

Homework 7

ME 240: Fundamentals of Instrumentation & Measurement

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1. A certain length is measured repeatedly with the following results: 49.3 cm, 50.1 cm, 48.9 cm, 49.2 cm, 49.3 cm, 50.5 cm, 49.9 cm, 49.2 cm, 49.8 cm, and 50.2 cm.
 - (a) (2 points) Arrange the data into bins of width 2 mm.
 - (b) (2 points) Draw a histogram of the data.
2. The air pressure P at a point near the end of an air supply line is monitored every hour in a 12-h period, resulting in these readings: 110 psi, 104 psi, 106 psi, 94 psi, 92 psi, 89 psi, 100 psi, 114 psi, 120 psi, 108 psi, 110 psi, and 115 psi.
 - (a) (4 points) Draw a histogram of the data with a bin width of 5 psi, starting at 85 psi.
 - (b) (2 points) From your histogram, estimate the probability that future pressure measurements will fall between 95 and 105 psi.
3. (4 points) Calculate the mean, standard deviation, median, and mode of the data listed above.
4. (3 points) At a certain university, 15% of electrical engineering students are women and 80% of electrical engineering students are undergraduates. What is the probability that an electrical engineering student is an undergraduate woman?
5. (3 points) The chance that any of the two components of a measurement system (transducer and transmitter) is defective is 2%. Calculate the chance that both components in a measurement system are defective.