

AP STATISTICS SUMMER ASSIGNMENT

The purpose of this assignment is to introduce you to the world of statistics. Many students who sign up to take Statistics believe that this is a math course. Although Statistics is offered by the math department, this course is an analytical, thinking course. Students must have good analytical and writing skills and must be able to manipulate equations and use algebra to solve problems. Students will be expected to write all answers in **complete sentences** and put **answers in context**.

AP Statistics is a challenging course. The class approximates a college-level Statistics course and also prepares students for the AP Statistics test in May, which can be used to earn college credit. This course will not be like your traditional math courses based on performing rudimentary computations and “solving for x.” Rather, the focus of this course is to challenge you to **think, reason, explain, and support** results using evidence found in data.

This course will require that you be an **active participant**. This means you must be willing to work with me AND your classmates often during the year. Statistics is a very data driven subject (obviously) and it will be necessary, at times, to design/complete surveys and experiments in class in order to get the data we will need. If you would rather sit in class and do nothing, or you do not enjoy mental challenge of a good question, this is probably not the right course for you.

If you're still reading at this point (not afraid to be challenged), then welcome to AP Statistics. Attached you will find your summer assignment. Please read the directions **thoroughly** and complete each part to the best of your ability. If you have any questions, please feel free to email me at dtaylor1@mesquiteisd.org and I will answer as soon as possible. I look forward to working with each of you over the course of next school year.

*Note: Some of the questions on this assignment may require the use of a calculator. If you have your own, great! If not, it is “highly recommended” that you have your own calculator for statistics. Any Texas Instruments calculator will work, but we will be using the TI-84 plus in class/during instruction. If you or your parents have any question about calculators, please email me before you buy something that will not work for our class.

Here are but a few helpful websites:

www.Mathnstats.com – quick blurbs (new and good)

www.stattrek.com

includes videos and sample probs plus short notes

www.onlinestatbook.com !!!

<http://www.mrholloman.net/APS/Notes/>

<http://www.henry.k12.ga.us/ugh/apstat/chapternotes/index.html>

<http://www.anoka.k12.mn.us/education/components/docmgr/default.php?sectiondetailid=238457&catfilter=12846#showDoc>

<http://www.apstatsmonkey.com/StatsMonkey/Statsmonkey.html>

<http://arnoldkling.com/apstats/vidcontents.html>

<http://www.stats4stem.org/index.html>

www.davidmlane.com

Introductory Statistics – complete online course:

<http://www.psychstat.smsu.edu/introbook/sbk00.htm>

Statistics Encyclopedia Online

<http://www.statsoft.com/textbook/stathome.html>

Must Reads for Students...

<http://www.gallup.com/help/FAQs/poll1.asp>

Practical Stats

<http://www.practicalstats.com/Pages/excelstats.html>

Part 1: Why Statistics?

Write a page explaining why high school students should take a statistics class. Use evidence from the following sources to make your case:

http://www.ted.com/talks/lang/eng/arthur_benjamin_s_formula_for_changing_math_education.html

http://www.wired.com/magazine/2010/04/st_thompson_statistics/

Include in your response a paragraph explaining what you hope to gain from taking a class in Statistics. What are your reasons for signing up for this class? Be prepared to discuss on the first day of school.

Part 2: Data sets and scenarios

- First you will have to read through each one and define some basic concepts used in statistics. Provide a simple one or two line definition for each of the *italicized & underlined* terms.
- Then, provide a **complete solution** to the problem described (“Complete” solutions include explanations/work; not just answers).
- For all graphs, clearly label the axes and provide a scale & title.

1. In a study designed to determine the average death age reported for the population of a major U.S. city, a statistician randomly selected 31 obituaries from the city’s largest newspaper. The sample consists of 14 males and 17 females – their age of death is listed in the table below:

<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
55	75	84	87	70	57
60	77	90	44	93	84
62	82	98	91		79
71	75	61	94		75
74	74	70	60		74
79	89	58	68		

(A) Construct the following displays of the data for **BOTH** men and women:

- Parallel box-and-whisker plot
 - Male plot above the number line, Female plot below
 - Use number line from 50-100, scale: 5
- Histograms
 - One male, one female, one combined
 - x-axis scale: 5, y-axis scale: 1

(B) A statistician needs to interpret data in order to convey thoughts. Write a paragraph comparing and contrasting the data sets and provide insight into the similarities or differences for age of death for men and women in this particular city.

2. We are interested in studying if there is any correlation between a person's height and their weight. The following data shows the height (inches) and the weight (pounds) for 15 individuals:

<u>Ht</u>	<u>Wt</u>	<u>Ht</u>	<u>Wt</u>	<u>Ht</u>	<u>Wt</u>
62	165	69	211	85	321
58	157	68	188	61	170
71	192	71	244	57	164
81	265	62	215	56	148
74	223	67	199	51	153

(A) Construct a scatter plot of the data with height on the x-axis and weight on the y-axis. Must be done to **scale** (Clearly label the axes and provide a scale & title).

