

- The grades for the trigonometry exam are listed below. Find the range.
85, 76, 93, 82, 84, 90, 75

$$\text{range} = \text{max} - \text{min} = 93 - 75 = 18$$

- If a data set has 25 values and a standard deviation 9.4, then the variance is _____

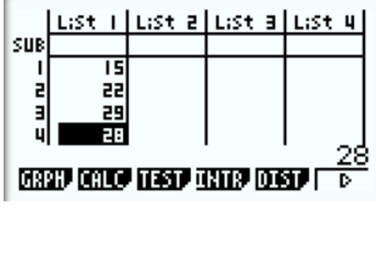
$$\text{var} = (\text{standard deviation})^2 = 88.36 \approx 88.4$$

- Find the sample variance for the following data set: 15, 22, 29, 28, 35

First, find the mean: $\bar{x} = \frac{15+22+29+28+35}{5} = 25.8$

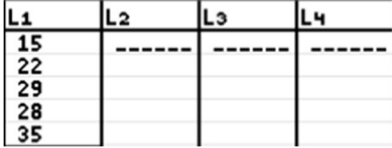
$$\text{Sample variance, } s^2 = \frac{\sum(x-\bar{x})^2}{n-1} = \frac{(15-25.8)^2+(22-25.8)^2+(29-25.8)^2+(28-25.8)^2+(35-25.8)^2}{4} = 57.7$$

Graphing Calculators: CASIO 9750 Enter dataset on List1

	Then F2 for CALC, F1 for 1VAR 1-Variable $\bar{x} = 25.8$ $\Sigma x = 129$ $\Sigma x^2 = 3559$ $\sigma x = 6.7941151$ $sx = 7.5960516$ $n = 5$	Where $\sigma x = 6.7941151$ is the pop standard deviation and $sx = 7.5960516$ is the sample standard deviation. Variance not given by calculators: $\text{variance} = (\text{std dev})^2$
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Therefore, the sample variance = sample standard deviation squared = $(7.5960516)^2 = 57.7$

TI 84 Enter dataset on List1

	Then STAT, CALC, 1-Var Stats Enter and keep L1 here: 1-Var Stats List:L1 FreqList: Calculate Enter on Calculate:	1-Var Stats $\bar{x}=25.8$ $\Sigma x=129$ $\Sigma x^2=3559$ $Sx=7.596051606$ $\sigma x=6.794115101$ $n=5$ $\text{minX}=15$ $\downarrow Q_1=18.5$
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Where $S_x = 7.5960516$ is the sample standard deviation and $\sigma_x = 6.7941151$ is the pop standard deviation. Variance not given by calculators:
 $variance = (std\ dev)^2$

Again, the sample variance = sample standard deviation squared = $(7.5960516)^2 = 57.7$

4. Find the population variance for the following data set: 16, 21, 30, 27, 37

First, find the mean, $\mu = 26.2$

$$\sigma^2 = \frac{\sum(x - \mu)^2}{n}$$

$$\sigma^2 = \frac{(16 - 26.2)^2 + (21 - 26.2)^2 + (30 - 26.2)^2 + (27 - 26.2)^2 + (27 - 26.2)^2 + (37 - 26.2)^2}{5} = 52.6$$

5. Find the sample standard deviation for the following data set: 28, 12, 30, 16, 22

First, find the mean, $\mu = 21.6$

$$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}} = \sqrt{\frac{(28-21.6)^2 + (12-21.6)^2 + (30-21.6)^2 + (16-21.6)^2 + (22-21.6)^2}{4}} = 7.7$$

6. Find the population standard deviation for the following data set: 32, 15, 27, 22, 26

First, find the mean, $\mu = 24.4$

$$\sigma = \sqrt{\frac{\sum(x - \mu)^2}{n}} = \sqrt{\frac{(32-24.4)^2 + (15-24.4)^2 + (27-24.4)^2 + (22-24.4)^2 + (26-24.4)^2}{5}} = 5.7$$

7. The average age of Stokes County school board members over the last 40 years has been 51, but members have ranged from 32 to 67. Use the range rule of thumb to estimate the standard deviation of the members' ages.

The range rule of thumb to estimate the standard deviation is used when we don't have access to the raw data, each individual data point from the sample. This rule consists of dividing the range by 4:

$$\text{Estimate of the standard deviation} = \frac{Max - Min}{4} = \frac{67 - 32}{4} = 8.75 \approx 8.8$$

8. Given that the mean of a set of data is 25 and the standard deviation is 3, what is the coefficient of variation?

$$CV = \frac{3}{25} \times 100 = 12\%$$

9. A sample of apples has a mean weight of 151.4 grams and standard deviation of 14.1 grams. A sample of grapes has a mean weight of 3.94 grams and standard deviation of 0.56 grams. Which of the two samples has a larger variability?

$$CV_{apples} = \frac{14.1}{151.4} \times 100 = 9.3\%$$

$$CV_{grapes} = \frac{0.56}{3.94} \times 100 = 14.2\%$$

The grapes weight has a larger variability compared to the apples in these samples