

## Calculating the standard deviation of a probability distribution using the TI-83/84 calculator

Consider the following probability distribution:

Outcome	Probability	Expected outcome
1	20%	-10%
2	50%	20%
3	30%	40%

Calculate the expected value and standard deviation corresponding to this distribution.

### 1. Input the probabilities and the outcomes into two columns, L1 and L2

L1	L2	L3	L4
.2	-.1		
.5	.2		
.3	.4		

### 2. Create L3 as the product of L1 and L2

Using **STAT Edit** mode, move the cursor over L3, hit **ENTER** and then type in

**2<sup>nd</sup> L1 x 2<sup>nd</sup> L2**

L1	L2	L3	L4
.2	-.1	-.02	
.5	.2	.1	
.3	.4	.12	

### 3. Calculate the expected value as the sum of the elements in L3

**2<sup>nd</sup> LIST MATH 5 ENTER 2<sup>nd</sup> L3 ENTER**

Note: the "5" selects the sum function

Answer: 0.20 or 20%

### 4. Calculate the squared and squared differences, and put these into L4

Move the cursor over L4 and then type  $(L2-.2)^2 * L1$

Keystrokes:

**( 2<sup>nd</sup> L2 - . 2 ) X<sup>2</sup> x L1**

L1	L2	L3	L4
.2	-.1	-.02	.018
.5	.2	.1	0
.3	.4	.12	.012

### 5. Calculate the variance, which is the sum of the weighted squared deviations

**2<sup>nd</sup> LIST MATH 5 ENTER 2<sup>nd</sup> L4 ENTER**

Note: the "5" selects the sum function

Answer: 0.03

### 6. Calculate the standard deviation, which is the square root of the variance

**ENTER ^ . 5**

Answer: 0.173205 or 17.3205%