Hypothesis Testing of Flipkart's Delivery and Order Quantity Claims using Excel

Aim 1:- To test Flipkart claim of the average delivery time of the products is 5 days and also check for 2-Tailed, 1-Tailed(Left & Right Tailed) Tests

Case 1 2-Tailed Test Significance Level(α)=5%=0.05

Step 1:- Null Hypothesis H0:mean=5 days
So Alternate Hypothesis H1:mean≠5 days

Step 2:- Calculate T-Value using formula $t = (\bar{x} - \mu) / (\sigma / \sqrt{n})$

Sample mean($\bar{x}$)	4.949
Population mean(μ)	5
Standard Deviation(σ)	1.224703596
Sample Size(n)	1000
t	-1.31685872

Step 3:- Calculate 2-Tailed P-value(p)=T.DIST.2T(X,Degress of Freedom)

X=t-score	Df=n-1
2-Tailed P-value(p)	0.188187981

Step 4:- **Conclusion:-** Since p=0.188>0.05 we fail to reject H0 i.e μ=5 days

Case 2 Left Tailed Test Significance Level(α)=5%=0.05

Step 1:- Null Hypothesis H0:mean>=5 days
So Alternate Hypothesis H1:mean<5 days

Step 2:- Calculate t-Value using formula t = (x̄ - μ) / (σ / √n)

t -1.31686

Step 3:- Calculate Left-Tailed P-value(p)=T.DIST(X,Degress of Freedom,Cumulative)
X=t-score Df=n-1 Cumulative Distribution Funnction=True
Left-Tailed P-value(p) 0.094094

Step 4:- **Conclusion:-** Since p=0.094>0.05 we fail to reject H0 i.e μ>=5 days

Case 3 Right Tailed Test Significance Level(α)=5%=0.05

Step 1:- Null Hypothesis H0:mean<=5 days
So Alternate Hypothesis H1:mean<5 days

Step 2:- Calculate t-Value using formula Z = (x̄ - μ) / (σ / √n)

t -1.31686

Step 3:- Calculate Right-Tailed P-value(p)=T.DIST.RT(X,Degress of Freedom)
X=t-score Df=n-1
Right-Tailed P-value(p) 0.90591

Step 4:- **Conclusion:-** Since p=0.906>0.05 we fail to reject H0 i.e μ<=5 days

Summary of all three case results

Test Type	t-value	P-value	Conclusion
Two-Tailed	-1.317	0.188	Fail to reject H_0
Left-Tailed	-1.317	0.094	Fail to reject H_0
Right-Tailed	-1.317	0.906	Fail to reject H_0

Final Interpretation:

- **There is insufficient evidence** to conclude that the average delivery time is different from 5 days
- The sample mean of 4.949 days is **not statistically significantly different** from the hypothesized 5 days at the 5% significance level
- Flipkart's delivery time appears to be **approximately 5 days** on average based on this sample

Note: The negative t-value indicates the sample mean is slightly less than the hypothesized mean, but not enough to be statistically significant.

Aim 2:- To test Flipkart claim of the average quantity of the products ordered is 2 and also check for 2-Tailed, 1-Tailed(Left & Right Tailed) Tests

Case 1 2-Tailed Test Significance Level(α)=5%=0.05

Step 1:- Null Hypothesis H0:mean=2
So Alternate Hypothesis H1:mean≠2

Step 2:- Calculate T-Value using formula $t = (\bar{x} - \mu) / (\sigma / \sqrt{n})$

Sample mean($\bar{x}$)	2.511
Population mean(μ)	2
Standard Deviation(σ)	1.114055708
Sample Size(n)	1000
t	14.50487505

Step 3:- Calculate 2-Tailed P-value(p)=T.DIST.2T(X,Degress of Freedom)

X=t-score	Df=n-1
2-Tailed P-value(p)	2.09213E-43

Step 4:- **Conclusion:-** Since p=2.0921E-43<<0.05 we reject H0 i.e μ=2. So μ≠2.

Case 2 Left Tailed Test Significance Level(α)=5%=0.05

Step 1:- Null Hypothesis H0:mean>=2
So Alternate Hypothesis H1:mean<2

Step 2:- Calculate t-Value using formula t = (x̄ - μ) / (σ / √n)

t 14.50488

Step 3:- Calculate Left-Tailed P-value(p)=T.DIST(X,Degress of Freedom,Cumulative)
X=t-score Df=n-1 Cumulative Distribution Funnction=True
Left-Tailed P-value(p) 1

Step 4:- **Conclusion:-** Since p=1>0.05 we fail to reject H0 i.e μ>=2

Case 3	Left Tailed Test		Significance Level(α)=5%=0.05
Step 1:-	Null Hypothesis H0:mean<=2		
	So Alternate Hypothesis H1:mean<2		
Step 2:-	Calculate t-Value using formula Z = (x̄ - μ) / (σ / √n)		
	t	14.50487505	
Step 3:-	Calculate Left-Tailed P-value(p)=T.DIST.RT(X,Degress of Freedom)		
	X=t-score	Df=n-1	
	Right-Tailed P-value(p)	1.04606E-43	
		1.04606E-43	
Step 4:-	**Conclusion:-** Since p=1E-43<<0.05 we reject H0 i.e μ<2. So,μ >=2		

Summary of all three case results

Test Type	t-value	P-value	Conclusion
Two-Tailed	14.5049	2.09E-43	Reject H_o
Left-Tailed	14.5049	1	Fail to reject H_o
Right-Tailed	14.5049	1.05E-43	Reject H_o

Final interpretation:

- **There is sufficient evidence** to conclude that the average quantity ordered is different from 2 items as claimed by Flipkart
- The sample mean of 2.511 items is **statistically significantly different** from the hypothesized 2 items at the 5% significance level
- Flipkart's quantity ordered appears to be **approximately 2.5 items** on average based on this sample

Conclusion:

Delivery times averaged 4.95 days vs. claimed 5 days (no statistically significant difference, $p \approx 0.19$), while quantities averaged 2.51 vs. claimed 2 items (significantly higher, $p < 0.001$), providing management with reliable insights into operational efficiency and customer buying behaviour.