**Sample Z-score Problems**

Here are two problems from [www.stattrek.com](http://www.stattrek.com):

1. The Acme Light Bulb Company has found that an average light bulb lasts 1000 hours with a standard deviation of 100 hours. Assume that bulb life is normally distributed. What is the probability that a randomly selected light bulb will burn out in 1200 hours or less? (**Hint:** Find the z-score for 1200 hours and then look up the answer in the table.)
2. Bill claims that he can do more push-ups than 90% of the boys in his school. Last year, the average boy did 50 push-ups, with a standard deviation of 10 pushups. Assume push-up performance is normally distributed. How many pushups would Bill have to do to beat 90% of the other boys? (**Hint:** Find the z-score that corresponds to the 90th percentile, and then calculate the corresponding number of push-ups from the given mean and standard deviation.)
3. Use the data for runs tallied (RT) from the mixed-up baseball team activity:

13, 24, 65, 68, 72, 74, 77, 80, 81, 82, 85

Find the best normal distribution (bell curve) for the data by calculating the mean and standard deviation. (You can use the *Statistical* app or a calculator.) Find the z-score and percentile for a typical

1. catcher (68 RT)
2. designated hitter (82 RT)

Then, calculate the cumulative relative frequency for both players and express as a percentage. How do these values compare with the percentiles estimated from the normal distribution? Are they similar? If not, can you explain why there’s a discrepancy?

**Bonus:** Are there any outliers in the data? If so, are they weak or strong outliers? What is their origin, if any?