

Name: _____ Date: _____ Block: _____

Statistical Variation - Worksheet #2

1) Evaluate each summation.

a) $\sum_{i=1}^3 (i+1)$

b) $\frac{\sum_{i=1}^5 i^2}{5}$

c) $\frac{\sum_{i=1}^n x_n}{n}$ where $n = 5$ and x is an element of $\{78, 62, 71, 85, 84\}$

2) Find the mean, mean absolute deviation (MAD), variance, and standard deviation by hand for this data set, which shows the average temperature for 5 months. Verify your answers by finding the same data using the calculator: $\{78, 62, 71, 85, 84\}$

3) For each set of data below, find the mean, MAD, standard deviation, and variance. You may use the graphing calculator. Round to the nearest hundredth if necessary.

a) $\{25, 20, 10, 14, 21\}$

b) $\{50, 58, 50, 58, 65, 52, 42, 61\}$

mean = _____ $\sigma =$ _____

mean = _____ $\sigma =$ _____

MAD = _____ $\sigma^2 =$ _____

MAD = _____ $\sigma^2 =$ _____

4) On six consecutive months, the average rainfall, in inches, was 4, 2, 0, 1, 3, and 4 inches.

a) Calculate the mean, MAD, and the standard deviation.

b) How many standard deviations above or below the mean would a rainfall of 2 inches be?

5) Ball-Bearings, Inc. produces ball bearings automatically on a machine. The mean diameter of ball bearings produced is 20.00 mm. The standard deviation of the production over a long period of time was computed to be 0.150 mm. A ball bearing produced has a diameter of 20.27 mm. What is its z-score?

6) Kingsfield the cat weighs 13 pounds. The mean weight for a cat is 10 lbs, with a standard deviation 4.5. His male human weighs 240 lbs. The mean weight for a man is 180 lbs with a standard deviation of 30. Who is more overweight? Explain.

7) The mean score of a final exam is 70. The standard deviation of the scores is 7. Your test z-score is 2 and your friend's test z-score is -2. What did you both receive on the exam?

- 8) Past experience of a large manufacturing firm with administering a test to recent college graduates who had applied for a job revealed that the mean test score was 500, and the standard deviation was 50.

Management is considering placing a person whose score is one standard deviation or better above the mean in the most responsible position. What is the lowest score a college graduate must earn to qualify for a responsible position?

- 9) Mrs. Grieser gave a math exam which 75 Algebra students took. The mean score is 60 out of 100 correct, and the standard deviation is 15. About 25 of the students have a z-score of 1 or better.

One student received a 70 on the exam. Relative to other students, is this a good score? Explain your answer.

- 10) The mean for a statistics test is 61 and the standard deviation is 6. For a biology test, the mean is 22 and the standard deviation is 3.8. Bob got a 75 on the statistics test, and a 27 on the biology test. On which test did Bob do better? Explain.

- 11) Your family wants to buy a new car. In car A, the mean of the number of hours before brake repair is needed is 10,000 hours, and the standard deviation is 8. For car B, the mean for the same data is 15,000 hours, and the standard deviation is 25. What considerations might you make before choosing the car, assuming this will be the deciding factor?

- 12) In a school district, Mr. Mills is in charge of SAT testing. In a meeting, the superintendent asks him how many students scored less than one standard deviation below the mean on the mathematics portion of the SAT in 2009. He looks through his papers and finds that the mean of the scores is 525 and 1653 students took the SAT in 2009. He also found a chart with percentages of z-scores on the SAT in 2009 as follows:

z-score (mathematics)	Percent of students
$z < -3$	0.1
$-3 \leq z < -2$	2.1
$-2 \leq z < -1$	13.6
$-1 \leq z < 0$	34.0
$0 \leq z < 1$	34.0
$1 \leq z < 2$	13.6
$2 \leq z < 3$	2.1
$z > 3$	0.1

Use this information to help Mr. Mills find how many students scored less than one standard deviation below the mean on the mathematics portion of the SAT. Explain how you got your answer.