# MET 352 Engineering Design <br> Department of Materials and Metallurgical Engineering <br> South Dakota School of Mines and Technology 

## Alternative Assignment 6: Statistics and Error Analysis

Submit digitally before 11:00 pm After April 28

1. Find the mean, median, mode, and range for the following list of values: 111, 117, 113, 115, 113, 115, 117, 122, 117
2. A sample of six test scores of six students selected in three courses are

Test 1: 829886787662.
Test 2: 828292626272
Test 3: 878889868584
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. The length of a work piece approximately 2 cm long is to be measured within $1 \%$ precision. Can this be accomplished with
a) A meter stick can be read to the nearest millimeter. Explain.
b) A microscope reticle that can be read to the nearest 100 micrometers. Explain.
4. Restate the following measurements with relative errors ( $\pm \%$ ) in terms of absolute error ( $\pm \varepsilon$ ).
a) $6.1234 \pm 2 \%$. Show only the correct number of significant figures.
b) $10.1234 \pm 10 \%$. "
c) $2.1234 \pm 0.1 \%$. "
5. Uncertainties for the following parameters are shown.

$$
\mathrm{a}=25 \pm 1 \mathrm{~cm} \quad \mathrm{~b}=18 \pm 2 \mathrm{~cm} \quad \mathrm{c}=12 \pm 0.5 \mathrm{~cm} \quad \mathrm{t}=3.0 \pm 0.6 \mathrm{~s} \quad \mathrm{~m}=18 \pm 1 \mathrm{~kg}
$$

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

