

How can the Triangular Distribution be utilized in Excel? Can you provide some examples?

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The Triangular Distribution is a statistical concept that can be utilized in Excel for various purposes. This distribution is often used to model random variables that have an upper and lower limit, with most values falling towards the middle. In Excel, the Triangular Distribution can be utilized by using the "TRIANG.DIST" function. This function allows users to input the minimum, maximum, and mode values to generate a distribution curve.

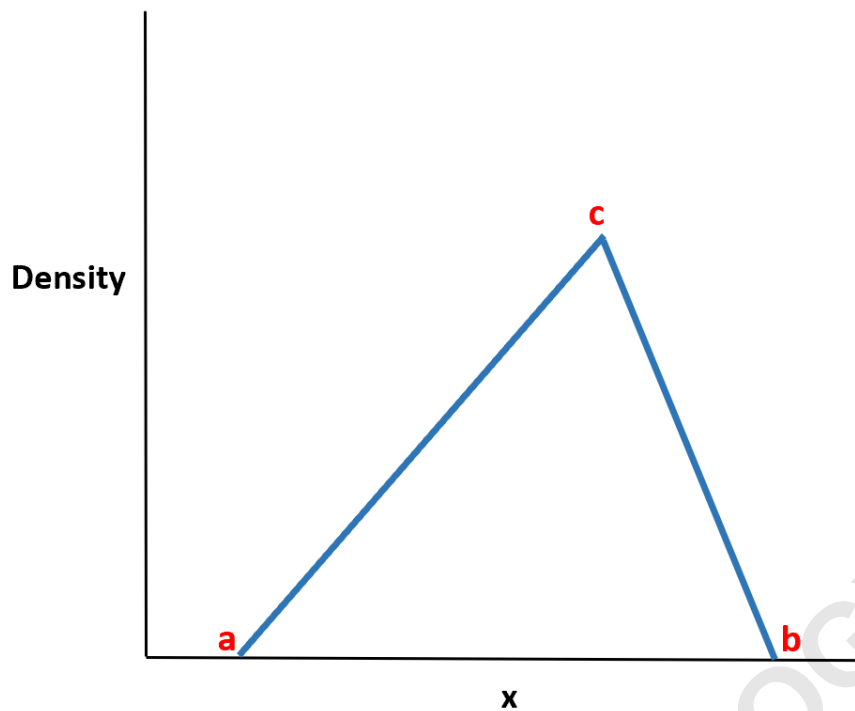
Some examples of how the Triangular Distribution can be utilized in Excel are in risk analysis, decision-making, and forecasting. For instance, in risk analysis, the Triangular Distribution can be used to model the potential outcomes of a project or investment with uncertain variables. In decision-making, it can be used to determine the best course of action by analyzing the potential outcomes and their probabilities. Additionally, in forecasting, the Triangular Distribution can be used to predict future values based on past data and expected fluctuations. Overall, the Triangular Distribution in Excel provides a valuable tool for analyzing and understanding data with upper and lower limits.

Use the Triangular Distribution in Excel (With Examples)

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:

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

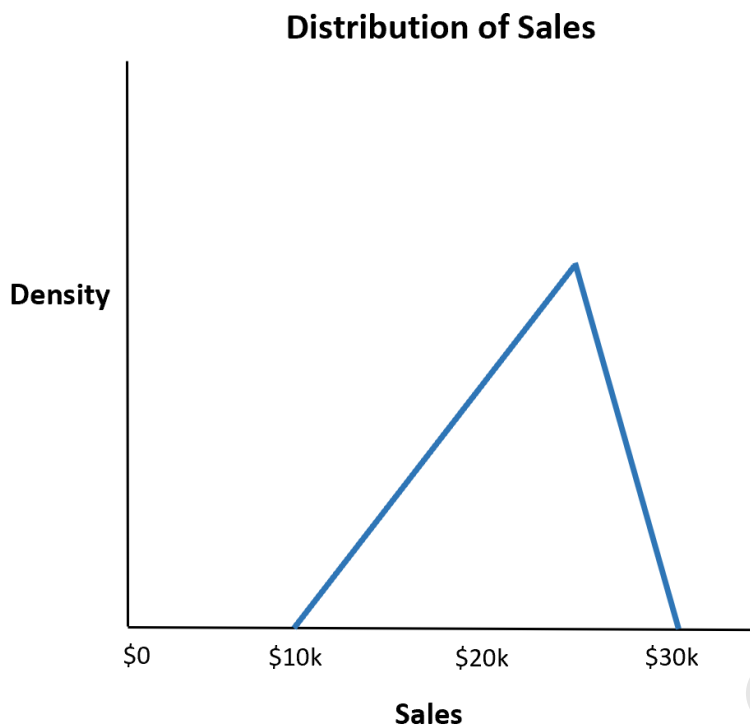
CDF:

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

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:

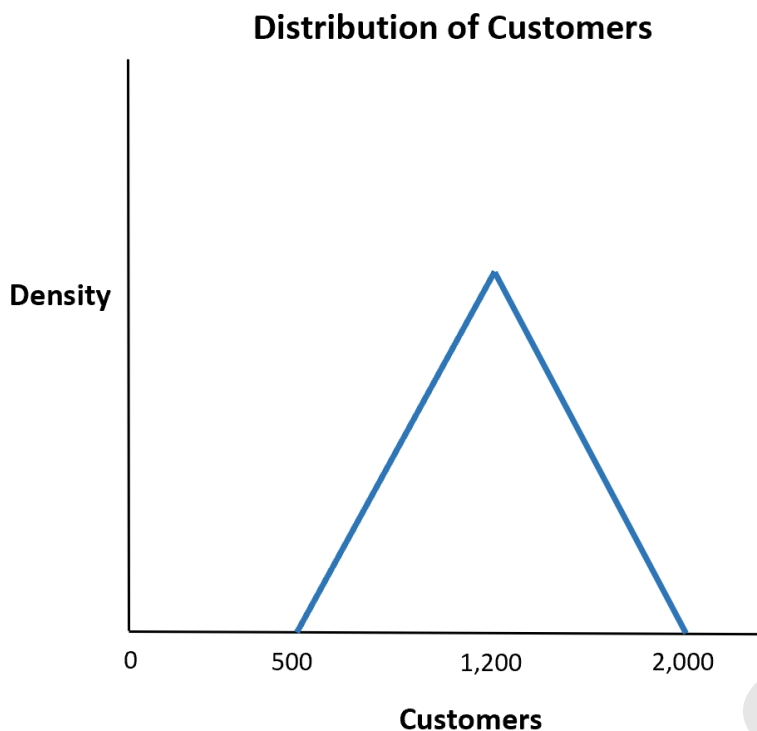
$$P(X < x) = (x-a)^2 / ((b-a)(c-a))$$

	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						
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11						
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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))))			
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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: