One Sample t

Saturday, June 24, 2023 12:53 PM

12. Using the data in the Excel file *Consumer Transportation Survey*, test the following null hypotheses:

a. Individuals spend at least eight hours per week in their vehicles.

b. Individuals drive an average of 600 miles per week.

c. The average age of SUV drivers is no greater than 35.

a. H0: Hours per week >= 8 Vs H1: Hours per week < 8

```
stats.ttest_1samp(consumer['# of hours per week in vehicle'],
                  popmean=8.0,
                  alternative='less')
## Conclusion: Hours per week may be at least 8.
TtestResult(statistic=0.21908455193438453, pvalue=0.5862528908348619, df=49)
```

b. H0: Miles per week = 600 Vs H1: Miles per week

```
In [6]: stats.ttest_1samp(consumer['Miles driven per week'],
   ...:                   popmean=600,
   ...:                   alternative='two-sided')
   ...: ## Conclusion: Miles pwe week may not be 600
Out[6]: TtestResult(statistic=-2.369407386313186, pvalue=0.02180041862974647,
df=49)
```

c. H0: Age of SUV <= 35 Vs H1: Age of SUV > 35

20. An industry trade publication stated that the average profit per customer for this industry was greater than $4,500. The Excel file *Sales Data* provides data on a sample of customers. Using a test of hypothesis, do the data support this claim or not?

H0: avg profit per customer <= 4500

H1: avg profit per customer > 4500

```
    ...: stats.ttest_1samp(sales['Gross Profit'].dropna(),
    ...:                   popmean=4500, alternative='greater')
    ...: ## Conclusion: avg profit per customer may not be greater than 4500
Out[17]: TtestResult(statistic=-0.3476456590343202,
pvalue=0.6353282443468329, df=59)
```

16. Using the data in the Excel file *Airport Service Times*, determine if the airline can claim that its average service time is less than 2.5 minutes.

H0: Times >= 150 Vs H1: Times < 150

```
    ...: stats.ttest_1samp(airport['Times (sec.)'].dropna(),
    ...:                   popmean=150, alternative='less')
    ...: ## Conclusion: Service time may be less than 2.5 minutes
Out[22]: TtestResult(statistic=-6.426512207272327,
pvalue=1.1126391554084507e-10, df=811)
```