AP Statistics
Summer Assignment

A Bit About Statistics

I am excited that you have chosen to take AP Statistics next year! Realize that Statistics will not be like any math class you have taken. The mathematics is secondary to analysis of data, decision making, justification of your decisions (that means lots of writing), and recognizing appropriate methods to collect and deal with data (so that results are meaningful and viable).

Prerequisite Skills

Using formulas and solving algebraic equations (Algebra I and II)
Data Terminology – mean, median, mode, range, interquartile range (7^{th} and 8^{th} grade math)
Displaying and interpreting statistical plots – bar graphs, dot plots, stem plots, box and whisker plots, histograms, scatterplots and regression (7^{th}, 8^{th}, Algebra I)
Basic probability

The Summer Packet

The problems that are in this packet all represent knowledge and skills that you should already have from previous coursework. This work will be due on the first day of class and will be graded. We will have a test over the content on the second or third day of class. If you have questions about the work, feel free to email me at mclay@hisd.com.

Calculator

The AP Statistics test allows the use of a calculator for the entire test. If at all possible, you need your own TI-84 calculator for assignments.

Have a great summer!

Mike Clay
Instructor, UIL Coach - Mathematics
Hallsville High School
mclay@hisd.com

Name _____

Algebra and Formulas in AP Statistics –

Solve each. (Round/truncate answers to the nearest thousandth…most numbers are not "pretty" in Statistics)

The *z*-score formula is: $z = \frac{x - \mu}{\sigma}$, solve for each variable

1. $z = \frac{27 - 29.2}{3.56}$

2. $1.8 = \frac{x - 215}{22.7}$

3. $-3.27 = \frac{124.6 - \mu}{5.6}$

4. $.38 = \frac{18.3 - 17.1}{\sigma}$

We will find minimum sample sizes (*n)* to guarantee particular margins of error. Solve each for *n* and round up to the next whole number.

5. $.03 = 1.96\sqrt{\frac{.27(1-.27)}{n}}$

6. $.01 = 2.576\sqrt{\frac{.4(1-.4)}{n}}$

7. $15 = 1.645\left(\frac{63}{\sqrt{n}}\right)$

8. $250 = 1.96\left(\frac{580}{\sqrt{n}}\right)$

9. $.05 = 1.645\sqrt{\frac{.5(1-.5)}{n} + \frac{.25(1-.25)}{n}}$

A one-proportion confidence interval uses the formula: $p \pm z^* \sqrt{\frac{p(1-p)}{n}}$

Evaluate each interval. Express your answer as (lower bound, upper bound). Round/truncate answers to the nearest thousandth

10. $p = .25$, $z^* = 1.96$, $n = 80$

11. $p = .375$, $z^* = 2.576$, $n = 100$

A one- sample interval for a mean uses the formula: $\bar{x} \pm t^* \frac{\sigma}{\sqrt{n}}$

Evaluate each interval. Express your answer as (lower bound, upper bound). Round/truncate answers to the nearest hundredth.

12. $\bar{x} = 125$, $t^* = 1.648$, $\sigma = 6.8$, $n = 450$

13. $\bar{x} = 38.6$, $t^* = 2.728$, $\sigma = 3.6$, $n = 35$

To the find the *z*-test statistic, the following formula is sometimes used: $z = \frac{p - p}{\sqrt{\frac{p(1-p)}{n}}}$

