```
import pandas as pd
import matplotlib.pyplot as plt
```

```
df = pd.read_csv(r"C:\Users\hp\Desktop\vender_prafomiss\vendor_sales_summary.csv")
df.head()
```

	VendorNumber	VendorName	Brand	Description	PurchasePrice	ActualPrice	Volume	TotalPurchaseQuantity	TotalPurchaseDollars	TotalSalesQuantity	TotalSalesDoll
0	1128	BROWN-FORMAN CORP	1233	Jack Daniels No 7 Black	26.27	36.99	1750.0	145080	3811251.60	142049.0	5.101920e+
1	4425	MARTIGNETTI COMPANIES	3405	Tito's Handmade Vodka	23.19	28.99	1750.0	164038	3804041.22	160247.0	4.819073e+
2	17035	PERNOD RICARD USA	8068	Absolut 80 Proof	18.24	24.99	1750.0	187407	3418303.68	187140.0	4.538121e+
3	3960	DIAGEO NORTH AMERICA INC	4261	Capt Morgan Spiced Rum	16.17	22.99	1750.0	201682	3261197.94	200412.0	4.475973e+
4	3960	DIAGEO NORTH	3545	Ketel One Vodka	21.89	29.99	1750.0	138109	3023206.01	135838.0	4.223108e+

```
df.shape
```

```
(10692, 18)
```

```
df.columns
```

```
Index(['VendorNumber', 'VendorName', 'Brand', 'Description', 'PurchasePrice',
       'ActualPrice', 'Volume', 'TotalPurchaseQuantity',
       'TotalPurchaseDollars', 'TotalSalesQuantity', 'TotalSalesDollars',
       'TotalSalesPrice', 'TotalExciseTax', 'FreightCost', 'GrossProfit',
       'ProfitMargin', 'StockTurnover', 'SalesToPurchaseRatio'],
      dtype='object')
```

```
df.isnull().sum()
```

```
df.fillna(0, inplace=True)
```

```
df.dtypes
```

```
VendorNumber              int64
VendorName               object
Brand                     int64
Description              object
PurchasePrice           float64
ActualPrice             float64
Volume                  float64
TotalPurchaseQuantity     int64
TotalPurchaseDollars    float64
TotalSalesQuantity      float64
TotalSalesDollars       float64
TotalSalesPrice         float64
TotalExciseTax          float64
FreightCost             float64
GrossProfit             float64
ProfitMargin            float64
StockTurnover           float64
SalesToPurchaseRatio    float64
```


```
df.fillna(0, inplace=True)
```

```
df.dtypes
```

```
VendorNumber              int64
VendorName               object
Brand                     int64
Description              object
PurchasePrice           float64
ActualPrice             float64
Volume                  float64
TotalPurchaseQuantity     int64
TotalPurchaseDollars    float64
TotalSalesQuantity      float64
TotalSalesDollars       float64
TotalSalesPrice         float64
TotalExciseTax          float64
FreightCost             float64
GrossProfit             float64
ProfitMargin            float64
StockTurnover           float64
SalesToPurchaseRatio    float64
```


```
df.drop_duplicates(inplace=True)
```

```
df['GrossProfit'] = df['TotalSalesDollars'] - df['TotalPurchaseDollars']
df['ProfitMargin'] = (df['GrossProfit'] / df['TotalSalesDollars']) * 100
df['FreightPerUnit'] = df['FreightCost'] / df['TotalSalesQuantity']
df['SalesToPurchaseRatio'] = df['TotalSalesDollars'] / df['TotalPurchaseDollars']
```

```
df.drop_duplicates(inplace=True)
```

```
df['GrossProfit'] = df['TotalSalesDollars'] - df['TotalPurchaseDollars']
df['ProfitMargin'] = (df['GrossProfit'] / df['TotalSalesDollars']) * 100
df['FreightPerUnit'] = df['FreightCost'] / df['TotalSalesQuantity']
df['SalesToPurchaseRatio'] = df['TotalSalesDollars'] / df['TotalPurchaseDollars']
```

Q1: Top 5 Vendors by Total Sales

```
top5_sales = df.sort_values(by='TotalSalesDollars', ascending=False).head(5)
top5_sales[['VendorName', 'TotalSalesDollars']]
```

	VendorName	TotalSalesDollars
0	BROWN-FORMAN CORP	5.101920e+06
1	MARTIGNETTI COMPANIES	4.819073e+06
2	PERNOD RICARD USA	4.538121e+06
3	DIAGEO NORTH AMERICA INC	4.475973e+06
4	DIAGEO NORTH AMERICA INC	4.223108e+06

```
import matplotlib.pyplot as plt

plt.bar(top5_sales['VendorName'], top5_sales['TotalSalesDollars'])
plt.title("Top 5 Vendors by Sales")
plt.xticks(rotation=45)
plt.ylabel("Total Sales ($)")
plt.show()
```

