STAT 110 – Fall 2009 – Section 4 – Exam 3 Answers **FORM A/B**

1) The University parking services is trying to gauge the support for raising the parking costs in order to install new security cameras. They take a survey of a random sample of 300 of those currently renting spots. 146 of those favor the increased fees for parking, while 154 are against raising the fees. What is the observed proportion ($\hat{p}$) who favor increasing the fees?

146/300 ≈ 0.487 = 48.7%

2) Continuing the previous problem, assuming the true percentage favoring increase is 45%, what is the standard deviation of the sampling distribution of the observed proportion?

$$\sqrt{\frac{0.45(1-0.45)}{300}} \approx 0.029 = 2.9\%$$

3/4) If $\hat{p}$ has an expected value (mean) of 52% and a standard deviation of 6%. What percent of the time will $\hat{p}$ fall between 46% and 52%?

34%

4/3) If $\hat{p}$ has an expected value (mean) of 52% and a standard deviation of 6%. What percent of the time will $\hat{p}$ fall below 40%?

2.5%

5) A game with two possible prizes gives you a 0.028 (2.8%) chance of winning $25.00 and a 0.047 (4.7%) chance of winning $10.00. What is the chance that you win nothing?

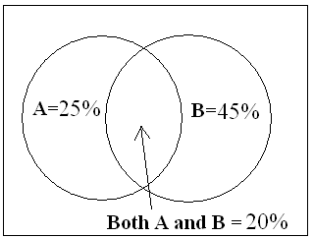
0.925 = 92.5%

6) A game with two possible prizes gives you a 0.028 (2.8%) chance of winning $25.00 and a 0.047 (4.7%) chance of winning $10.00. How much is playing the game once worth?

$1.17

7) The odds of a team to win there next game are of 7 to 2 against them winning. This means their estimated probability of it winning is:

2/9 ≈ 22.2%



Questions 8-10 refer to the Venn diagram at the right, where A occurs with probability 0.25, B occurs with probability 0.45, and both A and B occur with probability 0.20.

8) What is the probability of either event A or event B (or both) happening?

50%

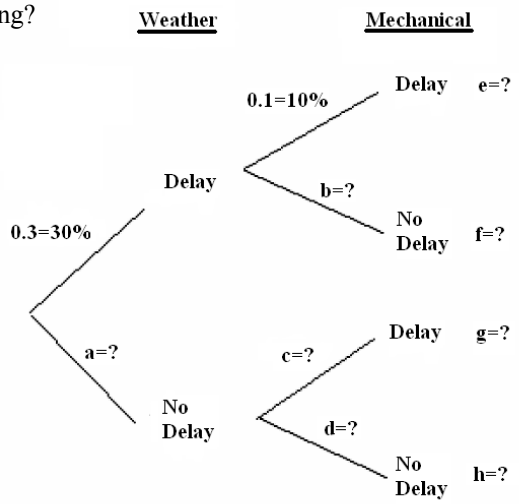
9) What is the probability of exactly one of event A or event B (but not both) happening?

30%

10) What is the probability of event A happening but not event B happening?

5%

Questions 11-15: The following tree diagram concerns whether or not a flight is on time. The has a 30% chance of being delayed due to weather. If the flight was delayed due to weather, there is a 10% chance it also has a mechanical delay.



11) What is the chance that there is no delay due to weather?

70%

12/13) Which missing value is the chance that there is no mechanical delay given that there was no weather delay?

d

13/12) What is the chance that there is both a delay due to weather and a delay due to mechanical difficulties?

3%

14) The probability that there is at least one delay is:

e+f+g

15) If mechanical delays and weather delays are independent then:

0.10

16/17) Used cars traded in at a dealership have a 30% chance of needing their breaks replaced, 20% chance of needing body work, a 20% chance of needing a new transmission; 15% need both breaks and body work, 12% need both body work and a new transmission, 10% need both breaks and a new transmission; and, 5% need all three. This problem is easiest to set up and analyze using:

A Venn diagram with three circles

17/16) Of students attending college in South Carolina 30% are enrolled at USC and 20% are enrolled at Clemson (no students are attending both). This problem is easiest to set up and analyze using:

A Venn diagram with two circles that do not overlap

A test-prep company is trying to find evidence to back up its claim that its program will help increase GRE scores by an average of over 30 points.

18/23) What null hypothesis is the company testing?

H_0: average increase = 30 points

19/24) What should their alternate hypothesis be?

H_A: average increase > 30 points

20/25) If the testing company wants to use α=0.05 and their p-value is 0.08, then:

They do not have enough evidence to reject H_0, and so they cannot claim the improvement is over 30 points

21) α is:

The probability you are willing to reject H_0 when H_0 is really true

22) A p-value of 0.048 means that

There is only a 4.8% chance of observing this much evidence against H_0 when it is really true.

A politician is seeking evidence that less than 50% of their constituents favor a proposed amendment.

23/18) What null hypothesis is politician testing?

H_0: percent favoring = 50%

24/19) What should their alternate hypothesis be?

H_A: percent favoring < 50%

25/20) If the politician is using α=0.05 and their p-value is 0.032, then:

They reject H_0, and so they have evidence the support is less than 50%