Measures of Variation or Dispersion

What is a standard deviation?

- It is used to tell how far on average any data point is from the mean.
  - The smaller the standard deviation, the closer the scores are on average to the mean.
  - When the standard deviation is large, the scores are more widely spread out on average from the mean.

Examples:

1. 24 students took a 100 point test. 12 of the students scored 83 and 12 of the students scored 77.

   a. What's the mean? _____
   b. What is the standard deviation? _____
   (the difference or distance between each score and the mean)?

2. 24 students took a 100 point test. 12 of the students scored a 95 and 12 of the students scored a 65.

   a. What is the mean? _____
   b. What is the standard deviation? _____

CALCULATING STANDARD DEVIATION

Calculate the standard deviation of the following test data by hand. Use the chart below to record the steps.

Test Scores	45	70	85	38	23	94	65	51	80	49

Mean:_____ ***n*:**_____

Number	Difference from the mean	(Difference from the mean)^2
	Sum of (Difference from the mean)^2	

- Sum of (Difference from the Mean)^2 divided by degrees of freedom ($n-1$):_____
  → **This is called variance.**

$$\frac{\sum(x-\bar{x})^2}{(n-1)} =$$

- **Final Step:**
  Standard deviation = square root of what you just calculated (variance).

Standard deviation =

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

For problems 1 and 2: calculate the standard deviation of the following test data by hand. Use the chart below to record the steps.

1.

Number	Difference from the mean	(Difference from the mean)^2
	Sum of (Difference from the mean)^2	

The data set below lists the calories burned in an hour by 10 members at Kosama.

500 430 380 535 421
488 364 454 508 472

A. Mean:_____ **B. *n*:**_____

C. Sum of (Difference from the Mean)^2 divided by (*n* – *1*):_____ **= variance.**

D. Standard deviation = square root of variance.
Standard deviation = _____.

2.

Number	Difference from the mean	(Difference from the mean)^2
	Sum of (Difference from the mean)^2	

The data set below lists the MAP scores of 10 freshmen students.

234 241 219 252 260
238 256 244 239 247

A. Mean:_____ **B. *n*:**_____

C. Sum of (Difference from the Mean)^2 divided by (*n* – *1*):_____ **= variance.**

D. Standard deviation = square root of variance.
Standard deviation = _____.