Name: _____ Functions & Statistics: Per __

Topic: Types of Graphs (1-1 to 1-7) Date: _____

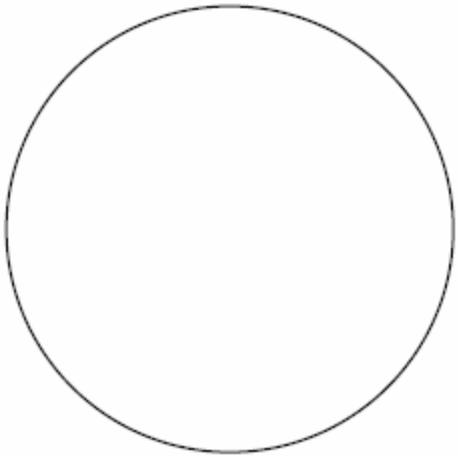
Do Now:

Given the following information, create a pie chart being sure to label percentages of each category, as well as measures of central angles. (Hint: Central Angles are part of 360^{o})

Hospital Emergency-Room Visits by Age Group in 1994 (in thousands)

Under 15 years old	23,751
15 to 24 years old	15,411
25 to 44 years old	28,219
45 to 64 years old	13,011
65 to 74 years old	5,797
75 years old and over	7,214

Emergency-Room Visits by Age Groups, 1994



When would a circle graph be used? _____

VOCABULARY:

Statistics: _____

Data: _____

Variable: _____

Population: _____

Sample: _____

Random Sample: _____

Distribution: _____

Maximum: _____

Minimum: _____

Range: _____

Mean: _____

Median: _____

Mode: _____

Quartiles: _____

Percentiles: _____

Frequency: _____

BAR GRAPHS: Use the Bar Graph below to answer the following questions:

Which food types have shown a consistent increase in consumption?

_____

Why is a circle graph a poor representation for this data?

_____

Why is a bar graph an appropriate graph to display this data?

_____

When would we use bar graphs to represent data? _____

STEM AND LEAF DIAGRAMS (STEMPLOTS) – Use the back to back stem and leaf diagram, which gives the number of CD's owned by each student.

Underclassmen		Upperclassmen
4	0	0
7 4 2	1	0 5
3 0	2	6
8 6 5 4 1 1	3	2 2 4 8
9 7 7 2 1 0 0	4	3 3 5 7 8
7 5 0	5	0 2 4 4 5 5 7
	6	3
	7	2 8
2	8	5

Identify the minimum, maximum, and range of the underclassmen's results.

Minimum: _____ Maximum: _____ Range: _____

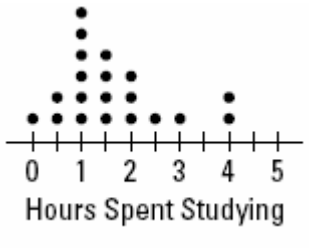
How many more underclassmen should be surveyed in order for the survey to have an equal number of participants? _____

Which values if any, appear to be outliers? _____

When and why would we use a stem and leaf diagram?

_____

DOT PLOTS (DOT FREQUENCY DIAGRAMS): Use the dot plot at the right showing the distribution of study time one weekend by students in Mrs. Lessard's math class.



What is the frequency of students who studied for two hours? _____

When and why would we use a dot plot? _____

_____

MEASURES OF CENTER – using sigma notation $\left(\sum_{i=1}^{n} X_i\right)$

Given the following diagram, find the three different measures of center (mean, median, mode)

4	3 7 9
5	0 1 4 4 7
6	1 5
7	4 6 8 9
8	2

Mean:

Median:

Mode:

Mean with Sigma Notation: $\frac{\sum_{i=1}^{n} X_i}{n}$ *or* $\frac{1}{n}\sum_{i=1}^{n} X_i$

Example: An apartment building has 200 apartments. If p_i represents the number of pets in the i^{th} apartment, then what does:

a) $\sum_{i=1}^{p} p_i$ represent?

b) $\frac{\sum_{i=1}^{p} p_i}{200}$ represent?

In the following data, x_i is the normal precipitation in inches in the i^{th} month fo the calendar year in Memphis, TN.

$$x_1 = 3.7, x_2 = 4.4, x_3 = 5.4, x_4 = 5.5, x_5 = 5.0, x_6 = 3.6,$$
$$x_7 = 3.8, x_8 = 3.4, x_9 = 3.5, x_{10} = 3.0, x_{11} = 5.1, x_{12} = 5.7$$

Write an expression in sigma notation to represent the yearly precipitation in Memphis, TN. _____

Evaluate this expression.

Consider the following expression: $\frac{1}{3}\sum_{i=7}^{9} x_i$

In words, what does this represent? _____

What is this expression when evaluated?

