

Section 2.4
PART II!!

Summarizing Data

using

Measures of Variation

Amounts of juice in 8 bottles (marked 16oz).

x (oz)	x^2
15.1	228.01
15.3	234.09
15.8	249.64
15.7	246.49
15.6	243.36
15.5	240.25
15.2	231.04
15.7	246.49

Nicer

Total: 123.9 1919.37
 $\uparrow$ $\uparrow$
 Σx Σx^2

Original Formulas for std. deviation.

Sample:

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

Population:

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

(for a finite pop.)

For juice amounts
 $s = 0.2588$

same!!

Shortcut formulas for Standard Deviation

Population

$$\sigma = \sqrt{\frac{\Sigma x^2 - \frac{1}{N}(\Sigma x)^2}{N}}$$

Sample

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

Using the shortcut formula for juice bottles:

$$s = \sqrt{\frac{\Sigma x^2 - \frac{1}{n}(\Sigma x)^2}{n-1}} = \sqrt{\frac{1919.37 - \frac{1}{8} \cdot 123.9^2}{8-1}} = \sqrt{\frac{0.46875}{7}} = \sqrt{0.06696} \approx 0.2588$$

Rounding Rule: keep one place more after the decimal than the sample data.

For juice bottles: $s = 0.2588 \approx \underline{\underline{0.26}}$