(B) Using a ruler, sketch a line of best fit for the data. Estimate the slope for your line (with appropriate units / context).

(C) Estimate the weight of someone who is 65 inches tall. How far off would your prediction have to be for you to consider it statistically significant

3. Data was collected on the average life expectancy and number of residents per television set for a random sample of 10 countries. The table below provides the summary descriptive statistics (n, mean, variance, standard deviation, median, range, minimum, maximum, quartile 1 and quartile 3):

	<u>N</u>	<u>Mean</u>	<u>Variance</u>	<u>St. Dev.</u>	<u>Median</u>
Life Exp.	10	66.5	133.1116	11.5374	69.5
# per TV	10	44.05	5890.716	76.751	7.3

	<u>Range</u>	<u>Min</u>	<u>Max</u>	<u>Q1</u>	<u>Q3</u>
Life Exp.	34	44	78	64	75.5
# per TV	198.7	1.3	200	2.6	29

(A) What observations can you make about average life expectancy in these countries (Provide the statistics to support your answer)?

(B) What observations can you make about the average number of people per TV in these countries (Provide the statistics to support your answer)?

4. According to a press release & data on car thefts in 2002, the 1989 Toyota Camry (a 13-year old car in that year) was the most stolen car in 2002. Further, according to the data, the 1990 Camry, 1991 Camry, and 1988 Camry were also all among the top ten most stolen cars that year. The press release claims that the most compelling reason for these cars being stolen is for parts but does not discuss any confounding variables.

(A) Based on the article, someone claims that because there is a high correlation between the age of the car and its theft (i.e., as the car gets older, it becomes more likely that it becomes a target for theft), it's obvious that car thieves prefer older cars. Does the high correlation mean that the age of the car causes the car to become a target? Do car thieves really prefer older cars or is there something else occurring – what are the possible confounding variables?

5. There is a simple game with the Florida Lottery where you select a three-digit number at the cost of \$1. Each night, the winning number is selected by having ping-pong balls numbered 0 through 9 in three separate containers with one digit being selected from each. If your three digit permutation (not combination) matches, you win \$500.

(A) What is the probability of winning the pick-3 on a given day, $P(\text{win})$? What is the probability of losing the pick-3 on a given day, $P(\text{loss})$?

(B) Since you pay \$1 to play the pick-3, we can calculate your expected winnings with the following formula:

$$E(\text{Winnings on a \$1 bet}) = (\text{Amount lost} \times P(\text{loss})) + (\text{Amount won} \times P(\text{Win}))$$

It appears that if I select the correct number that I win 500 to 1 but we know the lottery is actually making a profit. Calculate your expected winnings and interpret that value in the context of how much of each dollar the lottery keeps for itself.

If you are **done** with the summer assignment you should have the following:

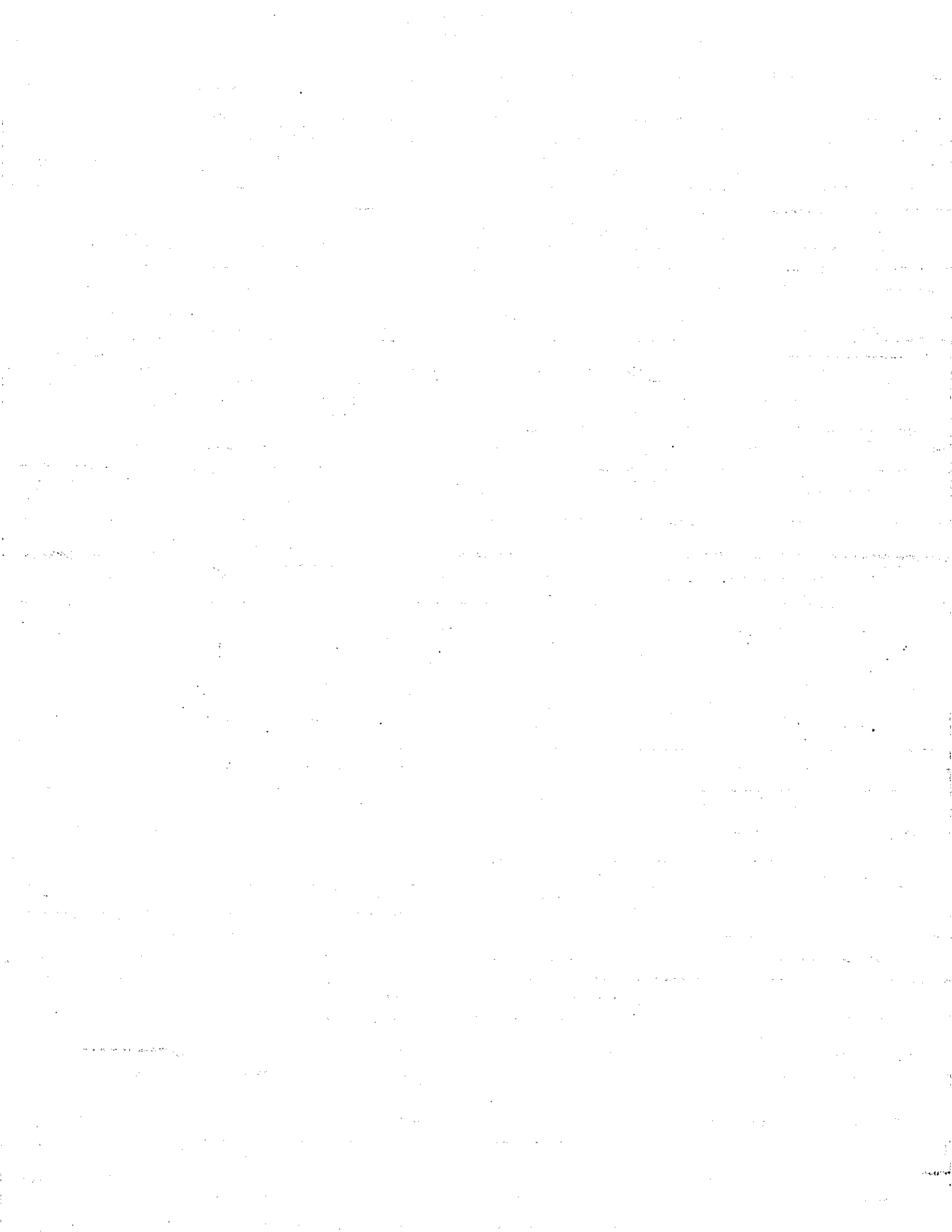
1. One page "Why statistics" essay
2. 21 terms and definitions
3. 10 problems / solutions (5 graphs total)

