Obviously: \[ \bar{x}_{\text{old}} \times 5 = x_1 + x_2 + x_3 + x_4 + x_5 \]

\[ \bar{x}_{\text{new}} = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + x_6}{6} = \frac{(30*5 + 36)}{6} = 31 \]

GROUP EXERCISES – STAT 226

EXERCISE 1: The mean age of 5 persons in a room is 30 years. A 36-year-old person walks in. What is now the mean age of the persons in the room?

\[ \bar{x}_{\text{old}} \times 5 = \frac{x_1 + x_2 + x_3 + x_4 + x_5}{5} \]

Suppose that the median age is 30 years and a 36-year-old person enters. Can you find the new median age from this information?

No, the new median \( \bar{x}_{\text{new}} \) will be the mean of the 3rd and 4th observations. We know the 3rd but not the 4th.

EXERCISE 2: For the following set of numbers: 4, 0, 1, 4, 3, 6 the mean, variance and standard deviation are given by: \( \bar{x} = 3, \ s^2 = 4.8, \ s = 2.19 \)

Suppose you add 2 to each of the numbers in the first set. That gives us the set 6, 2, 3, 6, 5, 8.

a. Find the mean and the standard deviation of this set of numbers.

\[ \bar{x} = \frac{36}{6} = 6 \]

\[ s^2 = \frac{[(6-6)^2 + (2-5)^2 + \ldots + (8-6)^2]}{5} = 4.8 \]

\[ s = \sqrt{4.8} = 2.19 \]

b. Compare your answers with those for the set given above. How did adding 2 to each number change the mean?

The mean increased exactly by 2.

The standard deviation and variance did not change at all.

This exercise should help you see that the standard deviation (or variance) measures only the spread around the mean and ignores changes in where the data are positioned.

EXERCISE 3: This is a variance contest. You must give a list of six numbers chosen from the whole numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, with repeats allowed.

a. Give a list of six numbers with the largest variance such a list can possibly have.

\[ 0, 0, 0, 9, 9, 9 \]

b. Give a list of six numbers with the smallest variance such a list can possibly have.

\[ 0, 0, 0, 0, 0, 0 \]

Or any other list of 6 identical numbers.

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