

```
In [14]: import pandas as pd
import numpy as np
from scipy import stats
import seaborn as sns
from matplotlib import pyplot as plt
```

```
In [2]: promo = pd.read_excel("Promotion.xlsx")
promo
```

Out[2]:

	Credit card spent (\$)	Type of promotion	Interest Rate Waiver (\$ spent)	Standard Promotion (\$ spent)
0	3354.34	Interest Rate Waiver	1989.10	1272.25
1	3856.25	Interest Rate Waiver	1808.38	1250.38
2	3632.23	Interest Rate Waiver	1153.75	1474.78
3	3655.30	Interest Rate Waiver	1745.64	2064.89
4	2032.94	Standard Promotion	1008.24	2030.87
...
445	3903.64	Standard Promotion	NaN	NaN
446	3696.94	Standard Promotion	NaN	NaN
447	3644.57	Interest Rate Waiver	NaN	NaN
448	3334.26	Standard Promotion	NaN	NaN
449	3668.49	Interest Rate Waiver	NaN	NaN

450 rows × 4 columns

```
In [3]: promo.dropna(axis = 1,inplace = True)### Removing null values
```

```
In [4]: promo
```

Out[4]:

	Credit card spent (\$)	Type of promotion
0	3354.34	Interest Rate Waiver
1	3856.25	Interest Rate Waiver
2	3632.23	Interest Rate Waiver
3	3655.30	Interest Rate Waiver
4	2032.94	Standard Promotion

	Credit card spent (\$)	Type of promotion
...
445	3903.64	Standard Promotion
446	3696.94	Standard Promotion
447	3644.57	Interest Rate Waiver
448	3334.26	Standard Promotion
449	3668.49	Interest Rate Waiver

450 rows × 2 columns

```
In [5]: promo.mean()
```

```
Out[5]: Credit card spent ($)    3294.604222
dtype: float64
```

```
In [6]: data1 = pd.Series(promo.iloc[:,0])
data1
```

```
Out[6]: 0      3354.34
1      3856.25
2      3632.23
3      3655.30
4      2032.94
...
445    3903.64
446    3696.94
447    3644.57
448    3334.26
449    3668.49
Name: Credit card spent ($), Length: 450, dtype: float64
```

```
In [7]: stats.ttest_1samp(data1,3294.604222)
```

```
Out[7]: Ttest_1sampResult(statistic=7.119134649620108e-09, pvalue=0.9999999943229142)
```

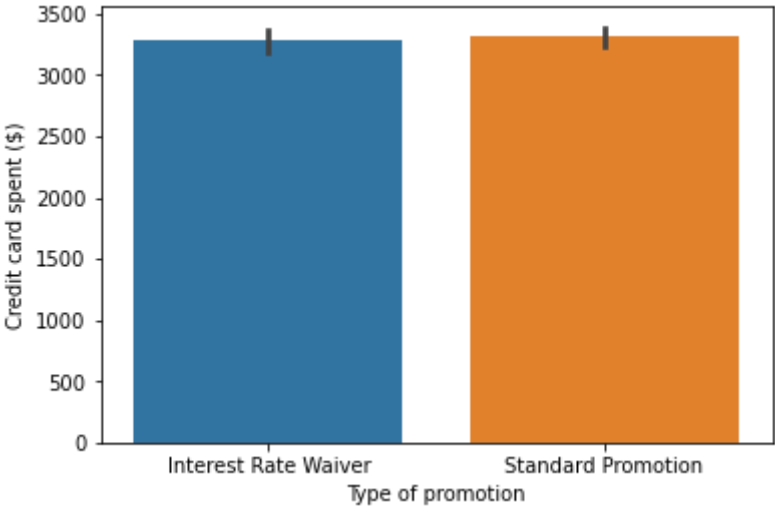
Null hypothesis is rejected

population mean > 7.19

```
In [8]: 1-stats.t.cdf(7.119134649620108e-09,450)
```

```
Out[8]: 0.4999999971614536
```

```
In [15]: sns.barplot(x = 'Type of promotion',y= 'Credit card spent ($)',data = promo)
plt.show()
```



```
In [ ]:
```