- b) What is the median? Show your work or explain how you got your answer.

- c) Which measure (the mean or the median) is the better way to represent typical performance on this quiz? Why?

- 6) For this problem, use the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.
- a) List five digits that have a median of 7 and a mean of 7 (repeats allowed). Find a different set of 5 digits that work.

 - b) List five digits that have a median of 7 and a mean that is less than 7 (repeats allowed.) Give the mean of your 5 digits. Find a different set of 5 digits that work.

 - c) List five digits that have a median of 7 and a mean that is more than 7 (repeats allowed.) Give the mean of your 5 digits. Find a different set of 5 digits that work.
- 7) Construct a data set where neither the mean nor the median is a reasonable “typical” value.

8) Imagine that you have a bag filled with 9 numbers. The mean and the median of the numbers in the bag are both 6.

a) You draw a number out of the bag. It is a 4. You replace it with a 1. Does the mean of the numbers in the bag get bigger, smaller, or stay the same? What about the median? Jot down some notes to explain how you figured this out.

b) You draw a number out of the bag. It is an 8. You replace it with 8 ones. Does the mean of the numbers in the bag get bigger, smaller, or stay the same? What about the median? Jot down some notes to explain how you figured this out.

9) Even though statisticians call the mean and the median measures of “center”, it might be less confusing to think of the mean and the median as ways to summarize a distribution with a single number. In other words, the mean and the median are ways to represent a “typical” measurement in a data set. When do you think it is better to use the median and when it is better to use the mean to summarize a distribution?