Lesson Four Practice Assignment
Z-Scores

1. Convert each of the following normally distributed scores into Z scores.

   a. Score of 70 with a mean of 66 and a standard deviation of 2.
   b. Score of 55 with a mean of 66 and a standard deviation of 5.
   c. Score of 60 with a mean of 60 and a standard deviation of 7.

2. Scores on a math test are distributed under a standard normal curve. A randomly selected student score was 82 which represented a z score of 2.2. Find the mean for this data if the standard deviation was 4.5.

3. Scores on a Geography exam are distributed under a standard normal curve. A randomly selected student score was 91 which represented a z score of 2.8. If the mean for the exam was 78, find the standard deviation.

4. Find the area under the standard normal curve given the following Z scores

   a. $P(-0.75 < Z < 0.75)$
   b. $P(Z > - 0.23)$

5. Scores on a Calculus exam are distributed. Answer the following questions if the mean on the exam was 68 and the standard deviation was 6.1

   a. Would the Z score for a student scoring 75 on the exam be positive, negative or zero?
   b. Would the Z score for a student scoring 55 on the exam be positive, negative or zero?
   c. Would the Z score for a student scoring 68 on the exam be positive, negative or zero?

6. A teacher marks some exams and finds the mean is 54% and the standard deviation is 8%. The teacher then adjusts the marks by raising the mean to 60%, and then raising the standard deviation to 9%. The z-scores are kept the constant. If a student had scored 76% initially, what is their new mark?

7. Toothpicks are produced, and any toothpick shorter than 3.57 cm and longer than 3.68 cm is rejected. If the mean is 3.62 cm and the standard deviation is 0.04 cm, how many toothpicks will be rejected if 20000 are produced? Convert to z scores to solve.

ANSWERS

1a. Z score $\rightarrow 2$ 1b. Z score $\rightarrow -2.2$ 1c. Z score $\rightarrow 0$

2. Mean $\rightarrow 72.1$ 3. SD $\rightarrow 4.64$

4a. 0.5467 4b. 0.59095

5a. Z Score $\rightarrow$ positive 5b. Z Score $\rightarrow$ negative 5c. Z Score $\rightarrow$ zero

6. 84.75%

7. 3450 toothpicks rejected