Measures of Position

Objectives

1. Use z-scores to compare data values
2. Determine and interpret percentiles
3. Determine the five-number summary
4. Create a boxpolot of a dataset

z-scores

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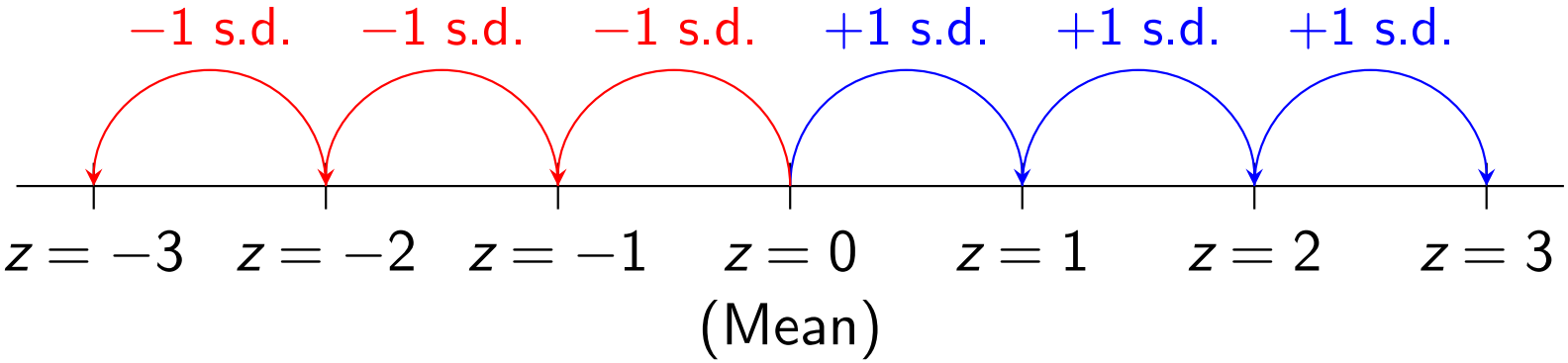
- A positive z-score indicates an above average value.
- A negative z-score indicates a below average value.
- A z-score of 0 indicates an exact average value.

Visual Interpretation of z-Scores



z-Score Formula

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"Usual" data values have z-scores between -2 and 2.

Example 1

The mean SAT score is 1059 with a standard deviation of 210; meanwhile the mean ACT score is 21 with a standard deviation of 5.4. A student takes both tests and receives a 1350 on the SAT and a 29 on the ACT. On which test did the student score better?

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The mean SAT score is 1059 with a standard deviation of 210; meanwhile the mean ACT score is 21 with a standard deviation of 5.4. A student takes both tests and receives a 1350 on the SAT and a 29 on the ACT. On which test did the student score better?

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The student did relatively better on the ACT.

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Percentile Score

A **percentile score** is the percent of data values less than a given value. (*Note*: this is not the same as percentage).

Example 2

For the dataset below, determine the percentile score for the data value 28.

30, 35, 28, 28, 19, 21, 34, 7, 21, 9, 36, 29, 33, 35, 13

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For the dataset below, determine the percentile score for the data value 28.

30, 35, 28, 28, 19, 21, 34, 7, 21, 9, 36, 29, 33, 35, 13

First, sort the dataset:

7, 9, 13, 19, 21, 21, 28, 28, 29, 30, 33, 34, 35, 35, 36

Example 2

For the dataset below, determine the percentile score for the data value 28.

30, 35, 28, 28, 19, 21, 34, 7, 21, 9, 36, 29, 33, 35, 13

First, sort the dataset:

7, 9, 13, 19, 21, 21, 28, 28, 29, 30, 33, 34, 35, 35, 36

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