

Module 2b – Calculating the Mean and Standard Deviation

Mean and Standard Deviation

- Against all Odds - Unit 6
- We do this when we are describing a single (univariate), relatively *symmetric continuous/quantitative* variable's *center* and *spread/variability* numerically

- **Center:** Mean
$$\bar{X} = \frac{\sum X}{N}$$

Standard Deviation (process)

- **Spread/Variability:** Standard Deviation (the individuals' *typical* distance from the mean)

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

- s=standard deviation
- x=the value for each individual
- \bar{x} =the mean
- n=the number of individuals

Standard Deviation (process)

Exam One Results

60
61
62
70
73
75
79
83
85
88
90
90
93
95
95
96
96
97
98
98

- Step 1: Calculate the mean: $1684/20=84.2$
- Step 2: Subtract the mean from every individuals' result.
- Step 3: Square the difference
- Step 4: Sum the squares (this is your sum of squares)
- Step 5: Divide the total by $n-1$ (this is your variance)
- Step 6: Take the square root of your variance (this is your standard deviation)

	<u>Exam One</u> <u>Results</u>	<u>Step 2 -</u> <u>subtract 84.2</u>	<u>Step 3 - square</u> <u>the differences</u>	
	60	-24.2	585.6	
	61	-23.2	538.2	
	62	-22.2	492.8	
	70	-14.2	201.6	
	73	-11.2	125.4	
	75	-9.2	84.6	
	79	-5.2	27.0	
	83	-1.2	1.4	
	85	0.8	0.6	
	88	3.8	14.4	
	90	5.8	33.6	
	90	5.8	33.6	
	93	8.8	77.4	
	95	10.8	116.6	
	95	10.8	116.6	
	96	11.8	139.2	
	96	11.8	139.2	
	97	12.8	163.8	
	98	13.8	190.4	
	98	13.8	190.4	
Sum of Results	1684		3273.2	Step 4 - sum the squares
Average of results	84.2		172.3	Step 5 - divide the sum by n-1 (this is your variance)
			13.1	Step 6 - take square root of variance (this is standard dev.)