Find *z*. Round/truncate answers to the nearest thousandth**.**

14 $p = .82$, $p = .75$, $n = 120$

15. $p = .38$, $p = .43$, $n = 45$

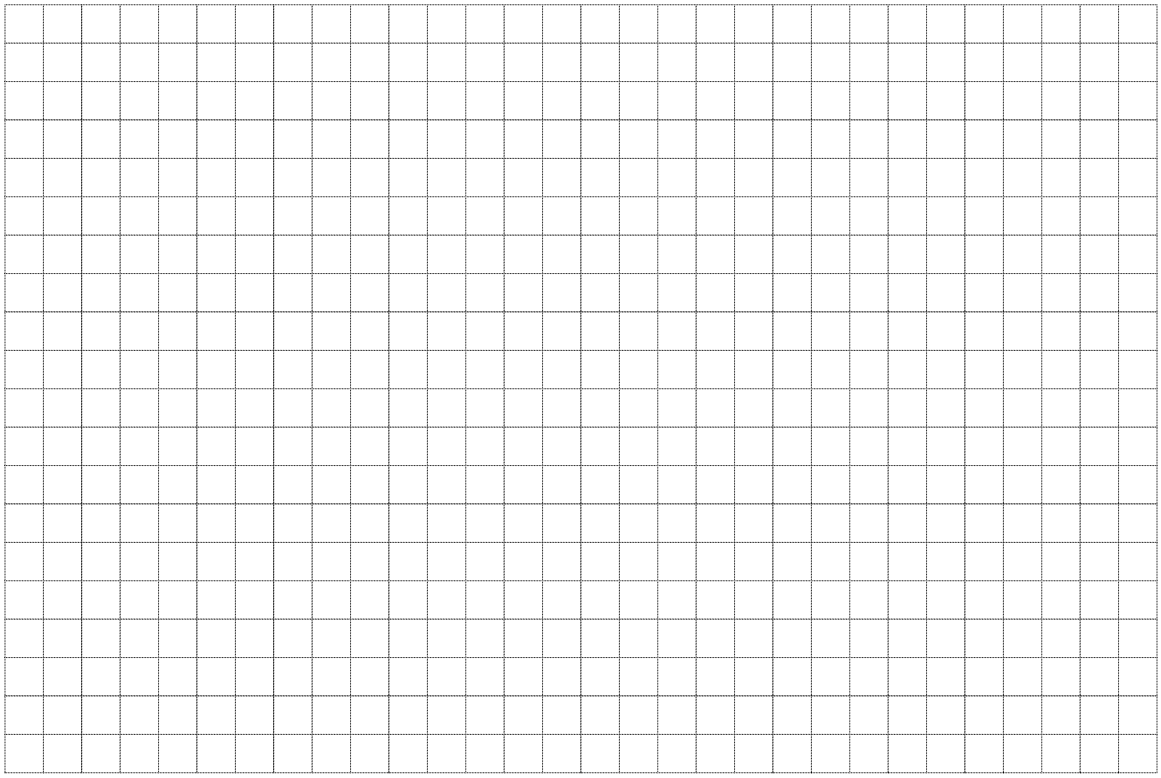
Bar Graphs

In 1997 there were 92,353 deaths from accidents in the United States. Among these were 42,340 deaths from motor vehicle accidents, 11,858 from falls, 10,163 from poisoning, 4051 from drowning, and 3601 from fires. The rest were listed as "other" causes.

a. Find the percent of accidental deaths from each of these causes, rounded to the nearest percent.

b. What percent of accidental deaths were from "other causes"?

c. Neatly create a *well-labeled* bar graph of the distribution of causes of accidental deaths. Be sure to include the "other causes" bar.



Dotplots

The date below gives the number of hurricanes that happened each year from 1944 through 2000 as reported by *Science* magazine.

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

Make a dotplot of these data. Make sure you include appropriate labels, title, and scale. The graph provided should help ensure you space your markings (you may use x's or dots) consistently. (hint – the horizontal axis will contain the numbers 0 through 7)

Box Plots and Histograms

Below is the list of ages of the players on the Washington Nationals baseball team in May of 2015.

29, 27, 26, 29, 28, 25, 25, 28, 23, 32, 26, 27, 33, 26, 25, 32, 23, 27, 32, 27, 26,
19, 33, 37, 23, 35, 28, 30, 24, 32, 33, 27, 30, 25, 21, 21, 21, 24, 27, 26, 26

a. Find the 5 number summary for these data. (minimum, lower quartile, median, upper quartile, and maximum). Enter data in List 1 (STAT, EDIT), then (STAT, CALC, 1-VAR STATS)

