How to Model Probabilities in Excel Using the Triangular Distribution: A Step-by-Step Guide

Authored by

stats writer

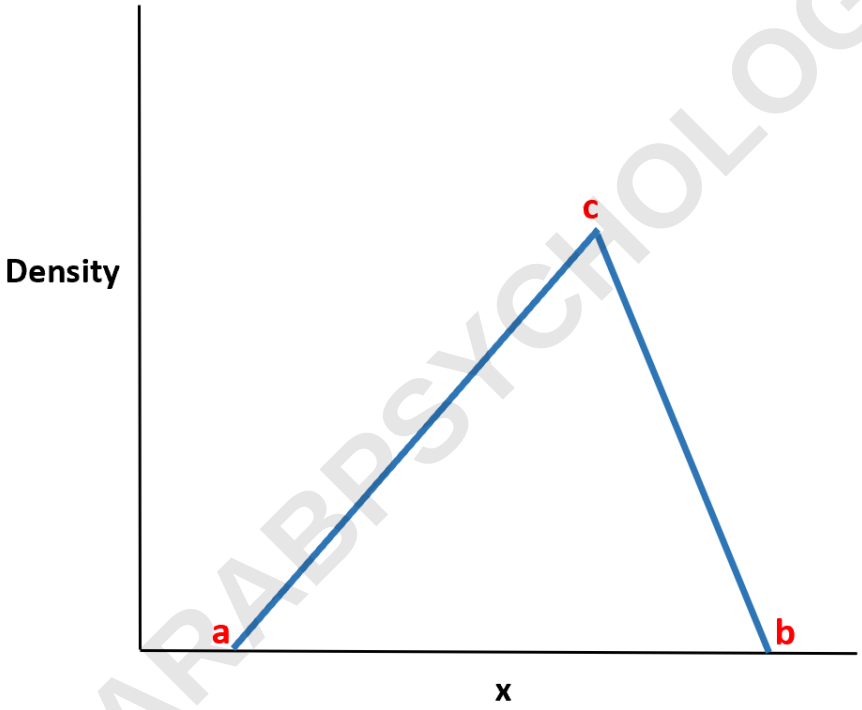
December 6, 2025

The triangular distribution in Excel can be used to model the probability of a given outcome by allowing the user to define the minimum, most likely, and maximum values for a given set of data. This is done by using the TRIMINV function in Excel, which takes in the minimum, most likely, and maximum values to generate a probability distribution. This allows the user to efficiently model the probability of an outcome to help make decisions or predictions.

The is a continuous probability distribution with a probability density function shaped like a triangle.

It is defined by three values:

The minimum value *a*
The maximum value *b*
The peak value *c*



The name of the distribution comes from the fact that the probability density function is shaped like a triangle.

The triangular distribution has the following :

PDF:

$$p_X(x) = \begin{cases} 0 & \text{for} \quad x < a \\ \frac{2(x-a)}{(b-a)(c-a)} & \text{for } a \leq x < c \\ \frac{2}{b-a} & \text{for} \quad x = c \\ \frac{2(b-x)}{(b-a)(b-c)} & \text{for } c < x \leq b \\ 0 & \text{for} \quad b < x \end{cases}$$

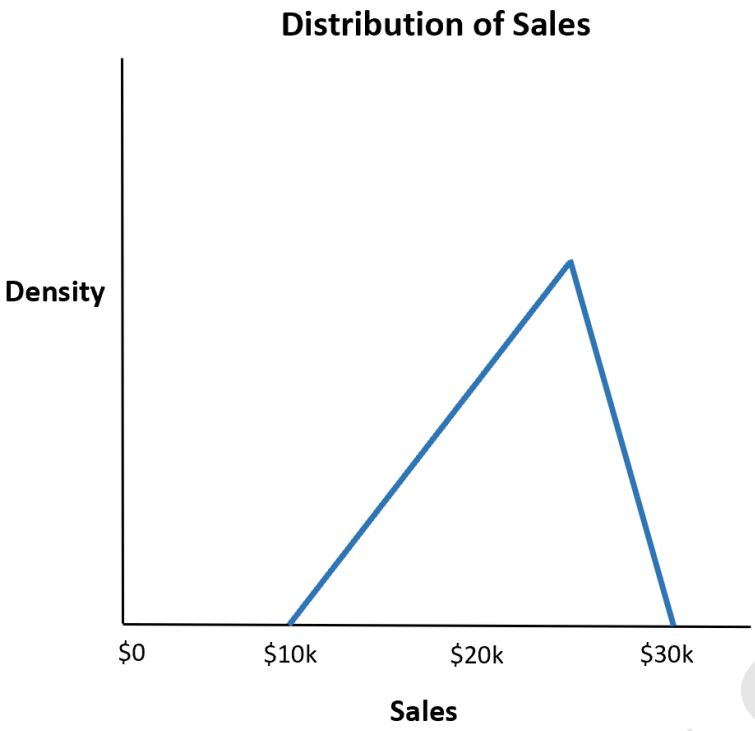
CDF:

