

## MAT121 Quiz 07

### Problem 1

A major metropolitan newspaper selected a simple random sample of 1,600 readers from their list of 100,000 subscribers. They asked whether the paper should increase its coverage of local news. Forty percent of the sample wanted more local news. What is the 99% confidence interval for the proportion of readers who would like more coverage of local news?

- (A) 0.30 to 0.50
- (B) 0.32 to 0.48
- (C) 0.35 to 0.45
- (D) 0.37 to 0.43

**Answer: D**

### Problem 2.

A survey was conducted at a local college to find the percentage of freshmen who were taking a math course. The results found that 75% were taking a math course with a margin of error of  $\pm 4\%$ . What is the confidence interval?

- (A) (0.72, 0.77)
- (B) (0.67, 0.82)
- (C) (0.91, 0.99)
- (D) (0.71, 0.79)

**Answer: D.**

### Problem 3.

1,600 of 2,000 voters say they plan to vote Republican. The 95% confidence level of the population proportion is

- A. 69.2 to 86.4%
- B. 76.5 to 83.5%
- C. 77.7 to 82.3%
- D. 78.2 to 81.8%

**Answer: D.**

### Problem 4.

The mean weight of trucks traveling on the highway is unknown. A state highway inspector needs an estimated mean. He selects 25 trucks passing the weighing station and gets a mean of 15.8 tons, with a standard deviation of the sample of 3.8 tons. Assume that the weights of trucks are normally distributed. Using the 95% confidence level, what is the confidence interval within which the population mean lies?

- A. 14.23 and 17.37
- B. 14.31 and 17.29
- C. 11.08 and 20.52
- D. 12.45 and 19.13

**Answer: A.**

**Problem 5**

In a random sample of 81 teenagers, the average number of texts handled in a day was 50 with a standard deviation of 15. What is the 95% confidence interval for the average number of texts handled by teens daily?

- A.  $50 \pm 1.96(15)$
- B.  $50 \pm 1.96(5/3)$
- C.  $50 \pm 1.96(5/9)$
- D.  $50 \pm 1.96(15/3)$

**Answer: B.**

**Problem 6.**

One gallon of gasoline is put in each of the 36 test autos, and the resulting mileage figures are tabulated with a sample mean of 28.5 and a standard deviation of 1.2. Determine a 95% confidence interval estimate of the mean mileage.

- A. (28.46, 28.54)
- B. (28.42, 28.58)
- C. (28.11, 28.90)
- D. (27.36, 29.64)

**Answer: C.**

**Problem 7.**

The National Research Council of the Philippines reported that 210 of 361 members in biology are women. Find the margin of error for constructing a 95% confidence interval estimate of women in biology in the Philippines.

- A. 0.051
- B. 0.54
- C. 0.95

D. 1.96

**Answer: A.**

**Problem 8.**

A catch of five fish of a certain species yielded the following ounces of protein per pound of fish: 3.1, 3.5, 3.2, 2.8, and 3.4. We can calculate the sample mean and standard deviation to be 3.20 and 0.27 respectively. Assume that the protein contents are normally distributed. What is a 90% confidence interval estimate for ounces of protein per pound of this species of fish?

- A.  $3.2 \pm 0.257$
- B.  $3.2 \pm 0.237$
- D.  $4.0 \pm 0.257$
- E.  $4.0 \pm 0.237$

**Answer: A.**

**Problem 9.**

Acute renal graft rejection can occur years after the graft. In one study (The Lancet, December 24, 1994, page 1737), 21 patients showed such late acute rejection when the ages of their grafts (in years) were 9, 2, 7, 1, 4, 7, 9, 6, 2, 3, 7, 6, 2, 3, 1, 2, 3, 1, 1, 2, and 7, respectively. The mean and the standard deviation are 4 and 2.8. Assume that the ages of renal grafts are normally distributed. What is the margin of error for constructing a 90% confidence interval estimate for the ages of renal grafts that undergo late acute rejection?

- A. 0.799
- B. 1.725
- C. 0.799
- D. 1.041

**Answer D.**

**Problem 10**

What is the critical t-value for finding a 90% confidence interval estimate from a sample of 15 observations?

- A. 1.341
- B. 1.761
- C. 1.350
- D. 1.753

**Answer. B.**

**Problem 11.**

Suppose (25, 30) is a 90% confidence interval estimate for a population mean  $\mu$ . Which of the following is the margin of error?

- A. 5.
- B. 2.5.
- C. 27.5.
- D. 1.645

**Answer. B.**

**Problem 12**

Suppose that a market research firm is hired to estimate the percent of adults living in a large city who have cell phones. Five hundred randomly selected adult residents in this city are surveyed to determine whether they have cell phones. Of the 500 people surveyed, 421 responded yes – they own cell phones. Construct a 95% confidence interval for the proportion of adult residents of this city who have cell phones.

Answers \*

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(0.176, 0.190)

☒

(0.810, 0.874)

☐

(0.19, 0.81)

☐

(0.715, 0.915)

### Problem 13

A survey was conducted to determine the percentage of high school students who planned to go to college. The results were stated as 82% with a margin of error of  $\pm 5\%$ . What is meant by  $\pm 5\%$ ?

- A. Five percent of the population were not surveyed.
- B. In the sample, the percentage of students who plan to go to college was between 77% and 87%.
- C. The percentage of the entire population of students who plan to go to college is between 77% and 87%.
- D. It is unlikely that the given sample proportion result would be obtained unless the true percentage was between 77% and 87%.

**Answer C**

### Problem 14

In a random sample of 80 teenagers, the average number of texts handled in a day was 50 with a standard deviation of 15. What is the 96% confidence interval for the average number of texts handled by teens daily?

- A.  $50 \pm 2.054(15)$
- B.  $50 \pm 2.054 \frac{15}{\sqrt{79}}$
- C.  $50 \pm 2.054 \frac{15}{\sqrt{80}}$
- D.  $50 \pm 2.088 \frac{15}{\sqrt{79}}$
- E.  $50 \pm 2.088 \frac{15}{\sqrt{80}}$

**Answer C.**

### Problem 15

In general, how does doubling the sample size change the confidence interval width?

- A. Doubles the interval width
- B. Halves the interval width
- C. Multiplies the interval width by 1.414
- D. Divides the interval width by 1.414

**Answer: D**

## Summary of Week #7 Quiz

### 1. Five Number Summary :

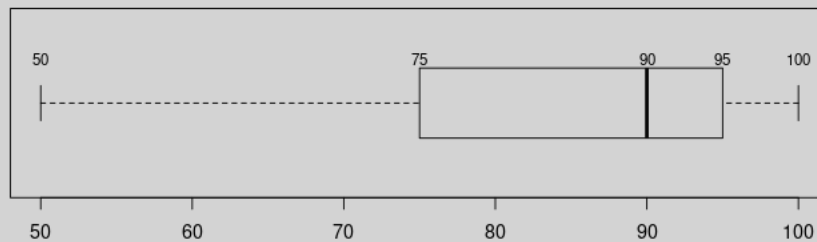
The five-number summary is used to describe the shape of the distribution of a given numerical data. It consists of five numbers: minimum data value, first quartile, median, the third quartile, and the maximum data value.

The five-number summary of this given data set is:

stats	value
Min.	50.00
1st Qu.	75.00
Median	90.00
3rd Qu.	95.00
Max.	100.00

### 2. Boxplot :

The boxplot is a geometric representation of the five-number summary. The boxplot of the given data set is given below.



Probability Distribution Histogram

