In-class Worksheet 4

1. Shown here is a frequency table for all scores on a MATH 1081 quiz.

| Score	Frequency
5	1
6	4
7	5
8	6
9	12
10	25
11	20
12	52
13	54
14	74
15	87
16	66
17	71
18	44
19	26
20	19

(a) When computing the standard deviation of these quiz scores, is it more appropriate to use the Sample standard deviation formula or the Population standard deviation formula? Explain.

(b) What is the standard deviation in that case?

(c) What is the 5-number summary for this data set?

(d) What is the coeffecient of variation?

(e) According to Chebyshev's Theorem, at least 75% of the quiz scores fall within the interval $\mu - 2\sigma$ to $\mu + 2\sigma$. Determine the bounds of the Chebyshev interval. Then determine the actual percentage of the data that falls within this interval in this specific case. Is it, in fact, 75% or more as the theorem indicates it will be?

2. The coefficient of variation **cannot be used** when the level of measurement is an interval. Consider the two sets of measurements of temperature:

Set A	68	59	68	77	59
Set B	15	20	20	15	25

(a) For each set, compute the coefficient of variation. What does this tell you about each data set?

(b) If Set A is the temperature in degrees Fahrenheit and Set B is temperature in degrees Celsius, what types of measurements are these data sets?

(c) Using the formula $C = (F - 32) * (5/9)$, convert Set A into Celsius. What do you notice about the two data sets?

3. A sample of 20 data values has a mean of $\bar{x} = 12$ standard deviation of $s = 2.3$. The lowest value in the data set is 5 and the highest value is 20.

(a) If 2 more data values each equal to 12 are added to the sample, then will the standard deviation of this new sample of 22 data values be greater than, less than, or remain equal to $s = 2.3$? Explain.

(b) On the other hand, if 2 more data values, one equal to 5 and the other equal to 20, then will the standard deviation of this new sample of 22 data values be greater than, less than, or remain equal to $s = 2.3$? Explain.

4. Shown here is a histogram displaying the number of hours of sleep per day for a random sample of 200 subjects.

Hours of Sleep Each Day (24-hour period)
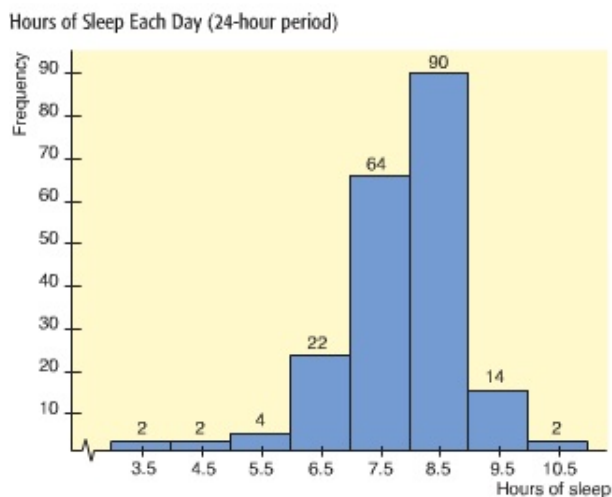
(a) Estimate the mean number of hours of sleep.

(b) Estimate the standard deviation of hours of sleep. (Is this a sample statistic or population parameter?)

5. The ogive shown represents the heights of males in a particular country in the 20-29 age group.
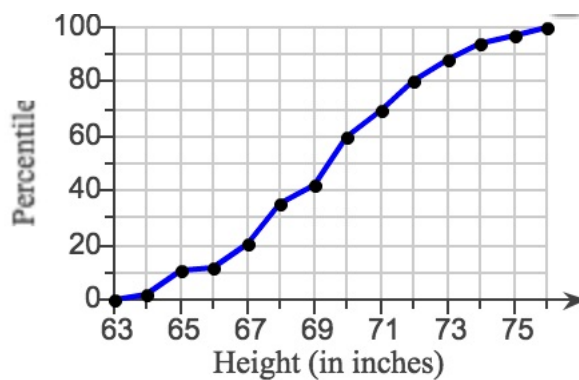
(a) Approximately what percentage of the males (age 20-29) are taller than 6 feet?

(b) What is the approximate median height of this population of males?

6. *Consumer Reports* rated automobile insurance companies and listed annual premiums for top-rated companies in several states. The following figure shows box-and-whisker plots for annual premiums for urban customers (married couple with one 17-year-old son) in three states.
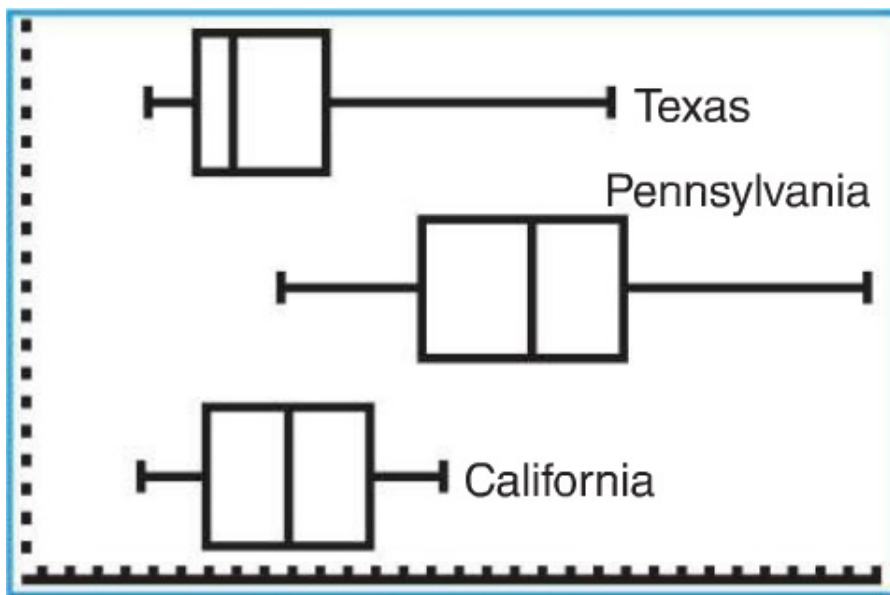
(a) Which state has the lowest annual premium?

(b) Which state has the highest annual premium?

(c) Which state has the highest median premium?

(d) Which state has the smallest range of premiums?

(e) Which state has the smallest inter-quartile range of premiums?