Name: _____ Date: _____

Sharing the total

A sample of five delivery times, in minutes: 4, 6, 6, 8, 11.

(a) Find the mean and median. State the units.

Set it up: Mean = total / number of values. Sort the list to find the median.

Work: Total = 35; n = 5. Mean = 35/5 = 7. Ordered list: 4, 6, 6, 8, 11. The middle value is 6.

Answer: Mean = 7 minutes. Median = 6 minutes.

(b) Find the mode and range.

Set it up: Mode = most frequent value, if one exists. Range = maximum minus minimum.

Work: Mode: 6. Range = 11 minus 4 = 7.

Answer: Mode: 6. Range = 7 minutes.

(c) Find the sample standard deviation, rounded to three decimal places. Explain which calculator output applies.

Set it up: Sum the squared distances from the mean, divide by n minus 1, then take the square root. This is a sample, so use Sx.

Work: Mean = 7. Distances from the mean: -3, -1, -1, 1, 4. Squared distances: 9, 1, 1, 1, 16; their sum = 28. Variance = 28/4 = 7. Standard deviation = square root of 7 = 2.646.

Answer: Sx = 2.646 minutes. It describes spread around the mean.

A whole club

The reading times, in minutes, of every member of a five person club: 3, 5, 5, 7, 10.

(a) Find the mean and median. State the units.

Set it up: Mean = total / number of values. Sort the list to find the median.

Work: Total = 30; n = 5. Mean = 30/5 = 6. Ordered list: 3, 5, 5, 7, 10. The middle value is 5.

Answer: Mean = 6 minutes. Median = 5 minutes.

(b) Find the mode and range.

Set it up: Mode = most frequent value, if one exists. Range = maximum minus minimum.

Work: Mode: 5. Range = 10 minus 3 = 7.

Answer: Mode: 5. Range = 7 minutes.

(c) Find the population standard deviation, rounded to three decimal places. Explain which calculator output applies.

Set it up: Sum the squared distances from the mean, divide by n, then take the square root. This is a population, so use sigma x.

Work: Mean = 6. Distances from the mean: -3, -1, -1, 1, 4. Squared distances: 9, 1, 1, 1, 16; their sum = 28. Variance = 28/5 = 5.6. Standard deviation = square root of 5.6 = 2.366.

Answer: sigma x = 2.366 minutes. It describes spread around the mean.

One unusually long wait

A sample of five waiting times, in minutes: 2, 4, 6, 8, 10.

(a) Find the mean and median. State the units.

Set it up: Mean = total / number of values. Sort the list to find the median.

Work: Total = 30; n = 5. Mean = 30/5 = 6. Ordered list: 2, 4, 6, 8, 10. The middle value is 6.

Answer: Mean = 6 minutes. Median = 6 minutes.

(b) Find the mode and range.

Set it up: Mode = most frequent value, if one exists. Range = maximum minus minimum.

Work: Mode: no mode (every value occurs once). Range = 10 minus 2 = 8.

Answer: Mode: no mode (every value occurs once). Range = 8 minutes.

(c) Find the sample standard deviation, rounded to three decimal places. Explain which calculator output applies.

Set it up: Sum the squared distances from the mean, divide by n minus 1, then take the square root. This is a sample, so use Sx.

Work: Mean = 6. Distances from the mean: -4, -2, 0, 2, 4. Squared distances: 16, 4, 0, 4, 16; their sum = 40. Variance = 40/4 = 10. Standard deviation = square root of 10 = 3.162.

Answer: Sx = 3.162 minutes. It describes spread around the mean.

(d) Replace 10 minutes with 30 minutes. Recalculate the mean and median. Which measure changes less, and why?

Set it up: Use the new total for the mean. Reorder the new list for the median.

Work: New data: 2, 4, 6, 8, 30. Mean = 50/5 = 10. Median = 6. The mean rises by 4; the median changes by 0.

Answer: The median changes less: it stays at 6 minutes. It is resistant to this large value.