In [9]:
```
# Importing all necessary python libraries for this project and the Data Set
import pandas as pd
import plotly.express as px
import plotly.io as pio
import plotly.graph_objects as go
pio.templates.default = "plotly_dark"
Cab_Ride_Data=pd.read_csv(r'C:\Users\OKONKWO HENRY\Downloads\rides.csv')
print(Cab_Ride_Data.head())
```

```
   Drivers Active Per Hour  Riders Active Per Hour  Rides Completed
0                       72                     295            202.0
1                       50                      78             43.0
2                       40                     250            181.0
3                       78                     140            124.0
4                       74                     195            108.0
```

In [12]:
```
# Lets check the Data Set for Null values or Not and Drop them
print(Cab_Ride_Data.isnull().sum())
Cab_Ride_Data=Cab_Ride_Data.dropna()
```

```
Drivers Active Per Hour    0
Riders Active Per Hour     0
Rides Completed            0
dtype: int64
```

In [ ]:
```
# DATA INSIGHT 1
# There were 54 Null values in the Rides Completed Column and the entire Null values rows has been delected or Drop
```

In [ ]:
```
#Let’s have a look at the descriptive statistics of the dataset:
print(Cab_Ride_Data.describe())
```

In [13]:
```
#Analysis the the relationship between the number of drivers active per hour and the number of riders active per hour:
demand = Cab_Ride_Data["Riders Active Per Hour"]
supply = Cab_Ride_Data["Drivers Active Per Hour"]

Demand_Supply = px.scatter(Cab_Ride_Data, x = "Drivers Active Per Hour",
                    y = "Riders Active Per Hour", trendline="ols",
                    title="Demand and Supply Analysis")
Demand_Supply.update_layout(
    xaxis_title="Number of Drivers Active per Hour (Supply)",
    yaxis_title="Number of Riders Active per Hour (Demand)",
)
Demand_Supply.show()
```

In [ ]:
```
# DATA INSIGHT 2
# It can seen that So there is a constant relationship between\n
# the number of drivers active per hour and the number of riders active per hour.
# A constant relationship between the number of drivers active per hour and the number of riders active per hour
# This means that for every X number of drivers, there is a consistent and predictable Y number of riders, and this ratio remains constant over time.
```

In [16]:
```
# Analysis on calculating the elasticity of demand for rides concerning the number of active drivers per hour:
avg_demand = Cab_Ride_Data['Riders Active Per Hour'].mean()
avg_supply = Cab_Ride_Data['Drivers Active Per Hour'].mean()
pct_change_demand = (max(Cab_Ride_Data['Riders Active Per Hour']) - min(Cab_Ride_Data['Riders Active Per Hour'])) / avg_demand * 100
pct_change_supply = (max(Cab_Ride_Data['Drivers Active Per Hour']) - min(Cab_Ride_Data['Drivers Active Per Hour'])) / avg_supply * 100
elasticity = pct_change_demand / pct_change_supply

print("Elasticity of demand with respect to the number of active drivers per hour: {:.2f}".format(elasticity))
```

