Warm-Up

1. What type of data is used in bar charts or pie charts?

categorical

2. What does the word relative typically mean when talking about charts thus far?

percentages

*Turn in the problems from ch. 2 to the basket →

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Dealing With a Lot of Numbers…

- Summarizing the data will help us when we look at large sets of quantitative data.
- Without summaries of the data, it's hard to grasp what the data tell us.
- The best thing to do is to make a picture…
- We can't use bar charts or pie charts for quantitative data, since those displays are for categorical variables.

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What is quantitative data?

Quantitative data is information about quantities; that is, information that can be measured and written down with numbers. Some examples of quantitative data are your height, your shoe size, and the length of your fingernails.

A discrete variable can take on a countable number of values. The number of values may be finite or countably infinite, as with the counting numbers.

A continuous variable can take on infinitely many values, but those values cannot be counted. No matter how small the interval between two values of a continuous variable, it is always possible to determine another value between them.

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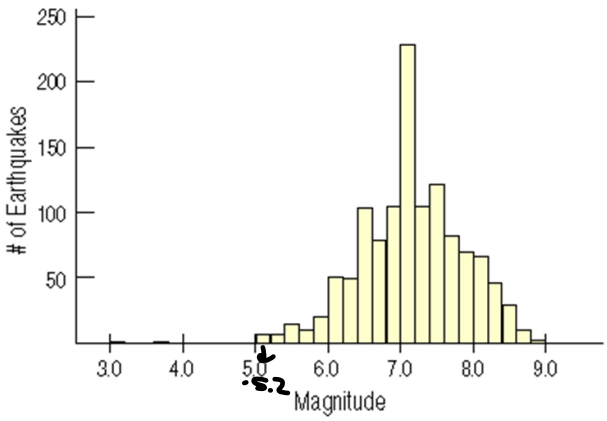
Histograms

- A histogram displays quantitative data by using bins (like bars) of equal widths with counts on the vertical axis.
- They do not show data values and there should be no spaces between the bins (if there is a space, this means that there is a gap in data).
- If a value falls on the border between two bins, it is placed in the bin on the right.



- A histogram plots the bin counts as the heights of bars (like a bar chart).
- It displays the distribution at a glance.
- Here is a histogram of earthquake magnitudes:

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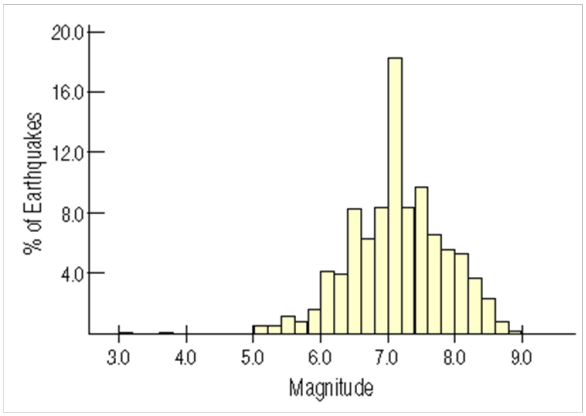
- A relative frequency histogram displays the *percentage* of cases in each bin instead of the count.
  - In this way, relative frequency histograms are faithful to the area principle.
- Here is a relative frequency histogram of earthquake magnitudes:



* Remember - spaces mean that there are gaps in the data!

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TI Tips - Making a Histogram

- Enter the following scores in L1: 22, 17, 18, 29, 22, 22, 23, 24, 23, 17, 21, 25, 20, 12, 19, 28, 24, 22, 21, 25, 26, 25, 16, 27, 22
- 2nd STATPLOT, choose Plot1 , Enter
- Choose On, select the histogram icon, then specify Xlist: L1 and Freq: 1
- Turn off any other graphs and check y= for any equations.
- ZOOM, select 9:ZoomStat, Enter
- Reset the scale to sensible values
- WINDOW, Xmin = ?, Xmax = ?, Xscl = ?
- GRAPH (if we hit ZoomStat it will undo our scale)
- TRACE

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TI Tips - Making a Histogram Cont'd

- Suppose you are given a set of test scores, with two grades in the 60s, four in the 70s, seven in the 80s, five in the 90s, and one 100.
- Enter the group cutoffs 60, 70, 80, 90, 100 in L2.
- Enter the corresponding frequencies 2, 4, 7, 5, 1 in L3.
- STATPLOT, Xlist: L2, Freq: L3
- How would you set up the window?

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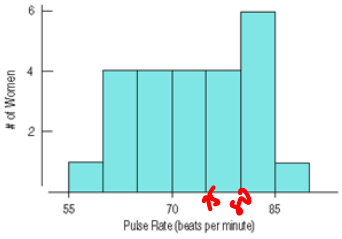
Stem-and-Leaf Displays

- Stem-and-leaf displays show the distribution of a quantitative variable, like histograms do, while preserving the individual values.
- Stem-and-leaf displays contain all the information found in a histogram and, when carefully drawn, satisfy the area principle and show the distribution.

