Unit 1 Day 3
Statistics
Data Description

(3-2) Measures of Variation

Jan 18-8:34 AM

Let's begin with some vocab:

Statistic: measure obtained by using data values from a sample.

Parameter: measure obtained by using all the data values from a specific population.

Measures of Variation: tell if the numbers are close together or spread far apart.

*Recall **range**: R = highest - lowest

*Recall Rounding Rule: 1 more decimal than the given data.

Mar 21-12:43 PM

Brand A	Brand B
10	35
60	45
50	30
30	35
40	40
20	25

Do both brand last equally well?

look at it graphically

Solution

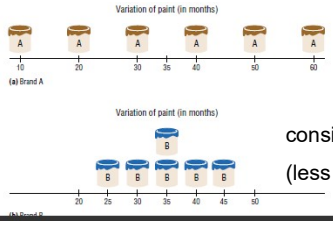
The mean for brand A is

$\mu = \frac{\Sigma X}{N} = \frac{210}{6} = 35$ months

The mean for brand B is

$\mu = \frac{\Sigma X}{N} = \frac{210}{6} = 35$ months

Figure 3–2 Examining Data Sets Graphically



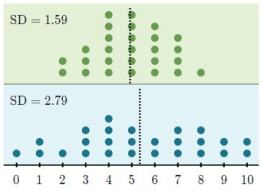
consistent

(less varied)

Jan 7-12:08 PM

Standard deviation measures the spread of a data distribution. **The more spread out a data distribution is, the greater its standard deviation.**

For example, the blue distribution on bottom has a greater standard deviation (SD) than the green distribution on top:



Interestingly, standard deviation cannot be negative. A standard deviation close to 0 indicates that the data points tend to be close to the mean (shown by the dotted line). The further the data points are from the mean, the greater the standard deviation.

Aug 23-8:06 AM

Population

Variance: the average of the squares of the distance each value is away from the mean.

$$\sigma^2 = \frac{\Sigma(X-\mu)^2}{N}$$

sigma

where
X = individual value
μ = population mean
N = population size

Standard deviation: square root of the variance

$$\sigma = \sqrt{\sigma^2} = \sqrt{\frac{\Sigma(X-\mu)^2}{N}}$$

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Sample

Variance: the average of the squares of the distance each value is away from the mean.

$$s^2 = \frac{\Sigma(X-\bar{X})^2}{n-1}$$

where
$\bar{X}$ = sample mean
n = sample size

slightly larger value (unbiased)

Standard deviation: square root of the variance

$$s = \sqrt{s^2} = \sqrt{\frac{\Sigma(X-\bar{X})^2}{n-1}}$$

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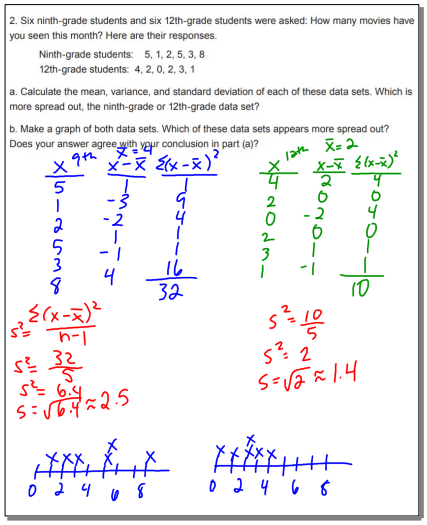

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Shortcut

Variance: the average of the squares of the distance each value is away from the mean.

$$s^2 = \frac{n(\Sigma X^2) - (\Sigma X)^2}{n(n-1)}$$

Standard deviation: square root of the variance

$$s = \sqrt{\frac{n(\Sigma X^2) - (\Sigma X)^2}{n(n-1)}}$$

Note that ΣX^2 is not the same as $(\Sigma X)^2$. The notation ΣX^2 means to square the values first, then sum; $(\Sigma X)^2$ means to sum the values first, then square the sum.

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Calc steps

TI -83/84

1.)Stat

1: edit

enter data into L_1

2.)Stat -> Calc

1: 1-Var Stats

TI-nspire

1.) Spreadsheets icon

Name column A time

starting at 1 enter data

2.) menu

4: statistics - stat calc

1: one variable stats

number of lists 1->ok

name of x1 list -> ok

time

Jan 8-9:36 AM