<u>Day #1</u>: 2.1: Percentiles and *z*-scores
Read 84-85

What is a percentile? On a test, is a student's percentile the same as the percent correct?

Alternate Example: Wins in Major League Baseball
The stemplot below shows the number of wins for each of the 30 Major League Baseball teams in 2009.

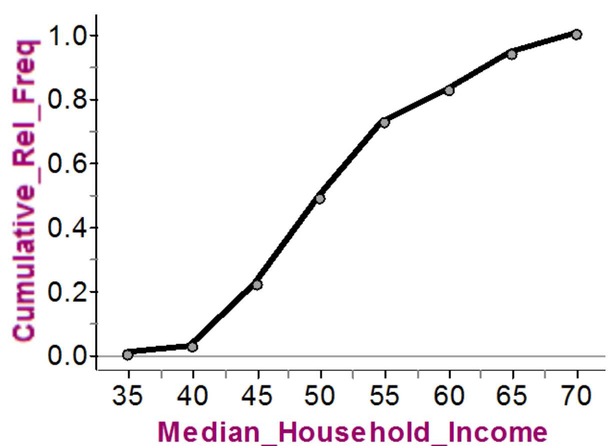
5	9
6	2455
7	00455589
8	0345667778
9	123557
10	3

Key: 5|9 represents a team with 59 wins.

Calculate and interpret the percentiles for the Colorado Rockies who had 92 wins, the New York Yankees who had 103 wins, and the Cleveland Indians who had 65 wins.

Read 86-89

Alternate Example: State Median Household Incomes
Here is a cumulative relative frequency graph showing the distribution of median household incomes for the 50 states and the District of Columbia.



a) California, with a median household income of $57,445 is at what percentile?

b) What is the 25th percentile for this distribution? What is another name for this value?

c) Where is the graph the steepest? What does this indicate about the distribution?

Read 89-91

How do you calculate and interpret a standardized score (z-score)? Do z-scores have units? What does the sign of a standardized score tell you?

Alternate Example: Home run kings

The single-season home run record for major league baseball has been set just three times since Babe Ruth hit 60 home runs in 1927. Roger Maris hit 61 in 1961, Mark McGwire hit 70 in 1998 and Barry Bonds hit 73 in 2001. In an absolute sense, Barry Bonds had the best performance of these four players, since he hit the most home runs in a single season. However, in a relative sense this may not be true. Baseball historians suggest that hitting a home run has been easier in some eras than others. This is due to many factors, including quality of batters, quality of pitchers, hardness of the baseball, dimensions of ballparks, and possible use of performance-enhancing drugs. To make a fair comparison, we should see how these performances rate relative to others hitters during the same year. Calculate the standardized score for each player and compare.

Year	Player	HR	Mean	SD
1927	Babe Ruth	60	7.2	9.7
1961	Roger Maris	61	18.8	13.4
1998	Mark McGwire	70	20.7	12.7
2001	Barry Bonds	73	21.4	13.2

In 2001, Arizona Diamondback Mark Grace's home run total has a standardized score of $z = -0.48$. Interpret this value and calculate the number of home runs he hit.

HW #1: page 105 (1, 5, 9, 11, 13, 15)

<u>Day 2</u>: 2.1 Transforming Data and Density Curves

Guess the width of the room in meters ____________

What is the effect of adding or subtracting a constant from each observation?

What is the effect of multiplying or dividing each observation by a constant?

In 2010, Taxi Cabs in New York City charged an initial fee of $2.50 plus $2 per mile. In equation form, *fare* = 2.50 + 2(*miles*). At the end of a month a businessman collects all of his taxi cab receipts and analyzed the distribution of fares. The distribution was skewed to the right with a mean of $15.45 and a standard deviation of $10.20.

a) What are the mean and standard deviation of the lengths of his cab rides in miles?

b) If the businessman standardized all of the fares, what would be the shape, center, and spread of the distribution?

Read 99-103

What is a density curve? When would we use a density curve? Why?

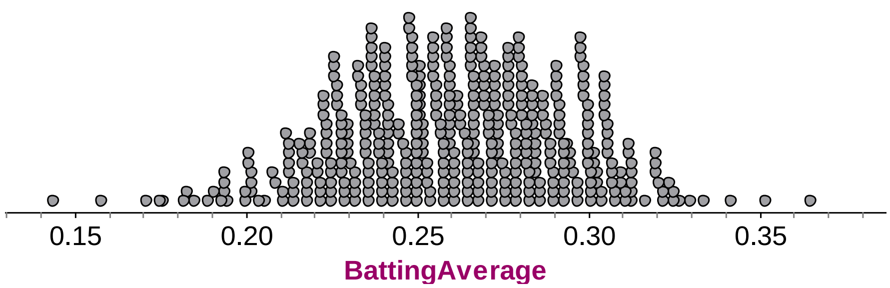
How can you identify the mean and median of a density curve? See Sudoku example on page 83.