Q2: Vendors with Negative Profit Margin

```
negative_margin = df[df['ProfitMargin'] < 0]
negative_margin[['VendorName', 'TotalSalesDollars', 'TotalPurchaseDollars', 'ProfitMargin']].head(10)
```

	VendorName	TotalSalesDollars	TotalPurchaseDollars	ProfitMargin
304	DIAGEO NORTH AMERICA INC	176577.85	185784.10	-5.213706
331	DIAGEO NORTH AMERICA INC	164084.34	173952.98	-6.014370
437	MARTIGNETTI COMPANIES	119616.75	138369.42	-15.677294
464	MHW LTD	130097.76	131392.96	-0.995559
550	DIAGEO NORTH AMERICA INC	113966.29	115711.52	-1.531356
578	MHW LTD	95499.46	112111.52	-17.394926
606	DIAGEO NORTH AMERICA INC	100067.22	106105.50	-6.034224
692	FABRIZIA SPIRITS LLC	94406.84	96915.17	-2.656937
718	BROWN-FORMAN CORP	89296.41	93830.40	-5.077461

```
print("Total vendors with negative margin:", negative_margin.shape[0])
```

```
Total vendors with negative margin: 2127
```

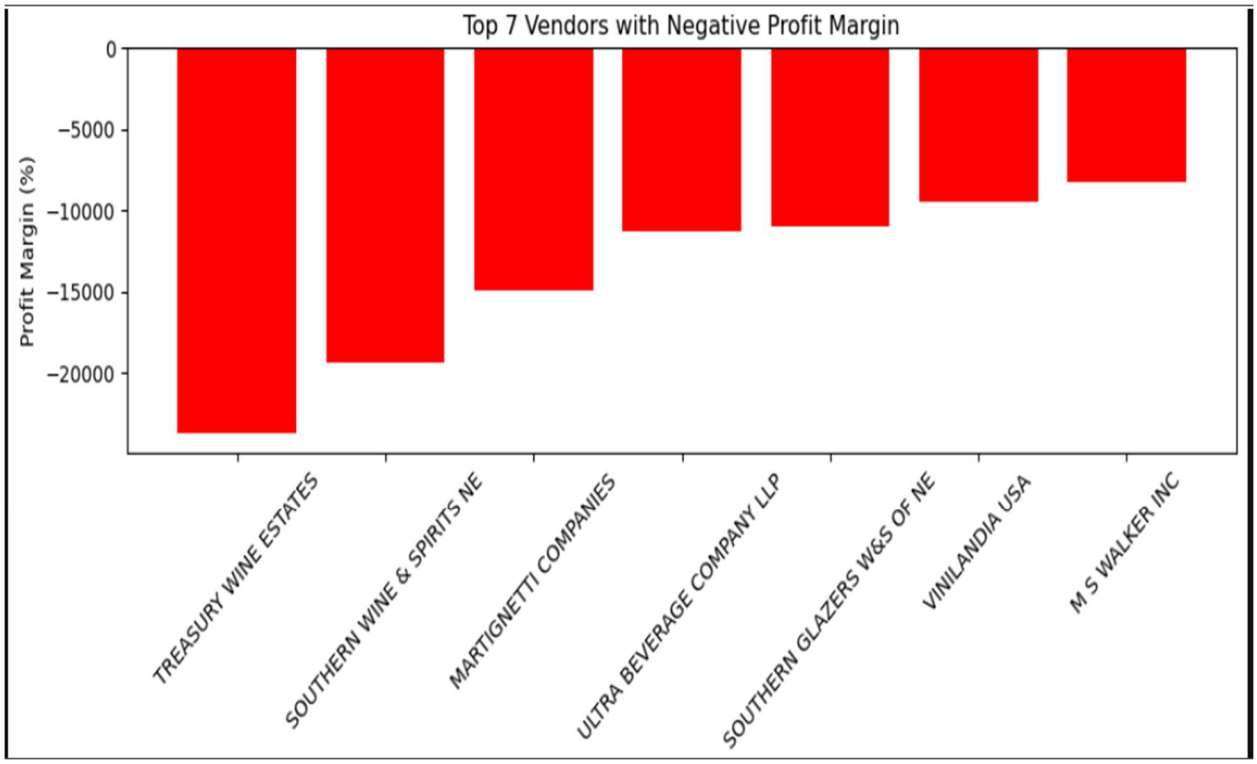
```
df = df[df['TotalSalesDollars'] > 0]  # Prevent divide by zero
df['ProfitMargin'] = (df['GrossProfit'] / df['TotalSalesDollars']) * 100
negative_margin = df[df['ProfitMargin'] < 0]
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_5140\228937201.py:2: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning
  df['ProfitMargin'] = (df['GrossProfit'] / df['TotalSalesDollars']) * 100
```

```
negative_margin_sorted = negative_margin.sort_values(by='ProfitMargin').head(10)

plt.figure(figsize=(10,5))
plt.bar(negative_margin_sorted['VendorName'], negative_margin_sorted['ProfitMargin'], color='red')
plt.title("Top 7 Vendors with Negative Profit Margin")
plt.xlabel("Vendor Name")
plt.ylabel("Profit Margin (%)")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```



Q3: Vendors with Highest Freight Per Unit ¶

