MET 352 Engineering Design Department of Materials and Metallurgical Engineering 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
- A sample of six test scores of six students selected in three courses are Test 1: 82 98 86 78 76 62. Test 2: 82 82 92 62 62 72
 - Test 3: 87 88 89 86 85 84
 - 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.

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- 4. Restate the following measurements with *relative errors* (±%) in terms of *absolute error* (±ε).
 a) 6.1234 ±2%. Show only the correct number of significant figures.
 b) 10.1234 ±10%. "
 - c) $2.1234 \pm 0.1\%$.
- 5. Uncertainties for the following parameters are shown. $a = 25 \pm 1 \text{ cm}$ $b = 18 \pm 2 \text{ cm}$ $c = 12 \pm 0.5 \text{ cm}$ $t = 3.0 \pm 0.6 \text{ s}$ $m = 18 \pm 1 \text{ kg}$

Compute the following quantities with their uncertainties.

- a) a b + c
- b) bt
- c) mc/t