$$F(x) = \begin{cases} 0 & \text{for} \quad x \leq a \\ \frac{(x-a)^2}{(b-a)(c-a)} & \text{for} \quad a \leq x \leq c \\ 1 - \frac{(b-x)^2}{(b-a)(b-c)} & \text{for } c < x < b \\ 1 & \text{for} \quad b \leq x \end{cases}$$

The following examples show how to use the Triangular distribution to calculate probabilities in Excel.

Example 1: Restaurant Sales

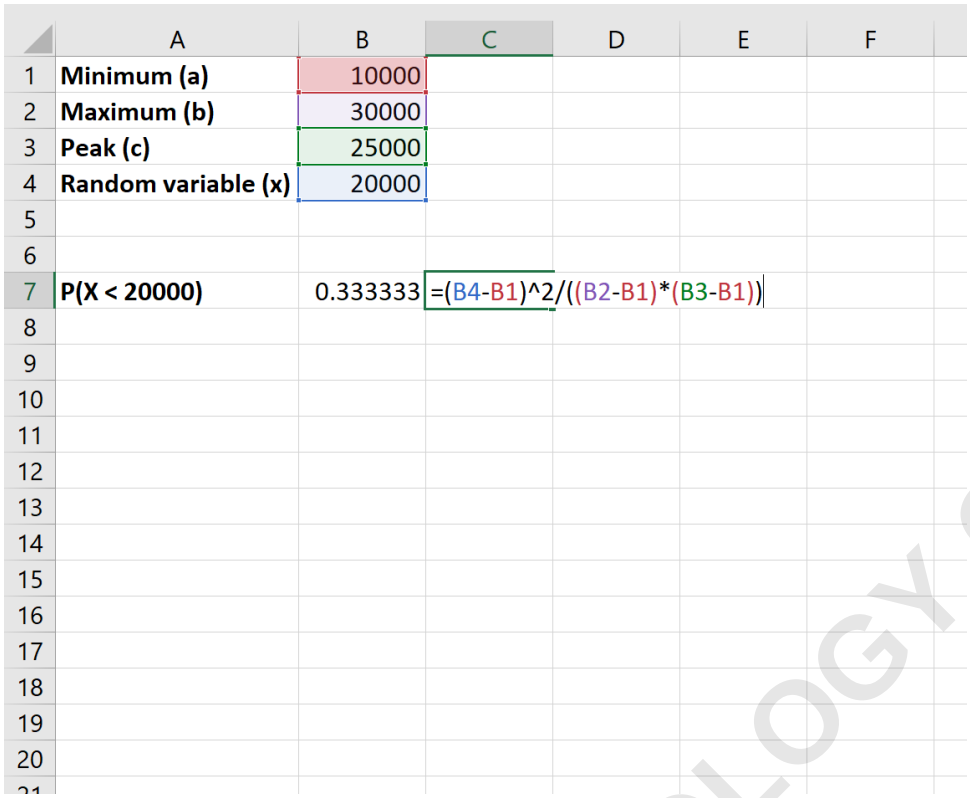
Suppose a restaurant estimates that their total sales for the upcoming week will be a minimum of $10,000, a maximum of $30,000, and most likely $25,000.



What is the probability that the restaurant makes less than $20,000 total sales?