```
df['FreightPerUnit'] = df['FreightCost'] / df['TotalSalesQuantity']
df = df[df['TotalSalesQuantity'] > 0]
```

```
C:\Users\hp\AppData\Local\Temp\ipykernel_5140\620049217.py:1: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#retur
  df['FreightPerUnit'] = df['FreightCost'] / df['TotalSalesQuantity']
```

```
top_freight = df.sort_values(by='FreightPerUnit', ascending=False).head(10)
top_freight[['VendorName', 'FreightCost', 'TotalSalesQuantity', 'FreightPerUnit']]
```

	VendorName	FreightCost	TotalSalesQuantity	FreightPerUnit
3695	DIAGEO NORTH AMERICA INC	257032.07	1.0	257032.07
5178	DIAGEO NORTH AMERICA INC	257032.07	1.0	257032.07
2840	DIAGEO NORTH AMERICA INC	257032.07	1.0	257032.07

Q4: Total Purchase Quantity vs. Total Sales Quantity

```
correlation = df['TotalPurchaseQuantity'].corr(df['TotalSalesQuantity'])
print("Correlation between Purchase & Sales Quantity:", round(correlation, 3))
```

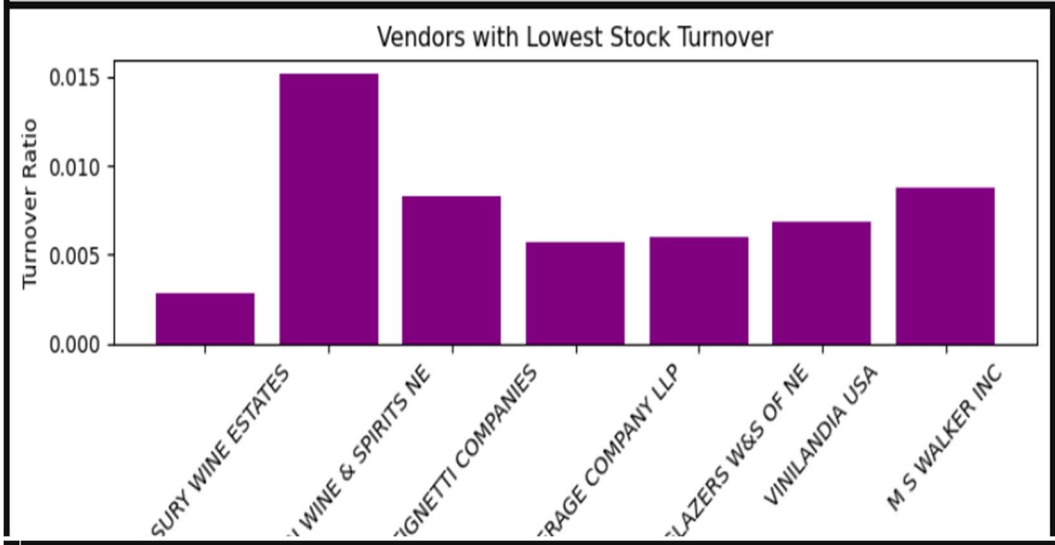
```
Correlation between Purchase & Sales Quantity: 0.999
```

Q5: Vendors with Stock Turnover < 1 (Slow-Moving Stock)

```
slow_movers = df[df['StockTurnover'] < 1]
slow_movers[['VendorName', 'StockTurnover']].sort_values(by='StockTurnover').head(10)
```

	VendorName	StockTurnover
3981	TREASURY WINE ESTATES	0.002817
2147	SOUTHERN WINE & SPIRITS NE	0.003333
5213	MARTIGNETTI COMPANIES	0.004386
2462	ULTRA BEVERAGE COMPANY LLP	0.005747
5200	SOUTHERN GLAZERS W&S OF NE	0.005952
6486	VINILANDIA USA	0.006849

