

Expected Value, Mean, and Variance Using Excel

This tutorial will calculate the mean and variance using an expected value. In this example, Harrington Health Food stocks 5 loaves of Neutro-Bread. The probability distribution has been entered into the Excel spreadsheet, as shown below.

	A	B	C	D	E
1	Expected Value, Mean, and Variance Sample Problem				
2					
3	x	p(x)	x*p(x)	$(x-\text{mean})^2 * p(x)$	
4	0	0.05			
5	1	0.15			
6	2	0.20			
7	3	0.25			
8	4	0.20			
9	5	0.15			
10		mean =			
11			variance =		
12					


You want to know how many loaves Harrington will sell on average and the variance of the distribution.

You are going to be calculating the mean and the variances using expected value. To calculate expected value, you want to sum up the products of the X's (Column A) times their probabilities (Column B).

Start in cell **C4** and type `=B4*A4`. Then drag that cell down to cell **C9** and do the auto fill; this gives us each of the individual expected values, as shown below.

	A	B	C	D	E
1	Expected Value, Mean, and Variance Sample Problem				
2					
3	x	p(x)	x*p(x)	(x-mean) ² *p(x)	
4	0	0.05	0		
5	1	0.15	0.15		
6	2	0.20	0.4		
7	3	0.25	0.75		
8	4	0.20	0.8		
9	5	0.15	0.75		
10		mean =			
11			variance =		
12					

Now to calculate the mean, you are going to just sum up that column by typing `=SUM(C4:C9)` into cell **C10**, hit the **Enter** key or click the checkmark icon, and our mean is 2.85, as shown below.


	A	B	C	D	E
1	Expected Value, Mean, and Variance Sample Problem				
2					
3	x	p(x)	x*p(x)	$(x-\text{mean})^2 * p(x)$	
4	0	0.05	0		
5	1	0.15	0.15		
6	2	0.20	0.4		
7	3	0.25	0.75		
8	4	0.20	0.8		
9	5	0.15	0.75		
10		mean =	2.85		
11			variance =		
12					

Now that you have the mean, we can calculate the variance. The variance is calculated by taking each X value and subtracting the mean (cell C10), and then squaring that and then multiplying that times the probability of that X or $(x-\text{mean})^2 * p(x)$.

Start off in cell **D4** and type $= (A4 - \$C\$10)^2 * B4$ and hit the **Enter** key or click the checkmark icon. Be sure to put absolute cell references for the mean so the cell does not change ($A4 - \$C\10). Now just drag that down to cell **D9** and auto fill like you did before; this gives you the variances, as shown below.

	A	B	C	D	E
1	Expected Value, Mean, and Variance Sample Problem				
2					
3	x	p(x)	x*p(x)	$(x - \text{mean})^2 * p(x)$	
4	0	0.05	0	0.406125	
5	1	0.15	0.15	0.513375	
6	2	0.20	0.4	0.1445	
7	3	0.25	0.75	0.005625	
8	4	0.20	0.8	0.2645	
9	5	0.15	0.75	0.693375	
10		mean =	2.85		
11			variance =		
12					

Now to calculate the variance of the distribution, sum up that column by typing `=SUM(D4:D9)` into cell **D11**, hit the **Enter** key or click the checkmark icon, and our mean is 2.0275, as shown below.

	A	B	C	D	E
1	Expected Value, Mean, and Variance Sample Problem				
2					
3	x	p(x)	x*p(x)	$(x-\text{mean})^2 * p(x)$	
4	0	0.05	0	0.406125	
5	1	0.15	0.15	0.513375	
6	2	0.20	0.4	0.1445	
7	3	0.25	0.75	0.005625	
8	4	0.20	0.8	0.2645	
9	5	0.15	0.75	0.693375	
10		mean =	2.85		
11			variance =	2.0275	
12					

[Click here](#) to download the completed spreadsheet so you can compare it to yours.

This concludes the tutorial on using Excel to calculate expected value, mean, and variance.