How do you plot a cumulative distribution function (CDF) in Excel?

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A cumulative distribution function (CDF) in Excel is a graphical representation of the cumulative probability distribution of a set of data. It shows the probability of a certain value or less occurring in a data set. To plot a CDF in Excel, first organize the data in ascending order. Then, create a new column next to the data with the formula "=RANK.AVG(cell,range,0)/COUNT(range)" to calculate the cumulative probability for each data point. Next, select the data and insert a scatter plot. Right-click on the plot and select "Change Series Chart Type" and choose "Line with Markers." Finally, add axis labels and a chart title to complete the CDF plot. This allows for a visual representation of the distribution of the data and can be useful in analyzing and understanding the behavior of the data set.

Plot a CDF in Excel

A cumulative distribution function (CDF) describes the probability that a random variable takes on a value less than or equal to some number.

We can use the following function in Excel to calculate cumulative distribution probabilities:

=NORM.DIST(x, MEAN, STANDARD_DEVIATION, TRUE)

The following example shows how to calculate and plot a CDF in Excel.

Example: Calculate & Plot CDF in Excel

First, let's create the following dataset in Excel:

	A	B	C	D	E	F	G	H
1	**Dataset**							
2	6							
3	7							
4	8							
5	9							
6	10							
7	11							
8	12							
9	13							
10	14							
11	15							
12	16							
13	17							
14	18							
15	19							
16	20							
17								
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21								
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24								

Next, let's specify the mean and standard deviation of the distribution:

	A	B	C	D	E	F	G
1	**Dataset**				**Mean**	15	
2	6				**Std. Dev**	3	
3	7						
4	8						
5	9						
6	10						
7	11						
8	12						
9	13						
10	14						
11	15						
12	16						
13	17						
14	18						
15	19						
16	20						
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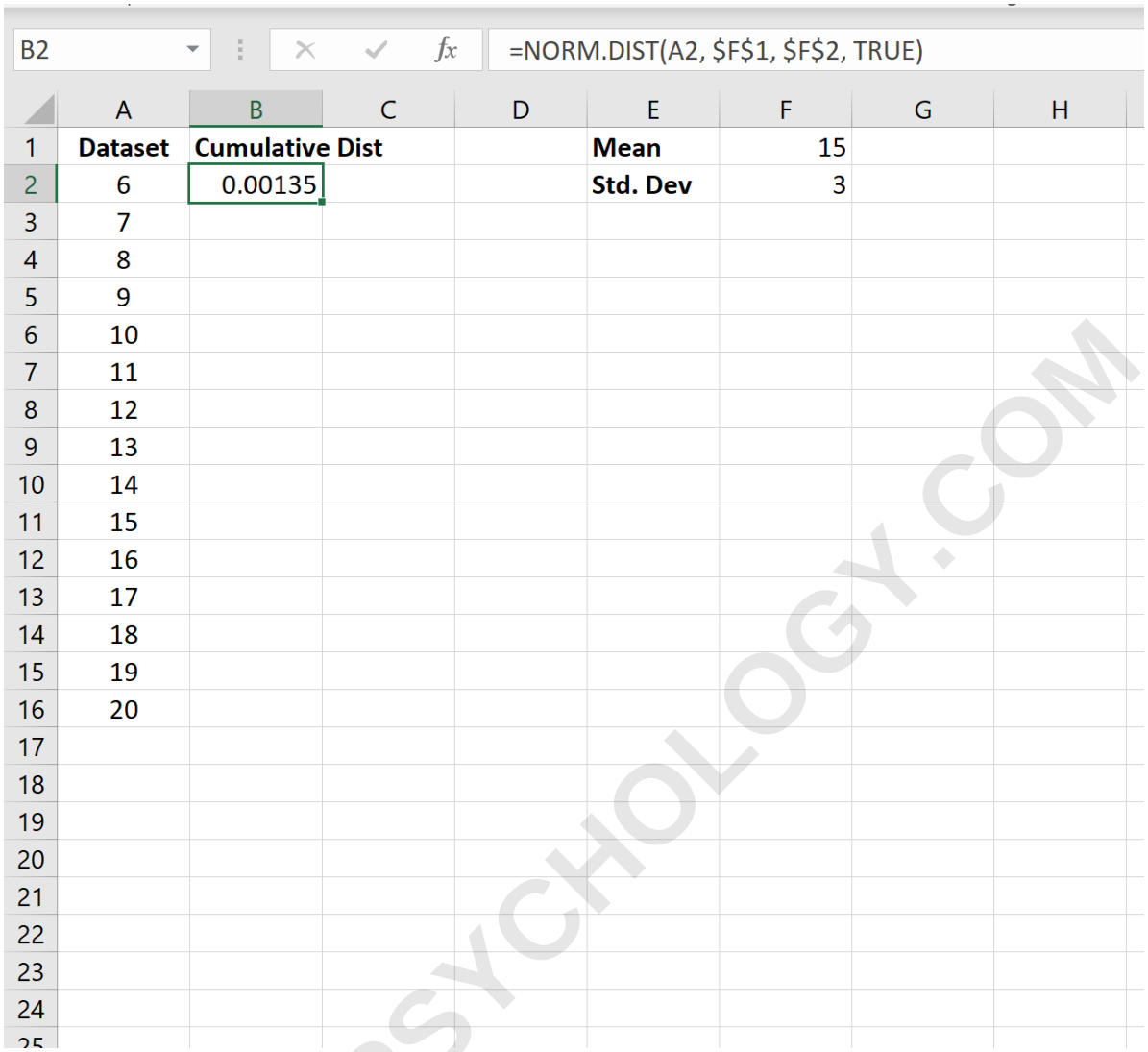
26							

