

Please show all work and especially show any calculator input for this test. No work or calculator input will result in no credit given (even if your answer is correct).

I. Short Answer and Multiple Choice. (45 points total)

1. Write "true" or "false" next to each statement according to which is correct. (3 points each – 9 points total)

False Keeping the sample size fixed, the margin of error for a z-confidence interval for a population mean μ will increase if the confidence level is decreased.

True At the same level of confidence, the margin of error for a z-confidence interval for a population mean μ will decrease if the sample size is increased.

False If the hypothesis test: $H_0: \mu=25$ versus $H_a: \mu \neq 25$ for a population mean μ is significant at the $\alpha = 0.05$ level, then the corresponding 95% confidence interval for μ will contain the number 25.

2. Subjects in a weight loss experiment are put on a special diet. The subjects are weighed at the beginning of the diet and weighed six weeks later at the end of the diet. Which of the following tests of significance will you use to determine if the diet was successful? (3 points)

(a) The two sample t-test.

(c) The z-test for a population proportion.

(b) The paired t-test

(d) None of the above.

3. A recent USA Today/Gallup poll reported that 61% of Americans have an unfavorable opinion of Republicans in Congress. This result was based on a sample of 1142 Americans with a margin of error of 2.3% with 95% confidence. What is the corresponding confidence interval for the true proportion of Americans that have an unfavorable opinion of Republicans in Congress? (3 points)

$$61 \pm 2.3 \Rightarrow (58.7\%, 63.3\%)$$

$$(0.587, 0.633)$$

4. Fill in the blanks: If we computed a 92% t-confidence interval for the mean age (in years) of oak trees in Farmville to be (30 years, 120 years) then the margin of error is equal to 45 years and the sample mean age is equal to 75 years. (4 points each – 8 total)

5. The P-value for a hypothesis test is $P=0.025$. At which of the following significance levels would we reject the null hypothesis? (circle one) (3 points)

(a) $\alpha = 0.10$

(b) $\alpha = 0.05$

(c) $\alpha = 0.01$

(d) all of these

(e) both (a) and (b)

