

# AP Stats: Warm-Up!

You are trying to determine the average income for an adult in the U.S.. Should you use the mean or the median? What is the value of each one?

You have just taken an AP Stats exam and get the results back from the test. What is the value of receiving the median versus the mean?

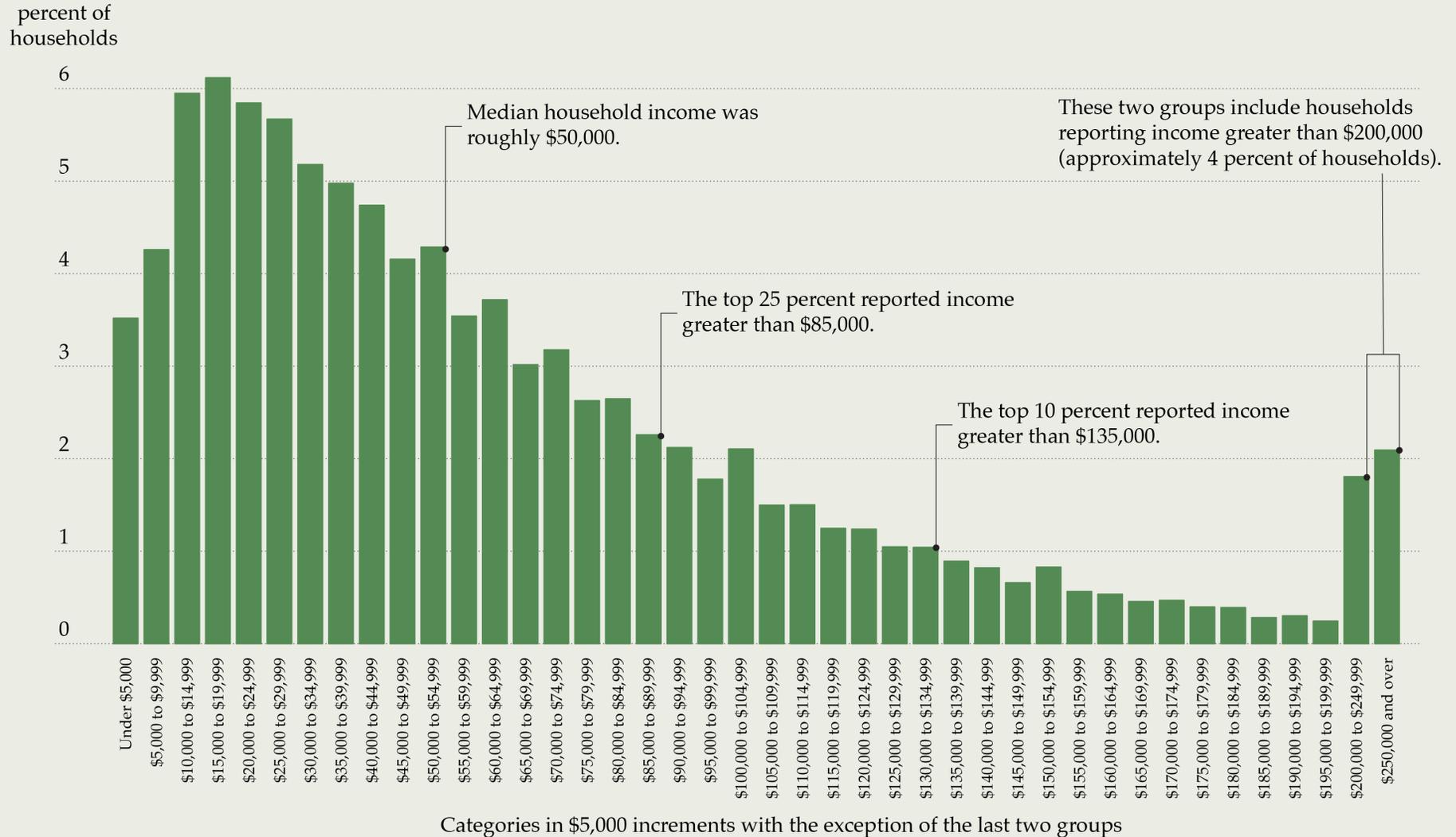


## Quote of the Day!

A statistician can have his head in an oven and his feet on ice, and he will say that on average he feels fine.

