Z - Score HW

1) Lauren is enrolled in a very large college calculus class. On the first exam, the class mean was 75 and the standard deviation was 10. On the second exam, the class mean was 70 and the standard deviation was 15. Lauren scored 85 on both exams. Assuming the scores on each exam were approximately normally distributed, on which exam did Lauren score better relative to the rest of the class?

(A) She scored much better on the first exam.
(B) She scored much better on the second exam.
(C) She scored about equally well on both exams.
(D) It is impossible to tell because the class size is not given.
(E) It is impossible to tell because the correlation between the two sets of exam scores is not given.

2) According to the empirical rule, a value in a distribution that is two standard deviations above the mean would lie at approximately what percentile?

A. 34th percentile
B. 68th percentile
C. 84th percentile
D. 95th percentile
E. 97th percentile

3) The mean score on a standardized test is 125 with a standard deviation of 25. Use the empirical rule to determine the appropriate percentile rank of someone who scored 152.

A. 68
B. 75
C. 79
D. 85
E. 92

4) Free-response questions on the AP Statistics Exam are graded on 4, 3, 2, 1, or 0 basis. Question #2 on the exam was of moderate difficulty. The average score on question #2 was 2.05 with a standard deviation of 1. To the nearest tenth, what score was achieved by a student who was at the 90th percentile of all students on the test? You may assume that the scores on the question were approximately normally distributed.

a. 3.5
b. 3.3
c. 2.9
d. 3.7
e. 3.1

5) The distribution of the diameters of a particular variety of oranges is approximately normal with a standard deviation of 0.3 inch. How does the diameter of an orange at the 67th percentile compare with the mean diameter?

(A) 0.201 inch below the mean

(B) 0.132 inch below the mean

(C) 0.132 inch above the mean

(D) 0.201 inch above the mean

(E) 0.440 inch above the mean

6) Given a bell-shaped, symmetric distribution with a mean of 50 and a standard deviation of 10, which of the following would be an accurate statement about the z-score of Q1?

A. $-2 \leq z \leq -1$
B. $-1 \leq z \leq 0$
C. $0 \leq z \leq 1$
D. $1 \leq z \leq 2$
E. $z < -2$ or $z > 2$

7) The mean and standard deviation of a normally distributed dataset are 19 and 4, respectively. 19 is subtracted from every term in the dataset and then the result is divided by 4. Which of the following best describes the resulting distribution?

a. It has a mean of 0 and a standard deviation of 1.
b. It has a mean of 0, a standard deviation of 4, and its shape is normal.
c. It has a mean of 1 and a standard deviation of 0.
d. It has a mean of 0, a standard deviation of 1, and its shape is normal.
e. It has a mean of 0, a standard deviation of 4, and its shape is unknown.
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Free Response
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1) Assuming that the batting averages in major league baseball over the years have been approximately normally distributed with a mean of 0.265 and a standard deviation of 0.032, what would be the percentile rank of a player who bats 0.370 (as Barry Bonds did in the 2002 season)?

2) The following graph shows the distribution of the heights of 300 women whose average height is 65″ and whose standard deviation is 2.5″. Assume that the heights of women are approximately normally distributed. How many of the women would you expect to be less than 5′2″ tall?