

1. A woman from the US measures 63 inches tall. The CDC says that American women have an average height of 64.3 inches with a standard deviation of 3.1 inches. A woman from Europe measures 160 centimeters, and the European Union demographics section reports that European women average 162.6 centimeters with a standard deviation of 7.8 centimeters. Without converting inches to centimeter (or vice versa), determine which woman is taller by comparing z-scores.

$$\frac{63 - 64.3}{3.1} = -.41935\dots$$

$$\frac{160 - 162.6}{7.8} = -.333\dots$$

The European woman is taller

2. The SAT Math test has a mean score of 500 with a standard deviation of 100. The ACT Math test has a mean score of 21 with a standard deviation of 5. Sandrine took both tests and scored 720 on the SAT and 33 on the ACT. Which score is higher?

$$\frac{720 - 500}{100} = 2.2$$

$$\frac{33 - 21}{5} = 2.4$$

ACT is higher score

3. Beth and Martha are identical twins who live in different cities. Both twins joined local bowling leagues and are comparing scores. Beth's average is 185 points per game, and Martha's is 178 points per game. Beth's league has a mean of 170 with a standard deviation of 12, while Martha's home league has a mean of 157 with a standard deviation of 17. Who has the better bowling score? Who is more highly ranked in their home league? Are your answers the same?

$$\frac{185 - 170}{12} = 1.25$$

$$\frac{178 - 157}{17} = 1.235\dots$$

Beth is better in her league (but barely)

4. Joaquin & Miranda purchased a new home in 2015 that sold for \$250,000. The mean selling price of homes at that time in the community was \$275,000, with a standard deviation of \$35,000. Mohamed & Tamira purchased a new home in 2016 that sold for \$289,000, in the same neighborhood, but by then the mean selling price of homes had jumped to \$300,000 with the same standard deviation. Which couple got a better deal on the home?

$$\frac{250,000 - 275,000}{35,000} = -.71428\dots$$

$$\frac{289,000 - 300,000}{35,000} = -.31428$$

Joaquin & Miranda got the better deal