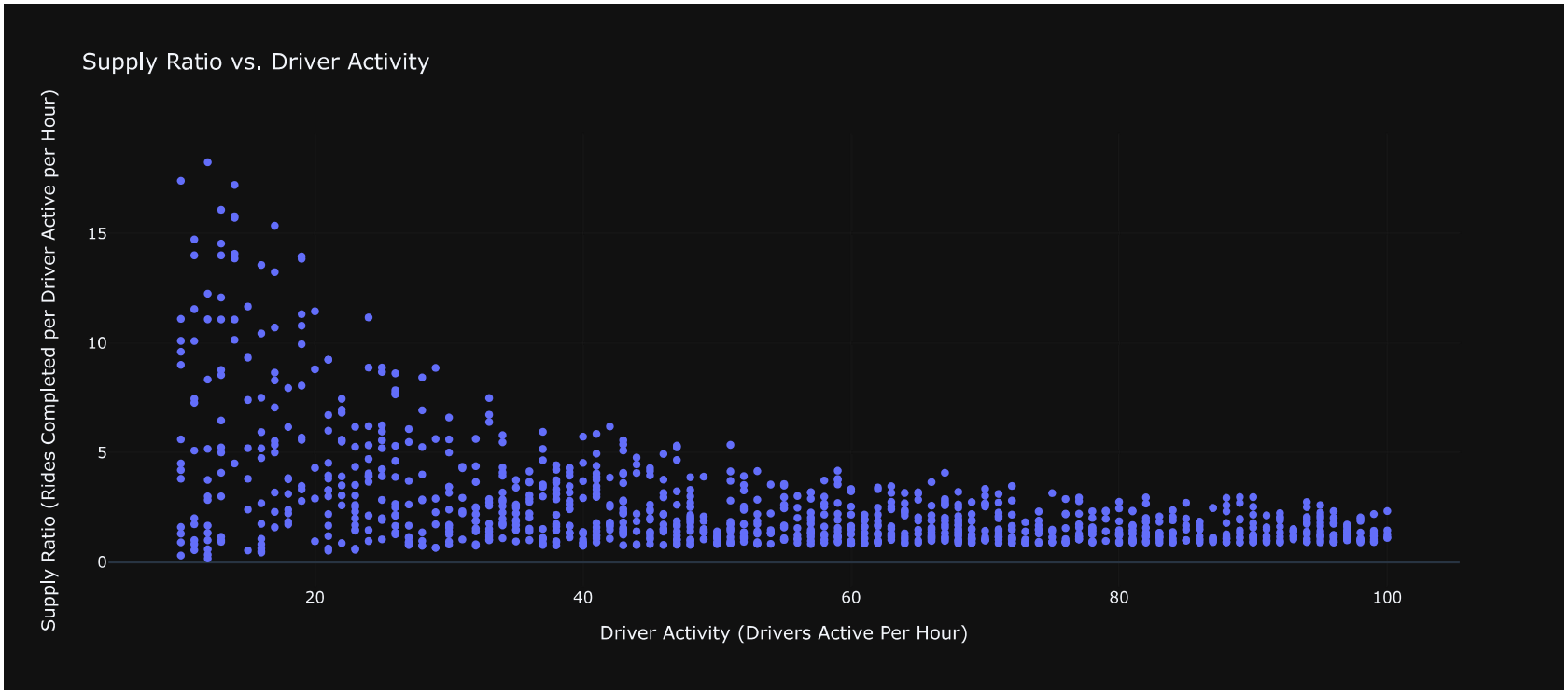
```
Elasticity of demand with respect to the number of active drivers per hour: 0.82
```

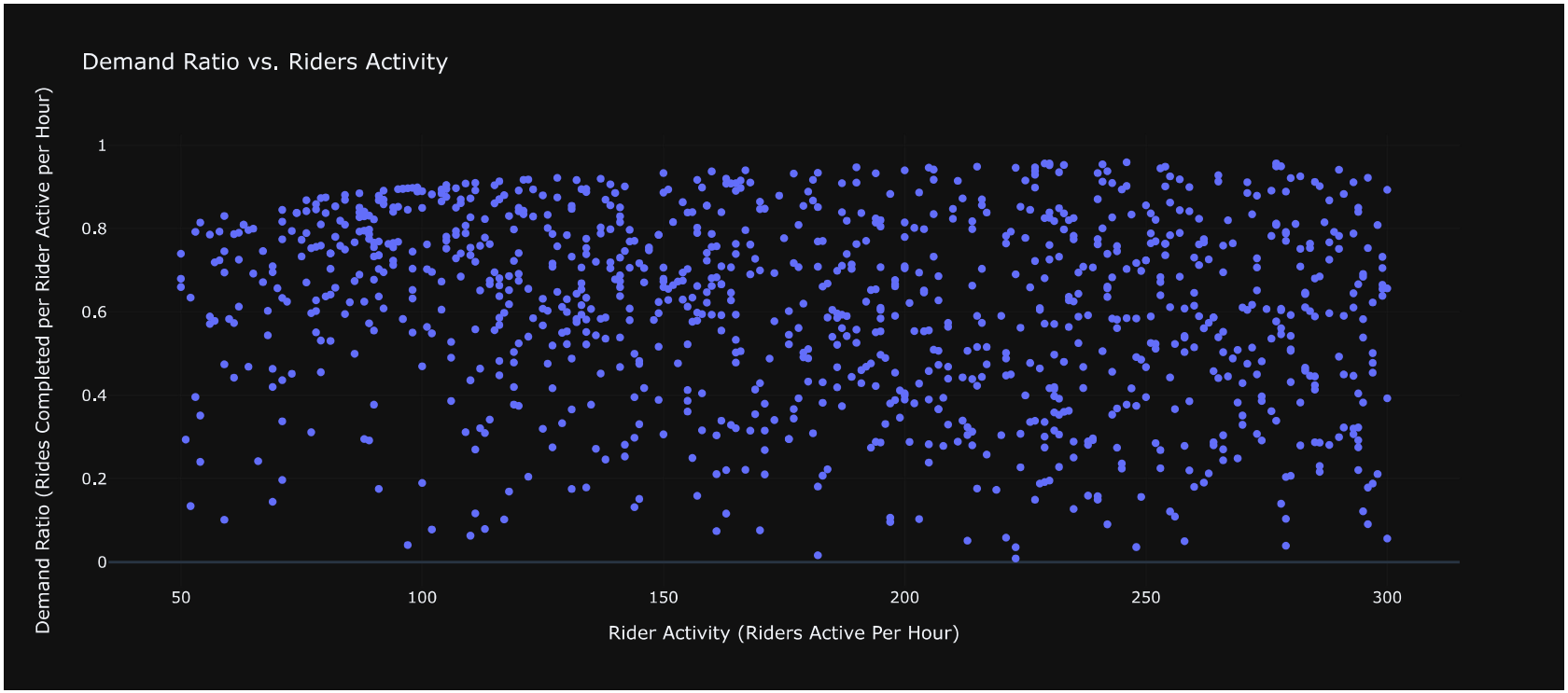
In [ ]:
```
# DATA INSIGHT 3
# It signifies a moderately responsive relationship between the demand for rides and the number of active drivers per hour.
# Specifically, this means that a 1% increase in the number of active drivers per hour would lead to a 0.82% decrease in the demand for rides,
# while a 1% decrease in the number of active drivers per hour would lead to a 0.82% increase in the demand for rides.

# This level of elasticity suggests that the demand for rides is somewhat sensitive to changes in the number of active drivers per hour.(Inelastic)
```

