

Short Answer – Math 2830

Name: _____

Directions: For each of the short answer problems be sure to show your work in order to receive full or partial credit.

NOTES ON ROUNDING ANSWERS:

- If you are **rounding** while performing calculations on test statistics and confidence intervals, be sure to round out to **4 decimal places**. Your final answers for **ALL** test statistics and confidence intervals should be rounded to **2 decimal places**.
- When rounding for **sample proportions** round to **4 decimal places if necessary**.

Part 1 Short Answer

Name: _____

1. The following data represent the amount of time it took subjects to complete a task

{36, 37, 18, 43, 41, 40, 34, 45, 62}

a. Determine the Five Number Summary for the data set (be sure to label what each number represents) (6 points).

b. Calculate the mean for the data set (round to 2 decimal places) (3 points).

Mean _____

c. Calculate the interquartile range (IQR) (4 points).

IQR _____

d. Identify any outliers using the 1.5(IQR) rule (5 points).

Outliers _____

e. Construct the box plot for the data set using the number line below. Be sure to label (5 points).



f. Identify the shape of the distribution if all outliers are **excluded** (i.e. symmetric, skewed left, or skewed right) (3 points)

Part 2 Short Answer

2. The cars in a parking lot were categorized according to their color and age as summarized in the following table. Leave your answers in fraction form and do NOT reduce the fraction (4 points each).

	Red	White	Total
Old	152	265	417
New	73	118	191
Total	225	383	608

a) What is the probability that a randomly

chosen car is either Red or Old?

b) Find the probability that a randomly chosen car is Red, given that it is Old.

3. The heights of mature trees in a park are normally distributed with mean 92 feet and standard deviation 12 feet. What proportion of the trees are between 100 feet tall and 110 feet tall? (5 points)

4. Consider a deck of 52 playing cards (4 points each).

a. Suppose you select one card out of the deck, replace it, and select another card. What is the probability of selecting 2 Aces?

b. Suppose you select one card from the deck then select a second card without replacing the first card. What is the probability of selecting 2 diamonds?

5. A 20 oz box of Kellogg's Raisin Bran has an average of 480 raisins per box and the number of raisins per box closely follows a normal distribution. It is important that the manufacturer maintains the appropriate amount of raisins per box, so the standard deviation of the number of raisins per box is only 20 raisins. If a 20 oz box of Kellogg's Raisin Bran is randomly selected, what is the probability that the number of raisins in the box will be between 470 and 500 raisins? (5 points)

Part 3 Short Answer

6. The recently instituted security procedures by the Transportation Safety Administration have received a great deal of attention in the media. A Washington Post-ABC News poll was conducted by telephone on November 21, 2010 to understand the current sentiment of adults regarding this issue. Among other things, subjects were asked whether they supported or opposed the use of full-body x-ray machines to screen passengers in airport security lines. Of the 196 randomly selected U.S. adults who responded to the question, 128 said they supported the screening. At a significance level of .05, is there convincing evidence that more than 50% of U.S. adults are in favor of the use of full-body x-ray machines to screen airline passengers? (9 points).

a.) State the null and alternative hypothesis and identify the claim.

b.) Compute the test value (round final answer to 2 decimal places).

c.) Find the p-value **OR** the critical value(s)/rejection region.

d.) Make a decision to reject or not reject the null hypothesis. Justify your decision.

7. To illustrate the effects of driving under the influence (DUI) of alcohol, a police officer brought a DUI simulator to a local high school. Student reaction time in an emergency was measured with unimpaired vision and also while wearing a pair of special goggles to simulate the effects of alcohol on vision. The time required, in seconds, for 9 teens to stop a 60 mph vehicle were recorded below. At $\alpha = 0.01$, can it be concluded that driving under the influence changes reaction times (9 points)?

Normal	4.47	4.24	4.58	4.65	4.31	4.80	4.55	5.00	4.79
Impaired	5.77	5.67	5.51	5.32	5.83	5.49	5.23	5.61	5.63

a.) State the null and alternative hypothesis and identify the claim.

b.) Compute the test value (round final answer to 2 decimal places).

c.) Find the p-value **OR** the critical value(s)/rejection region.

d.) Make a decision to reject or not reject the null hypothesis. Justify your decision.

8. A study was conducted to assess the effects that occur when children are exposed to cocaine before birth. Children were tested at age 4 for object assembly skill, which was described as “a task requiring visual-spatial skills related to mathematical competence.” Use $\alpha = 0.05$ significance level to test the claim that prenatal cocaine exposure is associated with lower scores of four-year-old children on the test of object assembly (12 points).

Born to cocaine users: $n_1 = 190$ $\bar{x}_1 = 7.3$ $\sigma_1 = 3.0$

No exposure to cocaine: $n_2 = 186$ $\bar{x}_2 = 8.2$ $\sigma_2 = 3.0$

a.) State the null and alternative hypothesis and identify the claim.

b.) Compute the test value (round final answer to 2 decimal places).

c.) Find the p-value **or** the critical value(s)/rejection region.

d.) Construct a 95% confidence interval.