

Math 254 Practice Problems Part I

1. a) To which data sets does Tchebysheff's Theorem apply?
b) Given a data set to which Tchebysheff's Theorem applies, what can you say about the proportion of measurements that are more than 2σ above the mean?
c) To which data sets does the Empirical Rule apply?
d) Given a data set to which the Empirical Rule applies, what can you say about the proportion of measurements that are more than 2σ above the mean?

2. A calculus class has two sections: A and B. Twenty-five students from Section A write Test 1 and have a mean score of 72. Thirty-five students from Section B write Test 1 and have a mean score of 78.
a) If the test scores from both sections are combined into one data set, what is the mean?
b) For what values of the median will the set of combined scores be skewed left?

3. A data set has sample variance equal to 3.25 and population variance equal to 2.6. How many measurements are in the data set?

4. Two data sets are given below in the form (x, y) .
Data Set A: $(-2, 10), (-3, 18), (-7, 25), (-6, 20)$
Data Set B: $(1, 0), (4, -30), (3, -30), (8, -68)$
a) Find the equation of the least squares regression line for Data Set A. Round your values to two decimal places.
b) Which data set fits better to a line? Explain.

5. a) Give the 5-number summary for the following data set:
36, 48, 62, 28, 31, 36, 28, 37, 38
b) Which of the measurements, if any, are outliers?

6. In order to pass quality control, a software program must pass both Test I and Test II. The probability of passing Test I is 97%; the probability of passing Test II is 96%. If the probability of passing at least one test is 99%, find the probability that a program passes quality control.

7. At your company, 2.3% of employees use a certain illegal substance. During the mandatory annual drug testing, 97% of users test positive and 99% of non-users test negative. What is the probability that a positive test result belongs to a non-user? Round your answer to three decimal places.
8. A fair coin is tossed twelve times. Find the probability of at least four heads appearing. Round your answer to three decimal places.
9. Suppose $P(\overline{A} \cap \overline{B}) = 0.2$ and $P(\overline{A}) = 0.3$. Calculate $P(A|A \cup B)$. Round your answer to three decimal places.