Statistics Unit 1 worksheet: Interpreting a standard deviation

Name _____ Date _____ Period _____

1. A café's espresso machine pulls shots that last a mean of 26 seconds, with a standard deviation of 2 seconds.

For each shot time in (a) to (c), say how many standard deviations it sits from the mean, and on which side.

(a) 30 seconds (b) 23 seconds (c) 31 seconds

(d) Which of the three shots is the most unusual for this machine?

(e) What shot time is 2 standard deviations below the mean?

2. A post office weighed 8 letters, in grams: 18, 20, 20, 21, 23, 24, 24, 26. Treat the 8 letters as a population.

(a) Find the mean and the standard deviation of the weights.

(b) Write one sentence interpreting the standard deviation.

(c) How many of the letters weigh within one standard deviation of the mean?

(d) Find the mean absolute deviation (MAD) of the weights. Explain why it comes out smaller than the standard deviation.

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3. An orchard reports that its apples this season have a mean weight of 180 g and a standard deviation of 15 g. Three students read the report.

Diego: "Every apple weighs between 165 g and 195 g."

Priya: "A typical apple weighs 15 g."

Amara: "The farm next door reports a standard deviation of 10 g, so our apples are heavier than theirs."

(a) Explain what each student has mixed up.

(b) Write one correct sentence about what the 15 g says.

4. Five judges each give a skater a whole-number score from 0 to 10. The mean of the five scores is 5.

(a) Give five scores with a standard deviation of 0.

(b) Give five scores with the largest standard deviation possible, find it to two decimal places, and explain why no set of scores does better.

(c) Give five scores with a standard deviation of exactly 2.

5. A bike-share station logged eight rides, in minutes: 9, 6, 11, 57, 8, 12, 7, 10. The 57-minute ride was a rider who forgot to dock the bike. Treat the rides as a population.

(a) Find the mean and standard deviation of all eight rides, the standard deviation to one decimal place.

(b) Find the mean and standard deviation of the seven other rides.

(c) A new ride lasts 14 minutes. Count how many standard deviations it sits from the mean using the summary from (a), and again using the summary from (b).

(d) Which summary shows honestly how unusual a 14-minute ride is? Explain.

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6. Luis took five quizzes. Every score was a whole number from 7 to 9, and the mean was 8. He reports that the standard deviation of his scores is 1.2.

(a) Explain why the 1.2 must be a mistake.

(b) Find the largest standard deviation his five scores could have, to two decimal places, and give scores that reach it.

7. Two runners timed their last six 400 m races, in seconds. Treat each runner's six races as a population.

Isaac	**62**	**63**	**64**	**64**	**65**	**66**
Omar	58	60	61	63	64	66

(a) Find the mean and standard deviation of each runner's times, to two decimal places.

(b) Compare the two runners in two sentences, one about the centers and one about the spreads.

(c) Using one standard deviation on each side of the mean, give a rough range for each runner's next time. Whose next time can be predicted more closely?

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