MET 352 Engineering Design

# Department of Materials and Metallurgical Engineering <br> 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 $\mathrm{x} \pm \delta \mathrm{x}$ 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. $\mathrm{a}=5 \pm 1 \mathrm{~cm} ; \mathrm{b}=18 \pm 2 \mathrm{~cm} ; \mathrm{c}=12 \pm 1 \mathrm{~cm} ;$
ii. $t=3.0 \pm 0.5 \mathrm{~s} ; \mathrm{m}=18 \pm 1$ gram;
iii.

Compute the following quantities with their uncertainties.
(a) $a+b-c$
(b) ct
(c) $\mathrm{mb} / \mathrm{t}$

