Practice Worksheet 3.1 – Precision, Accuracy and Errors

Consider the following table of results for 4 students who are trying to measure the melting point of steric acid:

Table 1: Class Results for Melting Points of Steric Acid (Temperature, ^{o} C)*

Trial	Bob	Jiwan	Sue	Charles
1	77.3	78.9	65.2	69.7
2	84.2	75.4	65.9	72.6
3	53.7	88.2	65.1	71.9
Mean	71.7	80.3	65.4	71.4

*please note that units and uncertainties have not been included so we can just focus on the numbers for this exercise. Normally you WOULD ALWAYS include units and uncertainties!

1. Compare the accuracy and precision of each student (discuss each student). The accepted value (or theoretical value) for the melting point is 71.2 ^{o} C. Who is most accurate and who is most precise?

In the experiment, it is likely that the purity of the sample tested would affect the melting point. So if the students started with an older sample of steric acid that may have been melted and crystallized many times in the lab, it may have picked up impurities from test tubes or had too much exposure to air.

2. How might an impure sample affect the result? How is this a systematic error?

3. Calculate the percentage error for each student given the actual value of 71.2 ^{o}C for the melting point of steric acid.