

Quiz 8 Review: Normal Distribution, Z-Scores, & Confidence Intervals

Name _____

Date _____ Period _____

1. Draw and label the curve representing a mean of 45 and a standard deviation of 15, including all percentages. Assume that the data is normally distributed.

For questions 2-3, refer to the curve above.

2a. $P(x \leq 45) =$

2b. $P(x \leq 75) =$

3. The mean number of hours worked a week among high school students is 14 with a standard deviation of 3. Find the probability of working at least 17 hours per week and interpret your answer in a sentence.

z-score: _____

$P(x > 17)$: _____

Interpretation:

For questions 4-5 use the following data. The price of lunch at the mall has a mean of \$5.00. The standard deviation is \$1.50. Find the following.

4. Probability of spending less than \$5.62

5. Probability of spending more than \$5.36

z-score: _____

z-score: _____

$P(x \leq 5.62)$: _____

$P(x > 5.36)$: _____

Determine the value of X for each of the following. Use the z-score formula

$$z = \frac{X - \bar{X}}{\sigma}$$

6. $z = 1.38$ $\bar{X} = 14$ $\sigma = 3.7$ $X =$ _____

7. $z = -2.42$ $\bar{X} = 9$ $\sigma = 1.75$ $X =$ _____

Use the following formulas to help you complete questions 8 – 10.

$$z = \frac{X - \bar{X}}{\sigma}$$

$$MoE = \pm zscore \left(\frac{\sigma}{\sqrt{n}} \right)$$

$$CI = \bar{x} \pm MoE$$

8. The average number of hours worked per week for college students is 27, and the standard deviation is 6. Assume the data is normally distributed.

- a) Determine the z-score for 35 hours. _____
- b) Determine the probability of someone working at least 35 hours. _____
- c) Determine the margin of error with 95% confidence if 64 people were surveyed: _____
- d) Determine the 95% confidence interval: _____ - _____

9. Scores of each of the Knitting Aptitude tests were normally distributed with a mean of 6 hours and a standard deviation of 1.67 hours. Carrie will be taking the test tomorrow. Assume the data is normally distributed.

- a) Determine the z-score for 2.17 hours = _____
- b) Determine the probability of someone finishing in less than 2.17 hours = _____
- c) Determine the margin of error with 90% confidence if 100 people took the test: _____
- d) Determine the 90% confidence interval: _____ - _____

10. **Bonus!** Scores for the Lord of the Rings Dwarven Competency exams were normally distributed with a mean of 77 percent correct and a standard deviation of 4.5. JRRT will be taking this exam this afternoon. What is the probability that his z-score will be between -.23 and 1.07?

- a) Determine the score that yields -0.23: _____
- b) Determine the score that yields 1.07: _____
- c) Determine the probability of scoring less than -0.23: _____
- d) Determine the probability of scoring less than 1.07: _____
- e) Determine the probability of scoring between -0.23 and 1.07: _____