Name: _____   Date: _____   Per: _____   **Algebra 2H**

Section 11.5 Day 2: Z-score Practice

1. A manufacturer of bolts has a quality control policy that requires it to destroy any bolts that are more than 1.8 standard deviations from the mean. The quality control engineer knows that the bolts coming off the assembly line have a mean length of 8 cm with a standard deviation of 0.05 cm. Given the bolt lengths are normally distributed, describe the length(s) of the bolts that will be destroyed.

2. A group of students has an average height of 6 feet with a standard deviation of 0.25 feet. A student is 5'7" tall. How many standard deviations away from the average is he? Given the heights are normally distributed, what is the *z*-score of his height?

3. Scores on a history test that are normally distributed have an average of 80 with a standard deviation of 6.
    a. What is the *z*-score for a student who earned a 75 on the test?

    b. A second test is given in the class, and the average is an 82 with a standard deviation of 8. The student scored a 76. On which test did the student perform better, compared to her peers?

4. Label the *x*-axis with the appropriate numbers for the standard normal distribution. Then, label each area under the curve with the appropriate percentages.
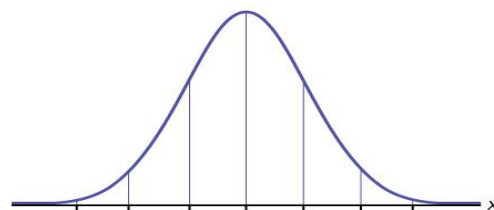
5. A highly selective university will only admit students who place at least 2 *z*-scores above the mean on the ACT, which is normally distributed with a mean of 18 and a standard deviation of 6.

    a. What is the minimum score that an applicant must obtain to be admitted to the university?

    b. Fill in the blank: The university only admits students in the top _____% of scorers.

6. Men in third-world countries have a life expectancy of $\mu = 60$ and $\sigma = 4.3$. Men in industrialized countries have a life expectancy of $\mu = 70$ and $\sigma = 6.3$. Both distributions are normally distributed. If a man in a third-world country lives to be 65 and a man in an industrialized country lives to be 72, who lived longer relative to their age distribution?

7.   In North America, adult female heights have an approximate normal distribution with a mean of 65.0 inches and a standard deviation of 3.5 inches. Adult male heights have an approximate normal distribution with a mean of 70.0 inches and a standard deviation of 4.0 inches.

   a. What is your height in inches?

   b. Find the *z*-score of your height.

   c. Do you lie within the middle 68%, 95%, or 99.7% of adult males/females?

8.   The weights of chocolate bars from Chocolate Factory A have a mean of 8 ounces with standard deviation of 0.24 ounces. The weights of chocolate bars from Chocolate Factory B have a mean of 5 ounces with a standard deviation of 0.18 ounces. The weights are normally distributed at both factories. Joe bought a chocolate bar from Factory A that weighs 8.32 ounces and his brother bought one from Factory B that weighs 5.28 ounces. Who "made out better?"

9.   The lengths of a particular leg bone for dinosaur fossils are normally distributed with a mean length of 5 feet and a standard deviation of 3 inches.

   a. What is the *z*-score that corresponds to a length of 62 inches?

   b. Another bone has a *z*-score of –1.4. What is the approximate length of the bone?

10.   Amy determines that a data value from a set that is normally distributed with μ = 9.2 and σ = 1.4 has a *z*-score of approximately –1.24. Find the approximate value of the data point.

11.   For healthy females, the red blood cell count (in millions per cubic millimeter of whole blood) is normally distributed with a mean of 4.8 and standard deviation of 0.30.

   a) What is $P(x < 4.5)$?

   b) What is $P(5.1 < x < 5.7)$?

   c) In a group of 800 women, how many would you expect to have a red blood cell count greater than 4.2?