Winter 2021 Data Science Intern Challenge

Question 1

a. To calcuate the Average Order Value, the revenue must be divided by the number of orders. However, the 3,145.13 calculated is not a great reflection of this metric because it is merely the mean of the order amount.

A better evaluation of this data would be to find the average cost of the item being sold across all 100 stores. This will give Shopify a better sense of how much the product is priced.

b. The metric that will better represent this data is the average cost of the product.

In [69]:
```
import pandas as pd
```

In [70]:
```
df = pd.read_excel('/Data.xlsx')
```

In [71]:
```
df.head()
```

Out[71]:

	order_id	shop_id	user_id	order_amount	total_items	payment_method	created_at
0	1	53	746	224	2	cash	2017-03-13 12:36:56.190
1	2	92	925	90	1	cash	2017-03-03 17:38:51.999
2	3	44	861	144	1	cash	2017-03-14 04:23:55.595
3	4	18	935	156	1	credit_card	2017-03-26 12:43:36.649
4	5	18	883	156	1	credit_card	2017-03-01 04:35:10.773

First, the data from the excel sheet is imported, and the information about this dataset is generated below. From there, we can tell that there is a total number of 5000 orders placed over a 30-day window.

In [72]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5000 entries, 0 to 4999
Data columns (total 7 columns):
 #   Column          Non-Null Count  Dtype         
---  ------          --------------  -----         
 0   order_id        5000 non-null   int64         
 1   shop_id         5000 non-null   int64         
 2   user_id         5000 non-null   int64         
 3   order_amount    5000 non-null   int64         
 4   total_items     5000 non-null   int64         
 5   payment_method  5000 non-null   object        
 6   created_at      5000 non-null   datetime64[ns]
dtypes: datetime64[ns](1), int64(5), object(1)
memory usage: 273.6+ KB
```

In [73]:
```
df['cost_per_item'] = df.order_amount/df.total_items
```

To find the cost of each item sold in each shop, the order amount is divided by the total items for each order.

In [74]:
```
df.head()
```

Out[74]:

	order_id	shop_id	user_id	order_amount	total_items	payment_method	created_at	cost_p
0	1	53	746	224	2	cash	2017-03-13 12:36:56.190	
1	2	92	925	90	1	cash	2017-03-03 17:38:51.999	
2	3	44	861	144	1	cash	2017-03-14 04:23:55.595	
3	4	18	935	156	1	credit_card	2017-03-26 12:43:36.649	
4	5	18	883	156	1	credit_card	2017-03-01 04:35:10.773	

From there, the average price for the product is calculated by dividing the sum of the cost by the total number of orders.

In [75]:
```
sum(df.cost_per_item)/len(df.order_id)
```

Out[75]:
```
387.7428
```

c. 387.74 was the average cost found for the shoe, and considering the fact that these shops are relatively affordable, it seems to be on the high side.

```
In [84]: df1=df[['shop_id','cost_per_item']]
         df1.groupby(['shop_id']).mean()
```

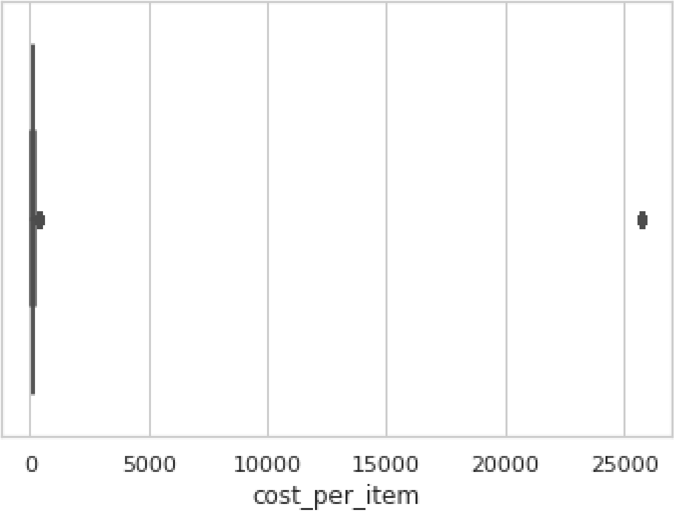
```
Out[84]:
                 cost_per_item
         shop_id
               1         158.0
               2          94.0
               3         148.0
               4         128.0
               5         142.0
             ...           ...
              96         153.0
              97         162.0
              98         133.0
              99         195.0
             100         111.0

         100 rows × 1 columns
```

It then became relevant to analyze the cost of the product across all 100 shops. There seemed to be a considerable disparity within the cost per item for each shop. This variation can be visualized in the box-plot below. The shop with ID 78 has a cost of 25725, making it the obvious outlier.

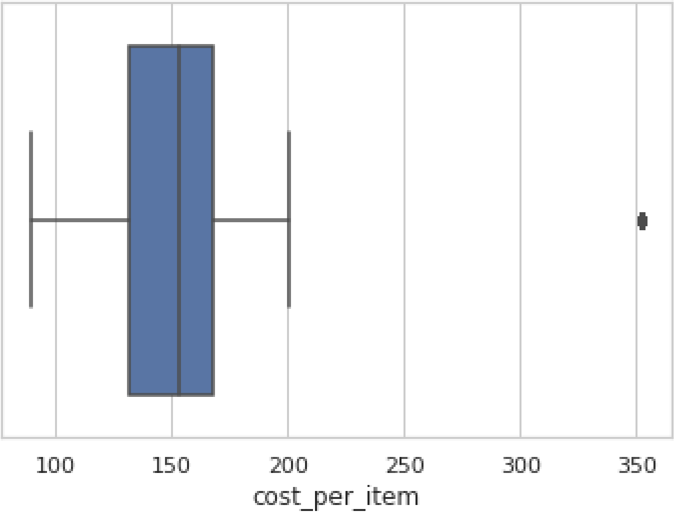
> Indented block

In [85]:
```
import seaborn as sns
sns.set(style="whitegrid")
ax = sns.boxplot(x=df1["cost_per_item"])
```



In [86]:
```
df1 = df1[df1.shop_id != 78]
```

In [87]:
```
ax = sns.boxplot(x=df1["cost_per_item"])
```



To better assess the data provided, the outlier was excluded. From the box plot above, the median is about 150, which is more reasonable for the item being sold.