Next, we can calculate the cumulative distribution probability for the first value in the dataset by using the following formula:

=NORM.DIST(A2, F1, F2, TRUE)



	A	B	C	D	E	F	G	H
1	**Dataset**	**Cumulative Dist**			**Mean**	15		
2	6	0.00135			**Std. Dev**	3		
3	7							
4	8							
5	9							
6	10							
7	11							
8	12							
9	13							
10	14							
11	15							
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Next, we can copy and paste this formula down to every other cell in column B:

	A	B	C	D	E	F	G	H
1	**Dataset**	**Cumulative Dist**			**Mean**	15		
2	6	0.00135			**Std. Dev**	3		
3	7	0.00383						
4	8	0.00982						
5	9	0.02275						
6	10	0.04779						
7	11	0.09121						
8	12	0.15866						
9	13	0.25249						
10	14	0.36944						
11	15	0.50000						
12	16	0.63056						
13	17	0.74751						
14	18	0.84134						
15	19	0.90879						
16	20	0.95221						
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19								
20								
21								
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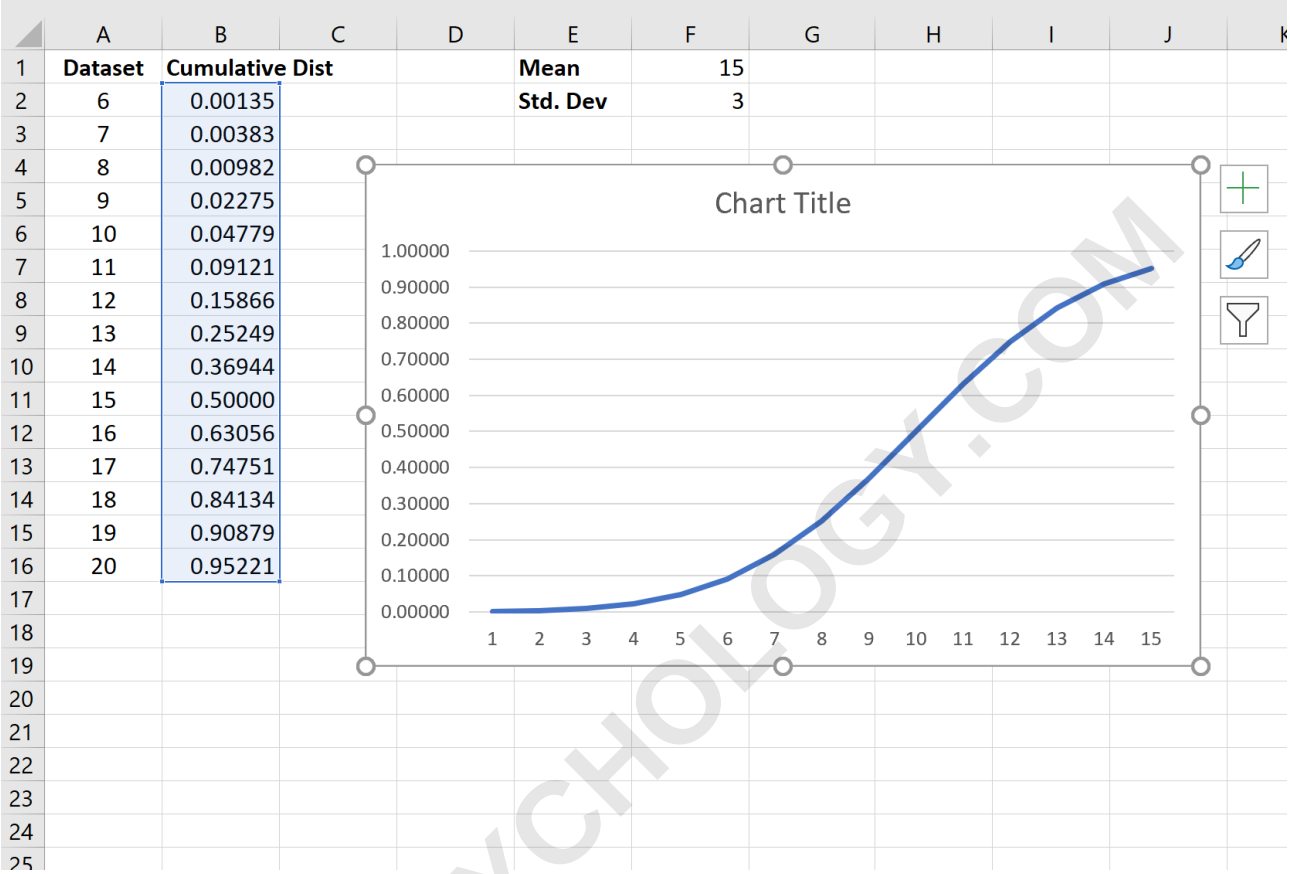
The CDF is now complete. The way we interpret the values is as follows:

The probability that the random variable will take on a value equal to or less than 6 is .00135.The probability that the random variable will take on a value equal to or less than 7 is .00383.The probability that the random variable will take on a value equal to or less than 8 is .00982.

And so on.



	A	B	C	D	E	F	G	H	I	J
1	**Dataset**	**Cumulative Dist**			**Mean**	15				
2	6	0.00135			**Std. Dev**	3				
3	7	0.00383								
4	8	0.00982								
5	9	0.02275								
6	10	0.04779								
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The values along the x-axis show the values from the dataset and the values along the y-axis show the CDF values.