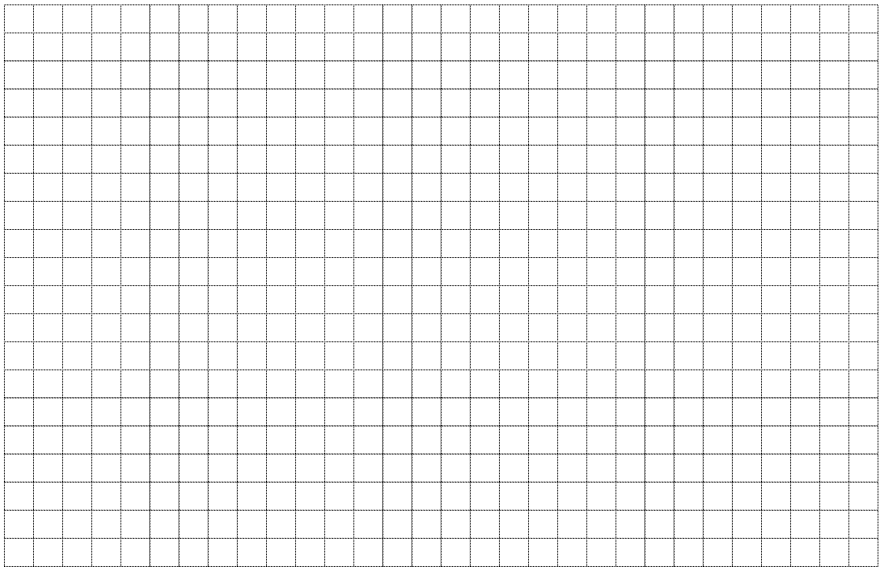
b. Draw a box and whisker plot of the data (plot it against a number line to show scale)

c. Find the mean, range and interquartile range of the data.

d. Complete the frequency table.

Ages	**Tally**	**Frequency**
19-22		
23-26		
27-30		
31-34		
35-38		

e. Create a *well-labeled* histogram using the categories and frequencies in part "d".



Scatterplots and Regression

The following data describes the number of persons per household in the United States in the census years between 1850 and 2000.

Year	# or persons in household
1850	5.55
1860	5.28
1870	5.09
1880	5.04
1890	4.93
1900	4.76
1910	4.54
1920	4.34
1930	4.11
1940	3.67
1950	3.37
1960	3.35
1970	3.14
1980	2.76
1990	2.63
2000	2.59

a. Create a *well-labeled* scatter plot of the data. Let *year* be independent and *# of persons* be dependent.

b. Use Linear Regression to find the equation for the line of best fit. _____
(STAT, CALC, LinReg(ax+b))

c. Graph the line of best fit.

d. Use the equation to predict the # of persons in a household in 1978.

e. Use the equation to predict the # of persons in a household in the year 2200. Comment on the answer, what it means and why it may not be reliable.

Stem and Leaf Plot

A marketing consultant observed 35 consecutive shoppers at a supermarket. One variable of interest was how much each shopper spent in the store. Here are the data (rounded to the nearest dollar), arranged in increasing order:

11, 12, 12, 15, 18, 20, 21, 24, 25, 27, 27, 28, 32, 33, 35, 37, 38, 39, 39, 40, 42, 45, 45, 46, 51, 52, 55, 58, 58, 59, 65, 68, 81, 82, 88

Make a stemplot using tens of dollars as the stem and dollars as the leaves. Make sure you include appropriate labels, title, and key.

Basic Probability

1. If you have 3 shirts, 2 pairs of pants, and 2 pairs of shoes, how many different outfits can you make?

2. With a 6 sided fair die:
   What is the probability of rolling a 2?

   What is the probability of rolling 2 2's in a row?

   What is the probability of rolling 3 times and not getting a 6?

3. With two 6 sided fair die:
   What is the probability of rolling a 12?

   What is the probability of rolling doubles?

4. 8! =

5. You have 4 chairs in a row:
   How many ways can 4 people sit in them?

   How many ways can 10 people sit in them?

6. The probability of winning a carnival game is 45%.
   What is the probability of not winning until your 4^{th} try?

7. Look it up! What is the probability of buying one Powerball lottery ticket and winning?