QUARTILES, PERCENTILES, AND BOX PLOTS:

Interquartile Range: _____

Five-Number Summary: _____

$\underline{N^{th}}$ Percentile: set of numbers is a value in the set such that *n* percent of the numbers are less than or equal to that value.

The stem and leaf diagram at the right displays the team batting averages of all Major League Baseball teams for the 1995 season. The stem represents the first two decimal places of the averages. Identify each of the following. (The use of your calculator is allowed)

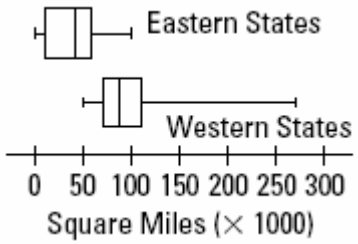
24	7 7 9
25	2 8 9 9
26	0 1 1 1 3 3 4 5 5 6
27	0 1 5 5 6 6 9 9
28	0 1
29	9

a) First quartile b) Third quartile c) Median

d) Mean e) Interquartile Range f) Number closest to the 60^{th} percentile.

Create a Box Plot (Box and Whisker) plot to display this data:

Use the box plot to the right, which represents thousands of square miles, of the 48 contiguous states east and west of the Mississippi River.



a) Which is greater, the maximum eastern-states area, or the upper quartile of the western states? _____

b) There are 26 states east of the Mississippi River. How many states have areas which are at or below the lower quartile? _____

When or why would we use a Box and Whisker Plot?

_____

OUTLIER CRITERION

Lower Outlier: _____ Upper outlier: _____

Which measure(s) of center will outliers effect and why?

_____

HISTOGRAMS

Frequency Histogram: _____

Cumulative Frequency Histogram: _____

Relative Frequency Histogram: _____

How can a frequency histogram be turned into a relative frequency histogram?

_____

Use the frequency histogram to the right answer the following questions:

In what interval is the median?

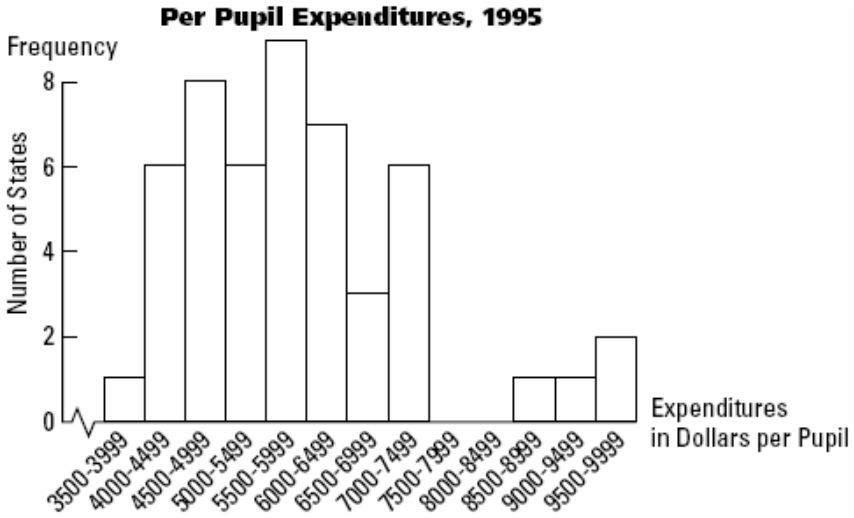
_____

How many states spend more than $8000 per pupil?

_____

When or why would we use a histogram?

_____



VARIANCE AND STANDARD DEVIATION

Deviation: _____

Variance: _____

Sample Variance (s^2): _____

Population Variance (σ^2): _____

Standard Deviation: _____

Sample Standard Deviation (s): _____

Population Standard Deviation (σ): _____

To calculate the variance and standard deviation:

$$s^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1} \qquad s = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n} \qquad \sigma = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}}$$

Following these formulas you would:

Calculate the mean of the data ($\bar{x}$)

Find the deviation (difference) of each value from the mean $(x_i - \bar{x})$

Square each deviation and add the squares $\left(\sum_{i=1}^{n}(x_i - \bar{x})^2\right)$

Divide the sum of squared deviations by n-1. *This is the variance*

Take the square root of the variance. *This is the standard deviation*

The following are heights of the Macaws basketball team members: 69, 70, 70, 72, 73, 74, 77, 78, 78, 79. Find the variance and standard deviation for the heights of the Macaws first by hand then with a calculator.

Heights (in)	Deviation $(x_i - \bar{x})$	Deviation Squared $(x_i - \bar{x})^2$
69		
70		
70		
72		
73		
74		
77		
78		
78		
79		

Calculate the variance (s^2) and standard deviation (s) for the following heights of players on the Sweet Dreams.

Heights (in)		
69		
73		
74		
74		
74		
74		
74		
74		
75		
79		

What do you notice when you compare the variance and standard deviation between the two teams heights?

_____

Why do you think this is?

_____