Stat 1350, Quiz #10, Fall 2014 Name KEY

Instructions: Answer each question completely. Show all work for any computational questions.

1. Describe the law of large numbers.

the law of large #'s says that the bigger the sample the closer the proportion will be to the theoretical probability

2. Calculate the expected value of the information in the following table. It is for a raffle with 250 tickets sold that cost $5 each. The top prize is $1000, and there are two 2nd place prizes for $50 each.

Prize Money	$995	$45	-$5
Probability	1/250	2/250	247/250

What does the value mean?

$995(1/250) + 45(2/250) + (-5)(247/250) = -.6$

it means on average you will lose $.60 for every ticket if you buy many tickets.

3. If a game is fair, what is the expected value you should end up with?

0

4. What does a 95% confidence interval mean? Try to explain it to a friend who does not know statistics.

if we repeat the experiment many times 95 times/100 we will get a value in the interval we found.

5. Give a 98% confidence interval for a proportion of 75% based on a sample of 1305 people surveyed. Write your answer as an interval. Specify any calculator commands you used or show work.

1-Prop Z Int

X = 979 (1305 x .75) make whole #

n = 1305

C-level = .98

(.7223, .77807)

6. The national average of IQ has a mean of 100 with a standard deviation of 15. You have sampled 1000 students in a particular school district and found an average IQ of 109. Is this result statistically significant or is it the result of variability. Test the following hypotheses with a significance level of 0.01.

$$H_0: \mu = 100, H_a: \mu > 100$$

State your z-score, and your P-value. Did you reject the null hypothesis or fail to reject it?

Z-test Stats

$\mu_0 = 100$

$\sigma = 15$

$\bar{x} = 109$

$n = 1000$

$\mu > \mu_0$

$\Rightarrow$

$z = 18.97$

$P = 1.511631 \times 10^{-80}$

reject H_0

(the P-value is MUCH smaller than .01)