Normal Distribution/Empirical Rule/Z-Scores Word Problems   Name_____

1. The average playing time of CDs in a large collection is 35 minutes, and the standard deviation is 5 minutes.

    a. What value is 1 standard deviation above the mean? 1 standard deviation below the mean? What values are 2 standard deviations from the mean?

    b. Assuming the distribution of time is approximately normal, about what percentage of times are between 25 and 45 minutes? Less than 20 minutes or greater than 50 minutes? Less than 20 minutes?

    a) 40 minutes, 30 minutes, 25-45 minutes
    b) 95%, 0.3%, 0.15%

2. In a recent study on world happiness, participants were asked to evaluate their current lives on a scale from 0 to 10, where 0 represents the worst possible life and 10 represents the best possible life. The responses were normally distributed, with a mean of 5.4 and a standard deviation of 2.2. Find the probability that a randomly selected study participant's response was:
    a. Less than 4

    b. Between 4 and 6

    c. More than 8

    a) 0.2611
    b) 0.3453
    c) 0.1190

3. The test scores for the quantitative reasoning section of he GRE are normally distributed. The mean score is 150 with a standard deviation of 8.75. The test scores of four students are 162, 168, 155, and 138. Find the z-score that corresponds to each value.

Score $162 \rightarrow z = 1.37$ Score $155 \rightarrow z = 0.57$

Score $168 \rightarrow z = 2.06$ Score $138 \rightarrow z = -1.37$

4. Suppose your statistics professor returned your first midterm exam with only a z-score written on it. She also told you the histogram of the scores was approximately normal. How would you interpret each of the following z-scores?
    a. 2.2

    b. -0.4

    c. 0
    a) You did very well!   b) You did slightly below average.   c) You did average.