In [14]:
```
#  Calculate the supply ratio and demand ratio for each level of driver activity

Cab_Ride_Data['Supply Ratio'] = Cab_Ride_Data['Rides Completed'] / Cab_Ride_Data['Drivers Active Per Hour']
Cab_Ride_Data['Demand Ratio'] = Cab_Ride_Data['Rides Completed'] / Cab_Ride_Data['Riders Active Per Hour']
print(Cab_Ride_Data.head())
```

```
   Drivers Active Per Hour  Riders Active Per Hour  Rides Completed  \
0                       72                     295            202.0
1                       50                      78             43.0
2                       40                     250            181.0
3                       78                     140            124.0
4                       74                     195            108.0

   Supply Ratio  Demand Ratio
0      2.805556      0.684746
1      0.860000      0.551282
2      4.525000      0.724000
3      1.589744      0.885714
4      1.459459      0.553846
```

In [15]:
```
# Visalization of Supply Ratio and Demand Ratio
fig = go.Figure()
fig.add_trace(go.Scatter(x=Cab_Ride_Data['Drivers Active Per Hour'],
                         y=Cab_Ride_Data['Supply Ratio'], mode='markers'))
fig.update_layout(
    title='Supply Ratio vs. Driver Activity',
    xaxis_title='Driver Activity (Drivers Active Per Hour)',
    yaxis_title='Supply Ratio (Rides Completed per Driver Active per Hour)'
)
fig.show()

fig = go.Figure()
fig.add_trace(go.Scatter(x=Cab_Ride_Data['Riders Active Per Hour'],
                         y=Cab_Ride_Data['Demand Ratio'], mode='markers'))
fig.update_layout(
    title='Demand Ratio vs. Riders Activity',
    xaxis_title='Rider Activity (Riders Active Per Hour)',
    yaxis_title='Demand Ratio (Rides Completed per Rider Active per Hour)'
)
fig.show()
```


Supply Ratio vs. Driver Activity
Supply Ratio (Rides Completed per Driver Active per Hour)
0
5
10
15
20
40
60
80
100
Driver Activity (Drivers Active Per Hour)



In [ ]:
```
# DATA INSIGHT 4
# The above graph shows the ratio of the number of drivers active per hour and the number of rides completed in an hour.
# Also it shows he ratio of the number of riders active per hour and the number of rides completed in an hour
```

In [ ]:

In [ ]: