

Day 4

1. You are one of several judges for a new reality TV show called "*Extreme Bot*" where teams of ten young inventors exhibit robots. The robots are designed to make certain parts which are to be specifically 5 micrometers thick. You are judging quality control and measure a sample of each team's parts. Here is what you discover:

Team 1's parts measure 4.6, 5.2, 5.1, 4.2, 4.9, 5.3, 5.0, 4.9, 4.8, 4.8 micrometers

Team 2's parts measure 3.9, 4.8, 5.0, 4.2, 5.1, 5.4, 3.9, 5.2, 4.4, 4.9 micrometers

Team 3's parts measure 4.6, 4.7, 4.6, 4.6, 4.5, 4.6, 4.5, 4.7, 4.8, 4.9 micrometers

- Determine the mean and the median for each team. Based on these findings, to which team would you award the highest score in quality control and why?
 - Compute the range for each team. What is the range telling you? To which team would you award the highest score if range were used to choose the winner, and why?
 - Compute the standard deviation for each team. Based upon the standard deviation, to which team would you award the highest score in quality control, and why?
 - Based upon your total findings, to which team would you award the highest score if the parts can be no more than 5 microns thick?
2. Your little sister has ten songs on her brand new iPod. The device is set to play songs at random with repetitions allowed.
- Explain how you could use your calculator to simulate how many songs your sister will need to play until she hears all ten songs.
 - Conduct your simulation 3 times and record the number of songs played until all ten have been heard.

The box plot at right shows the results of 100 simulations:

- What is the median of the distribution? What does it tell you?
 - What is the IQR? What does it tell you?
 - What is Q1? What does it tell you?
 - What is Q3? What does it tell you?
 - The maximum value is 48 songs. Use the 1.5 IQR rule to verify that 48 is not an outlier.
- h. Your little sister says she listened to a hundred songs before she heard her favorite. Do you think she is exaggerating? Explain.
- i. What is the (theoretical) probability that your sister will only have to listen to each song one time before hearing all ten?

