Video Lecture 2, Unit 2
Standard Deviation

The ages of the five Jones brothers:
18,19,20,21,22

The ages of the five Brown brothers
10,15,20,25,30

Mean of the Jones brothers' ages:
(18+19+20+21+22) / 5 = 20

Mean of the Brown brothers' ages
(10+15+20+25+30) / 5 = 20

Standard deviation: A measure of how dispersed data is around its center (the mean).

How to calculate the standard deviation. (We will begin by using the Jones brothers example.)

Step 1: Calculate the mean of the data
Mean of the Jones brothers' ages:
(18+19+20+21+22) / 5 = 20

Step 2: Subtract each piece of data (each "observation") from the mean.

Step 2 continued:

18 - 20 = -2
19 - 20 = -1
20 - 20 = 0
21 - 20 = 1
22 - 20 = 2

Years

Step 3: Square each result that you got in step 3

-2 x -2 = 4
-1 x -1 = 1
0 x 0 = 0
1 x 1 = 1
2 x 2 = 4

Years squared

Step 4: Add up the results of step 3

4+1+0+1+4 = 10 Years squared

Step 5: If your data represents the entire population, then divide the number you got in step 4 by the number of pieces of data (number of observations). On the other hand, if your data is only a sample that is smaller than the entire population, then divide by the number of observations MINUS 1

Since we have the ages of all 5 Jones brothers, we divide by the number of observations -- 5. (We don't subtract 1 because it's not a sample.)

10 / 5 = 2 years squared

population variance

Step 6: Take the square root of the answer that you got in step 5:

Sqrt(2) = 1.414213562373095 years

The standard deviation of the Jones brothers' ages is ±1.414 years

Now, the standard deviation for the Brown brothers.

Step 1:
Mean of the Brown brothers' ages
(10+15+20+25+30) / 5 = 20

Step 2:
10 - 20 = -10
15 - 20 = -5
20 - 20 = 0
25 - 20 = 5
30 - 20 = 10

Step 3:
-10 x -10 = 100
-5 x -5 = 25
0 x 0 = 0
5 x 5 = 25
10 x 10 = 100

Step 4:
100 + 25 + 0 + 25 + 100 = 250

Step 5:
250 / 5 = 50 variance

Step 6:
sqrt(50) = ±7.071067811865475 years standard deviation