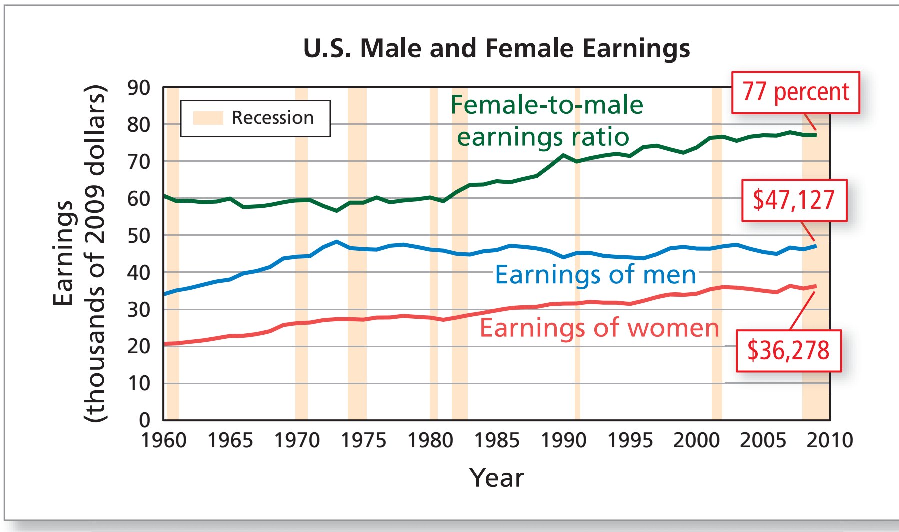
The Effect of Outliers on Averages

An **outlier** in a data set is a value that lies outside (is much smaller or larger than) most of the other values in the data set.

EXAMPLE 5 Analyzing Outliers and Averages

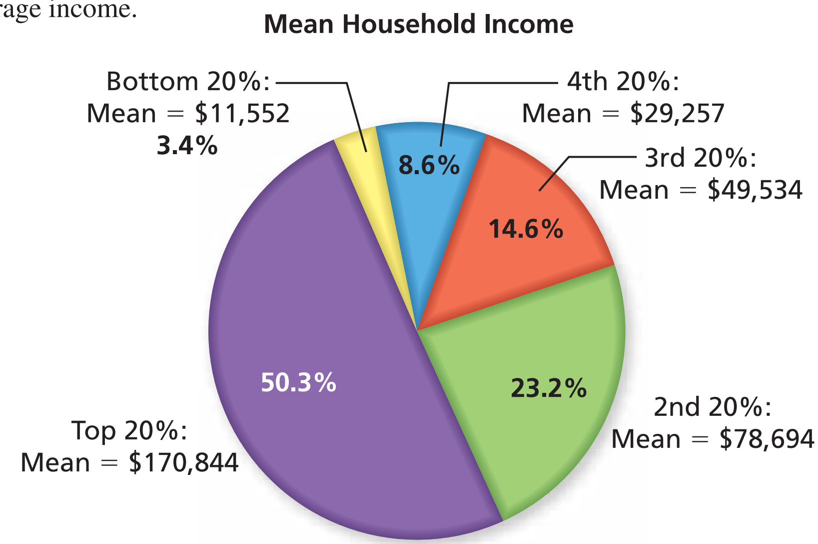
The 2009 U.S. Census report on income in the United States uses median income to describe the average income. Why does the report use median income instead of mean income to represent the average income?



Each year, the U.S. Census Bureau issues a report called *Income, Poverty, and Health Insurance Coverage in the United States.* This one was issued in September 2010.

SOLUTION

The mean annual household income in the United States was about $67,976 in 2009. The median household income was $49,777. The circle graph below helps explain the discrepancy between these two averages. The very high incomes in the top 20% caused the mean to overestimate the typical household income. Because the median is not as strongly affected by outliers as the mean, it is used to measure average income.



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Discuss other instances where the median is a better measure of the average value than the mean.