4. 19 math/algebra review problems – "Physics Pre-Test"

***You are strongly encouraged to read Freakonomics: A Rogue Economist Explores the Hidden Side of Everything, by Levitt & Dubner.

***Extra Credit (optional):** As you read you will need to select up to 3 topics from the book and write a one-page reflection on the topic. Your reflection should include why you chose this topic, what data the author used to investigate the topic, what conclusion was reached, what can be inferred from the findings and what reason the author gives for the observation(s)

* "Physics Pre-test" – next page



Name: EXAM Review

Physics Pretest

* **2018** AP Stats Summer Assignment

○ Circled Problems only

Show work + steps!

1. $23 + 8 + 450 =$ _____

2. $6008 - 463 =$ _____

3. $986 \times 7 =$ _____

4. $20 - 7.46 =$ _____

5. $2.8 \times 8.5 =$ _____

6. $307 \times 408 =$ _____

7. What is the answer to this division problem?

$$\begin{array}{r} 7 \overline{) 548} \end{array}$$

8. Divide 45,779 by 57.

9. Round 4,326,859 to the nearest ten-thousand.

10. What is the lowest common factor of 8 and 127

11. What is the least common multiple of 6 and 15?

12. Round 1764.2853 to the nearest tenth.

13. Solve for x: $x - 8 = 12$

14. Solve for n:

$$\frac{n}{4} = 12$$

15. Solve for x.

$$4x + 12 = 20$$

16. Write 60890000000 in scientific notation.

17. Write 2.45×10^{-8} in standard notation.

18. Isolate for adjacent

$$\cos \theta = \frac{\text{adjacent}}{\text{hyp}}$$

19. Isolate for t.

$$d = \frac{1}{2} g t^2$$

20. Isolate for g

$$T_p = 2\pi \sqrt{L/g}$$

Name: _____

21. Isolate for θ_1
 $n_1 \sin \theta_1 = n_2 \sin \theta_2$

22. Isolate for K
 $F = -kx$

23. Isolate for V_2
 $m_1 V_1 + m_2 V_2 = m_1 V_1 + m_2 V_2$

24. Isolate for d
 $F_{\text{grav}} = \frac{G m_1 m_2}{d^2}$

25. What is the formula for ΔV ?

26. What is the numerical value for gravity? _____

27. Using the formula: $P = 2(L + W)$
Find P when $L = 8''$ and $W = 6''$

28. Reduce $42/70$ to lowest terms.

29. Find the lowest common denominator for: $\frac{2}{3}$ $\frac{2}{6}$ $\frac{3}{4}$

30. Write the answer for 30-32 in lowest terms.

$$4^2/8 + 1^5/8 =$$

31. $5^5/6 - 3^3/10 =$

32. Write 0.02 as a percent. _____

33. Find the value of n:

$$\frac{8}{n} = \frac{12}{21}$$

34. What is 25% of 50? _____

35. Give the missing number: If a deposit of \$20 = +20 a withdrawal of \$20 = ? _____