2.2 Normal Distributions

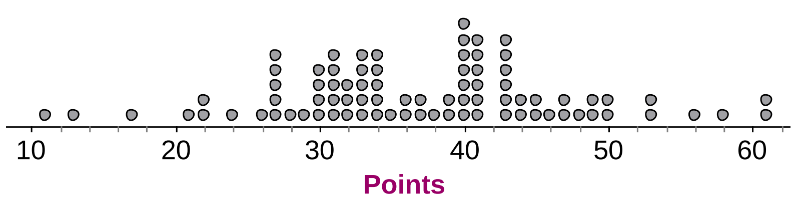
Read 110-111

In 2009, the distribution of batting averages for Major League Baseball players was approximately Normal with a mean of 0.261 with a standard deviation of 0.034. Sketch this distribution, labeling the mean and the points one, two, and three standard deviations from the mean.

What percentage of players had batting averages within one standard deviation of the mean? Within two standard deviation? Within three standard deviations?



Here is a dotplot showing the number of points Michael Jordan scored in each of his 82 games in 1986-1987. The mean of the distribution is 37.1 points and the standard deviation is 9.9 points. What percent of his point totals were within one standard deviation of the mean? Two? Three?



Read 111-114

What is the 68-95-99.7 rule? When does it apply?

Do you need to know about Chebyshev's inequality?

Page 114: Check Your Understanding

Suppose that a distribution of test scores is approximately Normal and the middle 95% of scores are between 72 and 84. What are the mean and standard of this distribution?

Can you calculate the percent of scores that are above 80? Explain.

HW #2: page 107 (19, 21, 23, 31, 33-38), page 131 (41, 43, 45)

<u>Day 3</u>: 2.2 Normal Calculations

Read 115-116

Find the proportion of observations from the standard Normal distribution that are less than 0.54.

Find the proportion of observations from the standard Normal distribution that are greater than –1.12.

Find the proportion of observations from the standard Normal distribution that are greater than 3.89.

Find the proportion of observations from the standard Normal distribution that are between 0.49 and 1.82.

What proportion of observations from a Normal distribution are within 1.5 standard deviations of the mean?

A distribution of test scores is approximately Normal and Joe scores in the 85^{th} percentile. How many standard deviations above the mean did he score?

How do you use your calculator to do these calculations?

Read 119-120

Alternate Example: Serving Speed
In the 2008 Wimbledon tennis tournament, Rafael Nadal averaged 115 miles per hour (mph) on his first serves. Assume that the distribution of his first serve speeds is Normal with a mean of 115 mph and a standard deviation of 6 mph.
(a) About what proportion of his first serves would you expect to exceed 120 mph? Use the four-step process.

(b) What percent of Rafael Nadal's first serves are between 100 and 110 mph?

(c) The fastest 20% of Nadal's first serves go at least what speed?

(d) What is the *IQR* for the distribution of Nadal's first serve speeds?

How can we do these calculations on the calculator? What do I need to show to get full credit?

According to http://www.cdc.gov/growthcharts/, the heights of 3 year old females are approximately Normally distributed with a mean of 94.5 cm and a standard deviation of 4 cm.

(a) What proportion of 3 year old females are taller than 100 cm?

(b) What proportion of 3 year old females are between 90 and 95 cm?

(c) 80% of 3 year old females are at least how tall?

(d) Suppose that the mean heights for 4 year old females is 102 cm and the third quartile is 105.5 cm. What is the standard deviation, assuming the distribution of heights is approximately Normal?

HW #3: page 131 (47-59 odd—on #53, do 4-steps for part (a) only)

<u>Day 4</u>: 2.2: Assessing Normality

Read 124-125

The measurements listed below describe the useable capacity (in cubic feet) of a sample of 36 side-by-side refrigerators. (Source: *Consumer Reports*, May 2010) Are the data close to Normal?

12.9	13.7	14.1	14.2	14.5	14.5	14.6	14.7	15.1	15.2	15.3	15.3
15.3	15.3	15.5	15.6	15.6	15.8	16.0	16.0	16.2	16.2	16.3	16.4
16.5	16.6	16.6	16.6	16.8	17.0	17.0	17.2	17.4	17.4	17.9	18.4

Read 126-128

When looking at a Normal probability plot, how can we determine if a distribution is approximately Normal?

Sketch a Normal probability plot for a distribution that is strongly skewed to the left.

HW #4: page 133 (63, 65, 66, 68-74)

<u>Day 5</u>: Chapter 2 Review/FRAPPY

FRAPPY: 2006B: Cumulative Relative Frequency Plots (Real estate sales)

HW #5: Chapter review exercises (optional: AP Statistics Practice Test)

<u>Day #6</u>: Chapter 2 Test