# Graph of the Day!

## Distribution of annual household income in the United States 2010 estimate





# Agenda

- Today: Mean, Median, Mode, Range, 5 number summary, Boxplots
- Tuesday: Drop
- Wednesday: Standard Deviation and Variance
- Thursday: Comparing Distributions
- Friday: Review for a Chapter Test
- Monday: Chapter 1 Test

HW will be assigned nightly but I will only check for completion on Monday. I would suggest doing it every night but it is up to you.

# Formal Definitions for the Mean and Median

Mean: The average of the data set.

$$\bar{X} = \frac{\sum X}{N}$$

Median: The midpoint of a data set

-Not susceptible to outliers, whereas the mean is (the median is considered a **resistant measure** because of this.

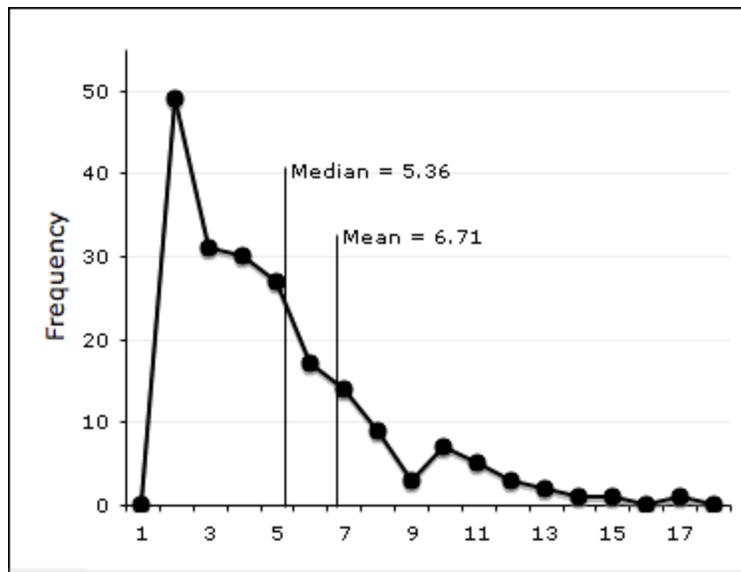


# Mean versus Median

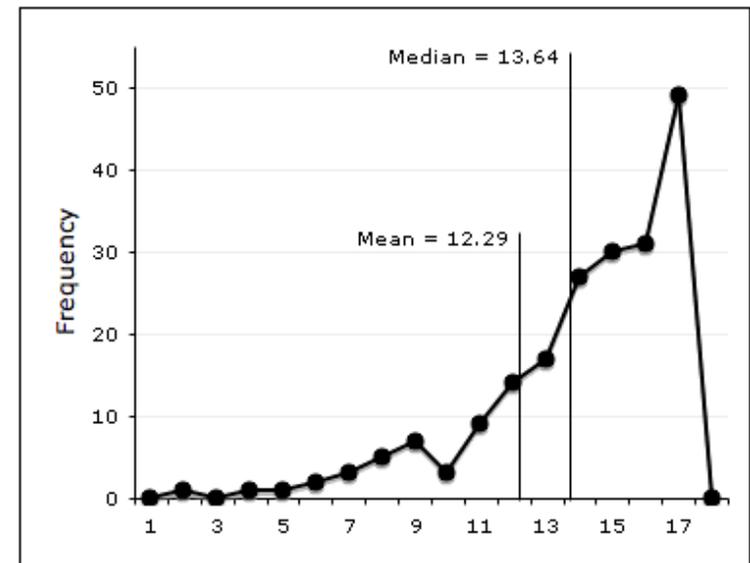
The mean gives us the “average” value but the median tends to give us the “typical” value.

It really depends what you are trying to convey when you choose which measure of center to report. You could omit outliers or just use the median which essentially does that. Or maybe you want to include the outliers as they are relevant to what you are looking at.