Stem-and-Leaf Example

- Compare the histogram and stem-and-leaf display for the pulse rates of 24 women at a health clinic. Which graphical display do *you* prefer?



8	8
8	000044
7	6666
7	2222
6	8888
6	0444
5	6

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What if your data has more than 2 digits?

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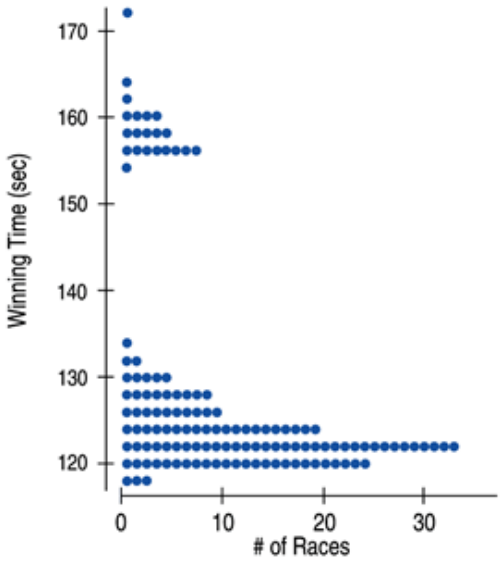
Dotplots

- A dotplot is a simple display. It just places a dot along an axis for each case in the data.
- The dotplot to the right shows Kentucky Derby winning times, plotting each race as its own dot.
- You might see a dotplot displayed horizontally or vertically.



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Think Before You Draw, Again

- Remember the "Make a picture" rule?
- Now that we have options for data displays, you need to *Think* carefully about which type of display to make.
- Before making a stem-and-leaf display, a histogram, or a dotplot, check the
  - Quantitative Data Condition: The data are values of a quantitative variable whose units are known.

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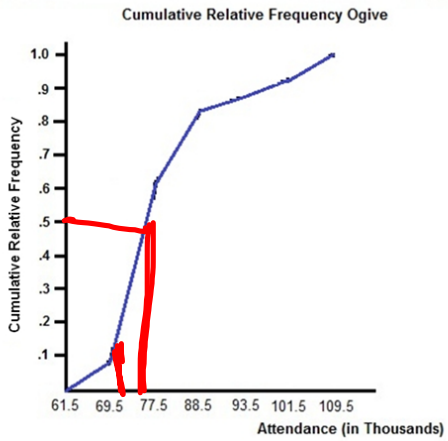
Cumulative Graphs (aka OGIVES)

A cumulative graph represents the number or proportion of a data set less than or equal to a given number. These graphs allow us to estimate percentiles.

A percentile is the value of a variable below which a certain percent of the observations fall. For example, the 20th percentile is the value (or score) below which 20% of the observations may be found.

The median of a data set is know as the 50th percentile.



1. What percentile would represent 70,000 in attendance? .15 15%.
2. Estimate the 50th percentile for attendance. median ≈ 76,000
3. Estimate the 80th percentile.

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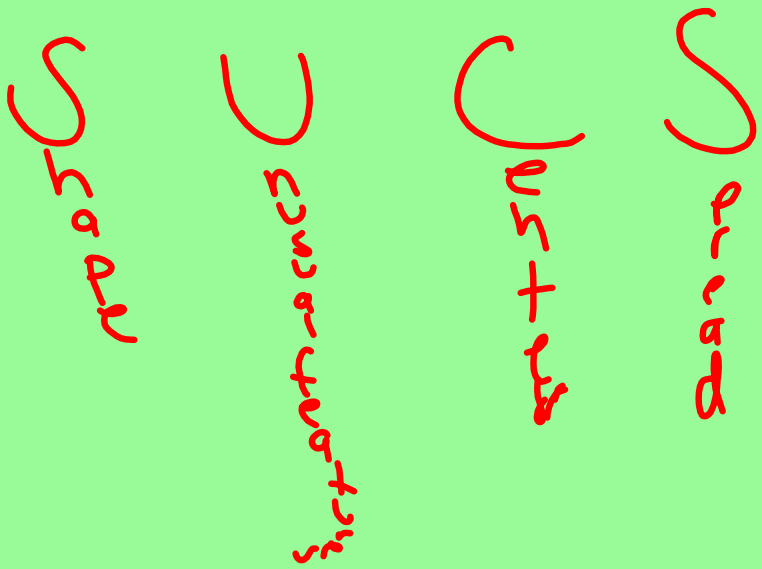
Shape, Center and Spread

- When describing a distribution, make sure to always tell about three things: shape, center, and spread...



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What is the Shape of the Distribution?

1. Does the histogram have a single, central hump or several separated humps?
2. Is the histogram symmetric?
3. Do any unusual features stick out? → U

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