Problem Set #3 1: Z-scores and Probability

1. The numbers that follow represent the total number of hours of sleep that I received each night for the first week of the semester: 6, 7, 7, 6, 7, 4.5, 8.  Find, the variance and standard deviation for these data.  Show your work.
2. Let’s say that the second week of the semester, the mean number of hours that I slept was exactly the same as it was for the first week, BUT, the variance was twice as large. For which week (first or second) would I be more likely to have gotten an unusually small (or large) amount of sleep? Explain your answer.
3. Assume heights are normally distributed with a mean of 68 inches and a standard deviation of 4 inches.
   1. Use z-scores to determine the probability that an Amherst student is at least 5'3".  Hint: consult the unit normal table, which can be downloaded from Moodle.
   2. Use z-scores to determine the proportion of people that are between 5'4" and 6'0" (i.e., at least 5.4", but not taller than 6'0").  Use the same procedure as in #1.
   3. If I select a person at random, what would we estimate is the probability they will be over 6'0"?
4. A physical fitness association is including the mile run in its secondary school fitness test. The time for this event is approximately normally distributed with a mean of 450 seconds and a SD of 40 seconds. If the association wants to designate the fastest 10% as “excellent” what time should the association set as their cutoff?