

SHOW ALL WORK AND JUSTIFY ALL ANSWERS.

1. (2 points each) A driver's reaction time to brake lights on a decelerating vehicle can be modeled with a normal distribution where the mean is 1.25 seconds and the standard deviation is 0.4 seconds.

$$X \sim N(1.25, 0.4) \quad \mu = 1.25 \quad \sigma = 0.4$$

- (a) Find the z-score for a reaction time of 1.00 seconds. Round to 2 decimal places.

$$z = \frac{x - \mu}{\sigma} = \frac{1 - 1.25}{0.4} = -0.625 \\ = -0.63$$

- (b) Find the z-score for a reaction time of 1.75 seconds. Round to 2 decimal places.

$$z = \frac{1.75 - 1.25}{0.4} = 1.25$$

- (c) Using z-scores and your calculator: What is the probability that reaction time is between 1.00 and 1.75 seconds? Write the calculator formula you used to answer this question, along with the parameters. (We did this every time in class)

$$P(-0.63 < z < 1.25) = \text{normalcdf}(-0.63, 1.25, 0, 1) \approx 0.6300029 \\ \approx 0.63$$

- (d) Without using z-scores (using the original parameters) and your calculator: What is the probability that reaction time is between 1.00 and 1.75 seconds? Write the calculator formula you used to answer this question, along with the parameters. (We did this every time in class)

$$X \sim N(1.25, 0.4) \\ P(1.00 < X < 1.75) = \text{normalcdf}(1.00, 1.75, 1.25, 0.4) \approx 0.628364 \\ \approx 0.63$$

- (e) About 68% of the reaction times lie between what two values (use the original parameters)?

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