# Skew Impacts the Mean and Median



(a) Negatively skewed



(c) Positively skewed

(b) Normal (no skew)

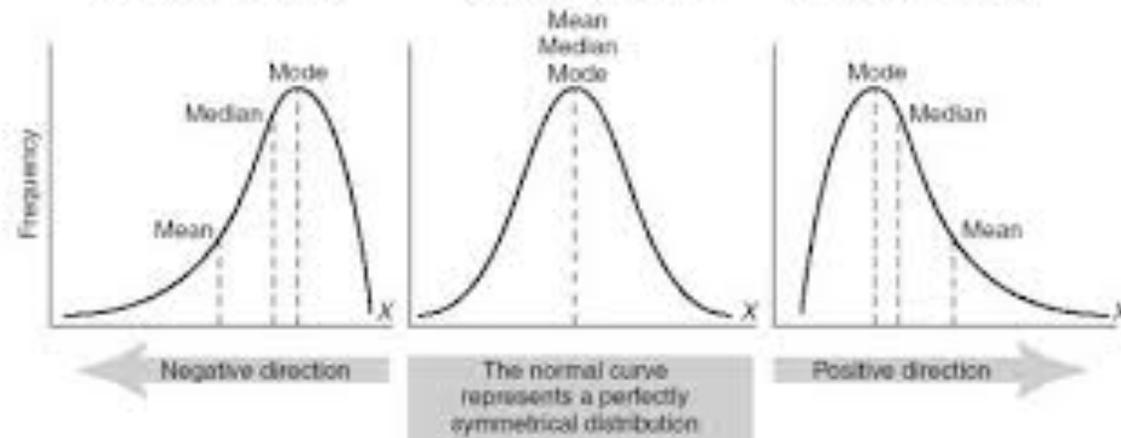


FIGURE 15.6 Examples of normal and skewed distributions



# Measuring Spread

**Range:** Highest – Lowest

**Percentiles:** The percent of values that fall at or below a certain value.

The 50<sup>th</sup> Percentile is simply the Median

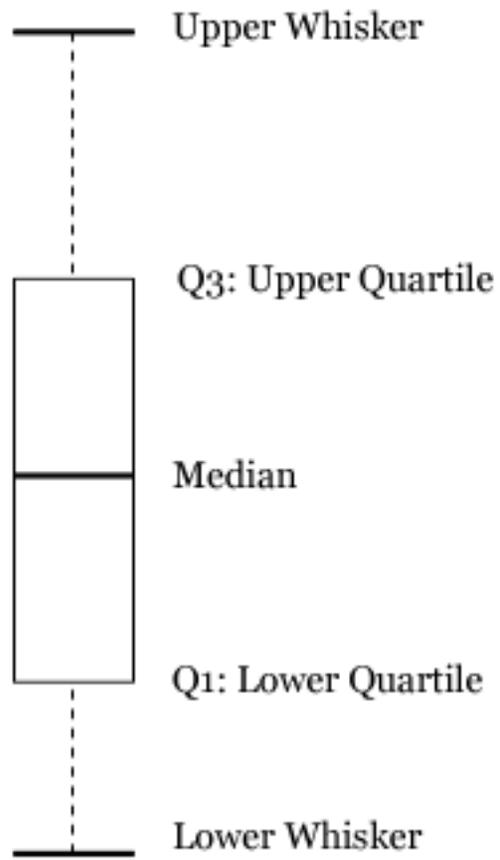


# Quartiles

- The first quartile is the 25<sup>th</sup> percentile (it is the median of the numbers to the left of the median).
- The third quartile is the 75<sup>th</sup> percentile (it is the median of the numbers to the left of the median).

# 5-Number Summary and Boxplots

Min   Q1   M   Q3   Max



The highway mpg's from 13 minicompact cars are below

19, 22, 23, 23, 23, 26, 26, 27, 28, 29, 29, 31, 32

Calculate the 5 number summary and make a boxplot.

Then use your calculator to get those same values and make a graph.



# Suspected Outliers

The Interquartile Range:  $Q3 - Q1$

**The 1.5 X the IQR rule:** An observation may be called an outlier if it falls more than 1.5 X the IQR above the 3<sup>rd</sup> quartile or below the 1<sup>st</sup> quartile.



# HW #10

- Read Pg. 69-81
- Pg. 74 Exercises 1.27, 1.30, 1.31
- Pg. 82-83 Exercises 1.33, 1.35