

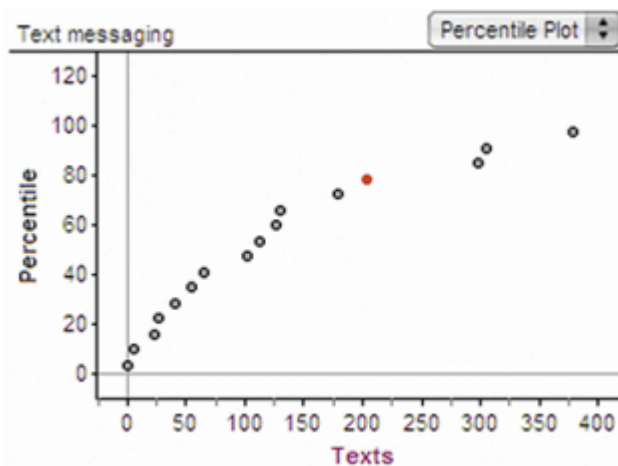
5. Growth charts We used an online growth chart to find percentiles for the height and weight of a 16-year-old girl who is 66 inches tall and weighs 118 pounds. According to the chart, this girl is at the 48th percentile for weight and the 78th percentile for height. Explain what these values mean in plain English.

Exercise 7 involves a new type of graph called a percentile plot. Each point gives the value of the variable being measured and the corresponding percentile for one individual in the data set.

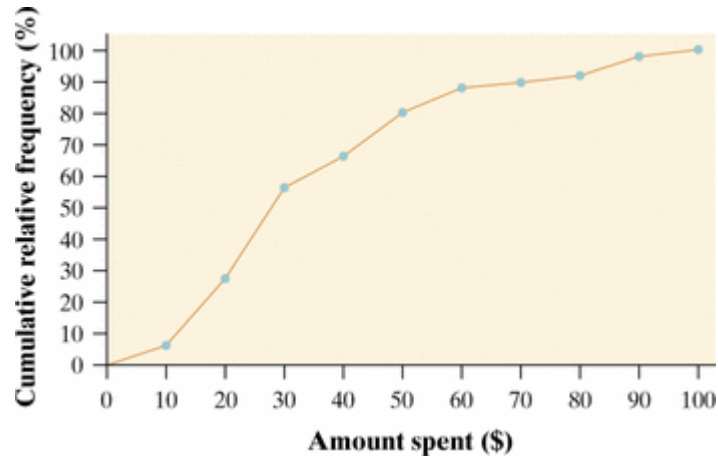
7. The percentile plot below shows the distribution of text messages sent and received in a two-day period by a random sample of 16 females from a large high school.

a) Describe the student represented by the highlighted point.

b) Use the graph to estimate the median number of texts. Explain your method.



9) Shopping spree The figure below is a cumulative relative frequency graph of the amount spent by 50 consecutive grocery shoppers at a store.



a) Estimate the interquartile range of this distribution. Show your method.

b) What is the percentile for the shopper who spent \$19.50?

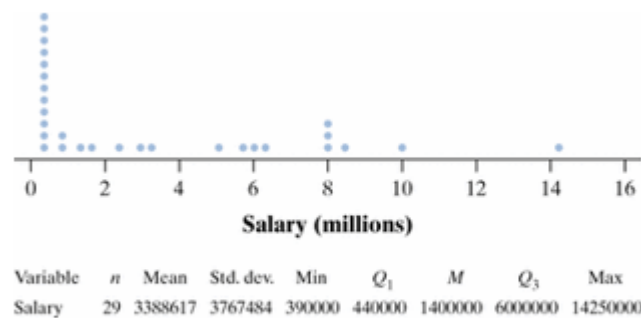
11) SAT versus ACT Eleanor scores 680 on the SAT Mathematics test. The distribution of SAT scores is symmetric and single-peaked, with mean 500 and standard deviation 100. Gerald takes the American College Testing (ACT) Mathematics test and scores 27. ACT scores also follow a symmetric, single-peaked distribution—but with mean 18 and standard deviation 6. Find the standardized scores for both students. Assuming that both tests measure the same kind of ability, who has the higher score?

13) Measuring bone density Individuals with low bone density have a high risk of broken bones (fractures). Physicians who are concerned about low bone density (osteoporosis) in patients can refer them for specialized testing. Currently, the most common method for testing bone density is dual-energy X-ray absorptiometry (DEXA). A patient who undergoes a DEXA test usually gets bone density results in grams per square centimeter (g/cm^2) and in standardized units.

Judy, who is 25 years old, has her bone density measured using DEXA. Her results indicate a bone density in the hip of $948 \text{ g}/\text{cm}^2$ and a standardized score of $z = -1.45$. In the reference population of 25-year-old women like Judy, the mean bone density in the hip is $956 \text{ g}/\text{cm}^2$.

- Judy has not taken a statistics class in a few years. Explain to her in simple language what the standardized score tells her about her bone density.
- Use the information provided to calculate the standard deviation of bone density in the reference population.

Exercise 15 refers to the dotplot and summary statistics of salaries for players on the World Champion 2008 Philadelphia Phillies baseball team.⁸



Baseball salaries Brad Lidge played a crucial role as the Phillies' "closer," pitching the end of many games throughout the season. Lidge's salary for the 2008 season was \$6,350,000.

- Find the percentile corresponding to Lidge's salary. Explain what this value means.
- Find the z -score corresponding to Lidge's salary. Explain what this value means.