Introduction to Sample Means, Standard Deviation, and Z-Scores Homework

Directions: Be sure to show all work, communicate your thought process, and justify your reasoning. Remember to check that your answers are complete, correct, and reasonable.

Round to the nearest ten-thousandth where necessary.

1. The mean number of hours a group of 50 people slept one night was 6.5 hours, with a standard deviation of 1.5 hours. The number of hours Vincent slept correlated to a z-score of -2.5. Interpret each aspect of this data.
   a. The mean of 6.5 hours implies that…
   b. The standard deviation of 1.5 hours signifies that…
   c. Vincent's correlating z-score indicates that…

2. In one class, the average height of a student is 70 inches, with a standard deviation of 3.5 inches. Students A, B, and C are in this class. Student A is 65 inches tall, student B is 73 inches tall, and student C's z-score is approximately -2.8571. Determine and interpret the z-scores for students A and B, and the approximate height of student C.

3. The average monthly spending amount for students in the same class as problem 2 is $45, with a standard deviation of $5. Student A spends $30 this month, student C spends $50 this month, and the corresponding z-score for Student B this month is 1.75. Determine and interpret the z-scores for students A and C, and calculate the approximate amount spent by student B this month.

4. The average number of successful catches that three football players, Joe, Timothy, and Andrew make are recorded. Joe's data set has a standard deviation of .4, Timothy's has a standard deviation of .25, and Andrew's has a standard deviation of 1.0. Provided with this information only, who would you expect to be most likely to catch the ball the next time it is passed to him? Justify your answer.

5. A student's determines his/her average test score, as well as the standard deviation for her main subjects. The standard deviation is 3.35 for math, 8.23 for science, 5.75 for history, and 3.3 for English. Assuming this student has a test in each subject coming up next week, for which subject would you expect the student's test average to be the least affected by the new test results, based solely on this data? Support your reasoning.

Expect a quick quiz on these ideas soon! ☺

<u>Selected Solutions</u>
2. Student A's z-score is approximately -1.4286, so student A's height is almost 1.5 standard deviations lower than the mean height.
Student B's z-score is approximately .8571, so student B's height is almost one full standard deviation greater than the mean height.
Student C is approximately 60 inches tall

   Work for student C:

     z = (x – m)/s

     -2.8571 = (x – 70)/3.5

     -9.9999 = x – 70

     60.00015 = x

4. Based solely on this data, we could say that Timothy is most likely to catch the ball the next time it is passed to him, since his standard deviation is the lowest. This means that his performance when it comes to catching the ball is more consistent than the other players.