

Unit 8: Statistical Inferences

ADVANCED

Name: _____ Date: _____

Use z-scores and the standard normal table; round probabilities to 4 decimal places and other answers as indicated.

1. SAT-style scores are normally distributed with mean 500 and standard deviation 100. The top 15% of scores earn a scholarship (use $z = 1.04$ for the 85th percentile). Find the minimum score needed, to the nearest whole number.

Answer: _____

3. A sample of $n = 800$ people has $\hat{p} = 0.45$. Using a 99% confidence level ($z = 2.576$), find the UPPER bound of the confidence interval for the true proportion. Round to 3 decimals.

Answer: _____

5. Adult heights are normally distributed with mean 68 in and standard deviation 3 in. Find $P(65 < X < 72)$, the probability a randomly chosen height is between 65 and 72 inches (use $z = -1.00$ and $z = 1.33$). Round to 3 decimals.

Answer: _____

7. A test score of 88 comes from a distribution with mean 76 and standard deviation 8. Compute the z-score of this value.

Answer: _____

2. In a poll of $n = 1200$ voters, the sample proportion supporting a measure is $\hat{p} = 0.62$. Compute the margin of error for a 95% confidence interval ($z = 1.96$). Round to 3 decimals.

Answer: _____

4. A pollster wants a 95% confidence interval ($z = 1.96$) for a proportion with margin of error at most 0.03, using the conservative estimate $p = 0.5$. Find the minimum required sample size (round up to a whole number).

Answer: _____

6. A population has mean 150 and standard deviation 20. For samples of size $n = 25$, the sample mean $\bar{x}$ is approximately normal. Find $P(\bar{x} > 156)$. Round to 4 decimals.

Answer: _____

8. IQ scores are normally distributed with mean 100 and standard deviation 15. A score of 127 corresponds to what percentile (use $z = 1.8$)? Give the percentile rounded to the nearest whole number.

Answer: _____

9. Delivery times are normally distributed with mean 240 min and standard deviation 18 min. By the empirical rule, what percentage of deliveries fall between 204 and 276 minutes? Give the percent value.

Answer: _____

11. A 95% confidence interval for a proportion is reported as (0.38, 0.46). Determine the margin of error of this interval. Give as a decimal.

Answer: _____

10. In a randomized experiment, 45 of 60 patients in the treatment group improved and 33 of 60 in the control group improved. Compute the treatment effect as the difference in sample proportions (treatment minus control). Give as a decimal.

Answer: _____