According to the CDF, we can use the following formula to find the probability that total sales will be less than $20,000:

P(X < x) = (x-a)2 / ((b-a)(c-a))



	A	B	C	D	E	F
1	**Minimum (a)**	10000				
2	**Maximum (b)**	30000				
3	**Peak (c)**	25000				
4	**Random variable (x)**	20000				
5						
6						
7	**P(X < 20000)**	0.333333	=(B4-B1)^2/((B2-B1)*(B3-B1))			
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

The probability that the restaurant makes less than $20,000 total sales is **.333**.

Example 2: Number of Customers

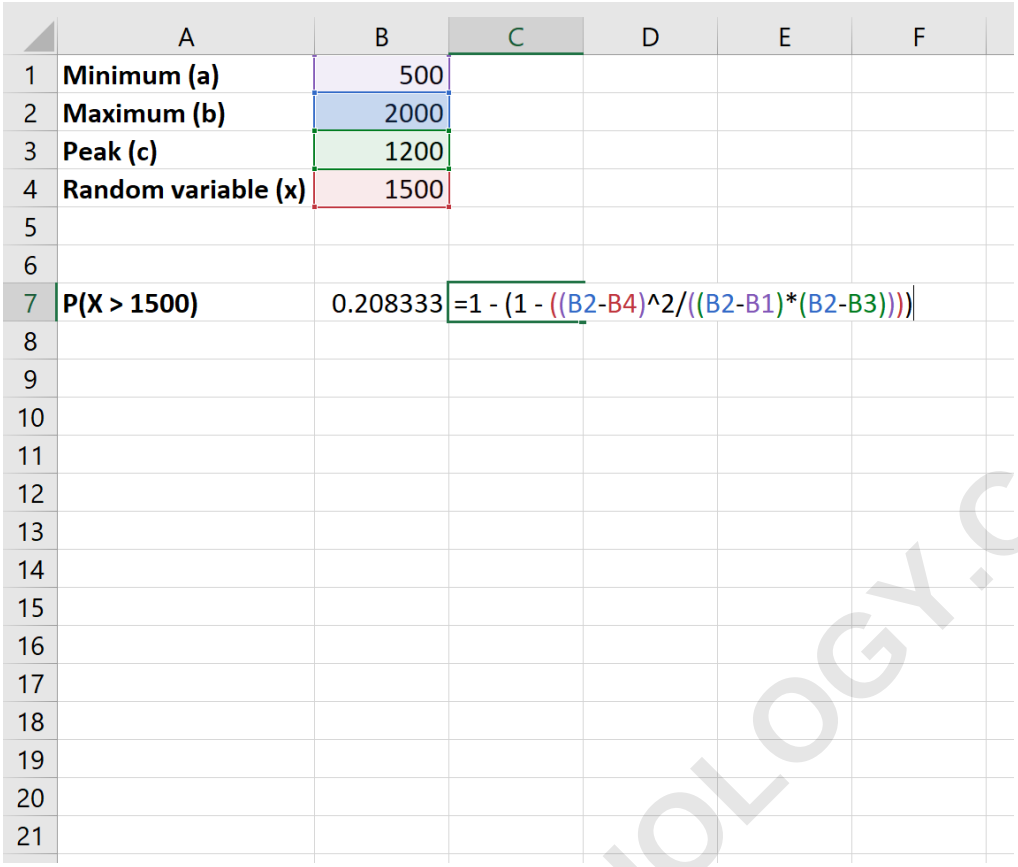
Suppose a shop estimates that the number of customers that will enter in a given week will be a minimum of 500, a maximum of 2,000, and most likely 1,200.

What is the probability that more than 1,500 customers enter the shop in a given week?

According to the CDF, we can use the following formula to find the probability that the total number of customers will be greater than 1,500:

P(X > x) = 1 -

Here's how to calculate this probability in Excel:



	A	B	C	D	E	F
1	**Minimum (a)**	500				
2	**Maximum (b)**	2000				
3	**Peak (c)**	1200				
4	**Random variable (x)**	1500				
5						
6						
7	**P(X > 1500)**	0.208333	=1 - (1 - ((B2-B4)^2/((B2-B1)*(B2-B3))))			
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

The probability that more than 1,500 customers enter the shop is **.208.**

The following tutorials explain how to work with other probability distributions in Excel: