MET 352 Engineering Design Department of Materials and Metallurgical Engineering South Dakota School of Mines and Technology

Assignment 8: Statistics and Error Analysis Submit digitally before 11:00 pm Monday 3-25-19

- 1. Find the mean, median, mode, and range for the following list of values: 13, 18, 13, 14, 13, 16, 14, 21, 13
- 2. The test scores of five students in three courses are:

Test 1: 92,88,80,68 and 52.

Test 2: 92,92,92,52,52

Test 3: 77,76,76,76,75

- a) Calculate the mean and range of each data set.
- b) Calculate the standard deviation of each data set.

c) Which set has the lowest standard deviation?

- d) Is it possible to answer question c) without calculations of the standard deviation?
- 3. A meter stick can be read to the nearest millimeter, a reticle in a microscope can be read to the nearest 100 micrometers. If you want to measure a length of 2 cm with a precision of 1% can you do so with the meter stick? Is it possible to do so with the reticle? Please explain your answer.
- 4. (a) After making a calculation, my excel spreadsheet gives the answer as 6.1234. from other data I know the fractional uncertainty is 2%. Restate the answer in the standard $x\pm\delta x$ using the correct number of significant figures. redo (a) assuming the answer found was 10.1234 with a fractional uncertainty of 10%.

redo (a) assuming the answer found was 2.1234 with a fractional uncertainty of 0.1%.

5. A student makes the following measurements:

i. $a = 5 \pm 1$ cm; $b = 18 \pm 2$ cm; $c = 12 \pm 1$ cm;

- ii. $t = 3.0 \pm 0.5 s$; $m = 18 \pm 1 gram$;
- iii.

Compute the following quantities with their uncertainties.

(a) a+b-c

(b) ct

(c) mb/t