

Distribution and Dispersion Measure Problems

[Answers](#)

1. Suppose you took the qualifying exam to become a postal worker. You will qualify to work in the post office if your composite final grade is at least a 75. The exam has a verbal, quantitative and analytical section. The verbal section is worth 25% of the final score, the quantitative – 35% and the analytical 40%. Your grade is a 65 on the verbal portion, an 85 on the quantitative part and a 76 on the analytical. Do you qualify to become a postal worker based on your grades?
2. Suppose an experiment was performed to compare the reliability of two brands of golf balls (*Nike and Callaway*). Six golf balls of each brand were struck by a mechanical golf club with exactly the same force. Balls from a perfectly reliable brand would travel the same distance with every strike. Below is the number of feet traveled by the six golf balls from each of the two brands.

Nike	Callaway
240ft	229ft
265	265
215	220
270	280
250	245
249	250

- A. Do the numbers above represent a sample or a population?
- B. Calculate the mean distance traveled by the two types of balls.
- C. Compare the two means you just calculated. What does the comparison imply?
- D. Calculate the variance and standard deviation of distance traveled by the two types of golf balls.
- E. Compare the two standard deviations and indicate which brand is the more reliable golf ball. Defend your answer.
- F. From the criterion we are using for reliability can you say with 100% certainty that, based on this experiment, one golf ball brand is more reliable than the other?

3. A sample of summer high temperatures is taken both from Los Angeles and San Diego.

Day	Los Angeles High Temperature	San Diego High Temperature
I	85	92
II	78	72
III	73	80
IV	90	75
V	92	69

- Calculate the mean summer temperature for the two cities.
 - Calculate the variance and standard deviation in summer temperature for the two cities.
 - Which of the two comparisons (mean and standard deviation) suggests San Diego has a more pleasant summer? Which of the two puts Los Angeles in a better light?
 - For which city does the calculated mean temperature provide more information on what to expect for a particular summer day?
4. The data below are the actual retail prices of a sample of 22 DVD models.

350	180	450	170
300	300	270	170
340	190	265	200
220	170	210	180
320	190	250	220
250	200		

- Generate a frequency distribution for the data. Use five classes in the distribution and set the class size at \$56. The first class of the distribution is \$170 to \$226.
- Generate the relative frequency distribution.
- Generate a histogram for the relative frequency distribution.
- Is the distribution skewed to the left or the right?
- Can you determine without calculation where the median would be relative to the mean?
- According to the relative frequency distribution, what is the chance that a DVD will cost at least \$338?
- What information does the relative frequency distribution provide that the frequency distribution does not?

5. We want to gain information about the distribution of income in the United States. Suppose we took two unbiased samples of full time employed U.S. residents - one sample in 1975, the other in 1995. The data is shown below. (The data is adjusted for inflation.)

Income in:

1975	1995
\$16,000	\$11,000
\$22,000	\$16,000
\$45,000	\$40,000
\$56,000	\$56,000
\$76,000	\$76,000
\$82,000	\$83,000
\$92,000	\$110,000
\$102,000	\$220,000
\$220,000	\$420,000

- A. What are the sample sizes?
- B. Find the median incomes for the two years.
- C. Calculate the mean incomes for the two years.
- D. Find the 25th and 75th percentile for each of the income distributions.
- Explain why the mean changed dramatically while the median remained unchanged over the time period.
 - What happened to the lower twenty-five percent of income earners in the sample over the time period? The top twenty-five percent of income earners?
 - Do the calculated medians imply that the typical income earner is any worse off in 1995 than in 1975?
 - Do the calculated means imply that the typical income earner is any better off in 1995 than in 1975?
 - Which income distribution do you think has a larger standard deviation?