# AP Statistics Summer Assignment

**This is due the first day of class: Sept 7, 2010!!!!!**

Complete these problems on a separate sheet of paper. Clearly label each problem, and except for word problems, write out the original problem. And, of course, show your steps!

You should be sharp in basic math, Algebra 1 and Algebra 2, to be successful in Statistics. The first few problems should review some basic algebra.

Solve the following for x (exact answers only—no decimal approximations. i.e. NO CALCULATORS!):

1. $28x^2 + 13x = 6$

2. $x - 4\sqrt{x} = 21$

3. $2x^3 + 6x^2 - 5x - 15 = 0$

4. $e^{4x-1} = 1$

5. $4^{x+2} = 8$

6. $\log_{32} x = -\dfrac{3}{5}$

7. $\log_3 \dfrac{1}{\sqrt{27}} = x$

8. $\dfrac{90}{\sqrt{x}} < 15$

Simplify, assume that the value of each variable is positive:

9. $\dfrac{(24m^9 n)^{\frac{1}{3}} \cdot \sqrt[3]{9m^3 n^7}}{\sqrt[3]{3mn^2}} =$

10. $2\log 2x - 3\log x + 3\log 2x$  (express as a single logarithm)

11. Evaluate to the nearest hundredth: $\log_8 0.32 =$    *(change of base formula)*

12. $\displaystyle\sum_{n=1}^{10} 50\left(\tfrac{4}{5}\right)^n =$

*(Use the formula for the sum of a geometric series,* $S_n = \dfrac{a_1\left(1 - r^n\right)}{1 - r}$ *)*

**Now, Statistics is all about problem solving. To be good at Statistics means to be a good problem solver. Try these Word Problems (Show steps and define variables. Clearly state and label your answer.):**

13.

|  | Men | Women | Total |
|---|---|---|---|
| Favor | 18 | 9 | 27 |
| Oppose | 12 | 25 | 37 |
| No opinion | 20 | 16 | 36 |
| Total | 50 | 50 | 100 |

In a survey about a change in public policy, 100 people were asked if they favored the change, opposed the change, or have no opinion about the change. The responses are indicated above.

a. Find the probability that a randomly selected respondent to the survey opposes or has no opinion about the change in policy.

b. If a person opposes the change, what's the probability that person is a woman?

c. What percentage of men favor the change?


14. Kevin has a bag of marbles. He has 5 white marbles, 6 green marbles, 2 red marbles, and 7 blue marbles.

a. If Kevin picks 3 marbles out of the bag (with replacement), what's the probability that all 3 are green?

b. If Kevin picks 3 marbles out of the bag (without replacement), what's the probability that all 3 are green?


15.

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

Find the mean, median, and mode of the above stem and leaf plot. What are the 1st and 3rd Quartile? Constuct a boxplot to describe the data.

*(Did you forget how to this stuff? There are a million websites to help you out. Here's one: http://ellerbruch.nmu.edu/cs255/jnord/boxplot.html )*

16. When Amritha studies for 2 hours she gets a 75% on her test. When she studies for 5 hours, she gets a 90% on her test. Assume there is a linear relationship between hours studied and score on test (this is a big assumption).

a) Find the slope of this line. Interpret the slope in the context of the problem.

b) Find the y-intercept. Interpret the y-intercept in the context of the problem.

c) According to the model, how many hours will she need to study to get a 100% on the test?

17. Assume that the Earth is a perfect sphere with circumference 25,500 miles at the equator. Now imagine a rope is tightly bound around the equator. If we cut that rope and add on an additional 21 feet of rope, naturally the rope will now fit "loosely" around the earth. Suppose you can suspend this rope a uniform distance above the Earth. How high above the ground will the rope be? Round your answer to the nearest inch.

18. Mr. Earl E. Bird leaves his house for work at exactly 8 a.m. every morning. When he averages 40 miles per hour, he arrives at his workplace 3 minutes late. When he averages 60 miles per hour, he arrives 3 minutes early. At what average speed, in miles per hour, should Mr. Bird drive to arrive at his workplace precisely on time?
(from Mathematics Teacher magazine).

19. How about we add up a lot of numbers? While we're at it, let's make them complex! Since this is the year 2010, find this big sum:

$$i + 2i^2 + 3i^3 + 4i^4 + ... + 2009i^{2009} + 2010i^{2010}$$

20. Bill was waiting on the first tee and decided to measure the radius of the tires on his golf cart. Tina said, "Don't bother. The golf cart's tires rotate at 44 rpms (revolutions per minute) and the cart travels at 4 miles per hour. With this info you should be able to calculate the radius of the tires." Bill was puzzled. Help him out. Find the radius of the tires to the nearest inch.