```
top_slow = slow_movers.sort_values(by='StockTurnover').head(10)
plt.figure(figsize=(8,4))
plt.bar(top_slow['VendorName'], top_slow['StockTurnover'], color='purple')
plt.title("Vendors with Lowest Stock Turnover")
plt.xticks(rotation=45)
plt.ylabel("Turnover Ratio")
plt.tight_layout()
plt.show()
```




```
import sqlite3

df = pd.read_csv(r"C:\Users\hp\Desktop\vender_prafomiss\vendor_sales_summary.csv")
conn = sqlite3.connect("vendor.db")
df.to_sql("vendor_summary", conn, if_exists="replace", index=False)
```

```
10692
```

```
def run_sql(query):
    return pd.read_sql_query(query, conn)
```

Q6 : Total Unsold Inventory Value

```
run_sql("""
SELECT SUM((TotalPurchaseQuantity - TotalSalesQuantity) * PurchasePrice) AS UnsoldValue
FROM vendor_summary;
""")
```

	UnsoldValue
0	8748929.54

Q7: Top 5 Brands by Sales to Purchase Ratio

```
run_sql("""
SELECT Brand, SalesToPurchaseRatio
FROM vendor_summary
ORDER BY SalesToPurchaseRatio DESC
LIMIT 5;
""")
```

	Brand	SalesToPurchaseRatio
0	4703	352.928571
1	11209	252.994305
2	5831	223.837079
3	3406	219.705009
4	5335	214.696533

8 Average Profit Margin by Brand (Top 5)

```
run_sql("""
SELECT Brand, AVG(ProfitMargin) AS AvgMargin
FROM vendor_summary
GROUP BY Brand
ORDER BY AvgMargin DESC
LIMIT 5;
""")
```

	Brand	AvgMargin
0	4703	99.716657
1	11209	99.604734
2	5831	99.553246
3	3406	99.544844
4	5335	99.534226

Q9: Vendor Contribution to Total Sales (Top 5)

```
run_sql("""
SELECT VendorName, TotalSalesDollars
FROM vendor_summary
ORDER BY TotalSalesDollars DESC
LIMIT 5;
""")
```

	VendorName	TotalSalesDollars
0	BROWN-FORMAN CORP	5.101920e+06
1	MARTIGNETTI COMPANIES	4.819073e+06
2	PERNOD RICARD USA	4.538121e+06
3	DIAGEO NORTH AMERICA INC	4.475973e+06
4	DIAGEO NORTH AMERICA INC	4.223108e+06

Q10: Vendors with High Margin but Low Sales

```
run_sql("""
SELECT VendorName, ProfitMargin, TotalSalesDollars
FROM vendor_summary
WHERE ProfitMargin > 30 AND TotalSalesDollars < 10000;
""")
```

	VendorName	ProfitMargin	TotalSalesDollars
0	PERFECTA WINES	31.256885	9867.65
1	MARTIGNETTI COMPANIES	30.071035	9643.10
2	STATE WINE & SPIRITS	32.283460	9854.52
3	HEAVEN HILL DISTILLERIES	31.120702	9612.99
4	MCCORMICK DISTILLING CO	31.909199	9698.52
...	...	...	...
3067	DIAGEO NORTH AMERICA INC	89.806174	27.86
3068	WINE GROUP INC	83.448276	15.95

Q11: Vendors with More Purchases but Zero Sales

```
run_sql("""
SELECT VendorName, TotalPurchaseQuantity, TotalSalesQuantity
FROM vendor_summary
WHERE TotalSalesQuantity = 0 AND TotalPurchaseQuantity > 0
ORDER BY TotalPurchaseQuantity DESC;
""")
```

	VendorName	TotalPurchaseQuantity	TotalSalesQuantity
0	ULTRA BEVERAGE COMPANY LLP	1140	0.0
1	ULTRA BEVERAGE COMPANY LLP	1044	0.0
2	DELICATO VINEYARDS INC	1032	0.0
3	STATE WINE & SPIRITS	1017	0.0
4	M S WALKER INC	1008	0.0
...	...	...	...
173	M S WALKER INC	1	0.0
174	MILTONS DISTRIBUTING CO	1	0.0

Q12: Top 5 Brands by Gross Profit

```
run_sql("""
SELECT Brand, SUM(GrossProfit) AS TotalGrossProfit
FROM vendor_summary
GROUP BY Brand
ORDER BY TotalGrossProfit DESC
LIMIT 5;
""")
```

	Brand	TotalGrossProfit
0	1233	1290667.91
1	4261	1214774.94
2	3545	1199901.61
3	8068	1119816.92
4	3405	1015032.27

```
top_brands.plot(kind='bar', x='Brand', y='TotalGrossProfit', legend=False, color='green')
plt.title("Top 5 Brands by Gross Profit")
plt.ylabel("Gross Profit ($)")
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```