In [ ]:

```
#Three observable trends from the data
#1-majority of players are male (approximately 84%)
#2-almost half of all players fall between the ages of 20-24 (approximately 45%)
#3-Despite higher prices/high item prices, more expensive games were purchased more
```

In [1]:

```
#import dependencies
import pandas as pd
import numpy as py
```

In [3]:

```
file = 'purchase_data.csv'
purchase_data = pd.read_csv(file)
```

In [41]:

```
#Player Count
player_demographics = purchase_data.loc[:, ["Gender", "SN", "Age"]]
player_demographics = player_demographics.drop_duplicates()
num_players = player_demographics.count()[0]

# Display the total number of players
pd.DataFrame({"Total Players": [num_players]})
```

Out[41]:

```
     Total Players
0              576
```

In [42]:

```
#Purchasing Analysis (Total)

average_item_price = purchase_data["Price"].mean()
total_purchase_value = purchase_data["Price"].sum()
purchase_count = purchase_data["Price"].count()
item_count = len(purchase_data["Item ID"].unique())

summary_table = pd.DataFrame({"Number of Unique Items": item_count,
                              "Total Revenue": [total_purchase_value],
                              "Number of Purchases": [purchase_count],
                              "Average Price": [average_item_price]})

summary_table = summary_table.round(2)
summary_table ["Average Price"] = summary_table["Average Price"].map("${:,.2f}".forr
summary_table ["Number of Purchases"] = summary_table["Number of Purchases"].map("{:
summary_table ["Total Revenue"] = summary_table["Total Revenue"].map("${:,.2f}".forr
summary_table = summary_table.loc[:,["Number of Unique Items", "Average Price", "Nur
summary_table
```

Out[42]:

	Number of Unique Items	Average Price	Number of Purchases	Total Revenue
0	183	$3.05	780	$2,379.77

In [43]:

```
#Gender Demographics

gender_demographics_totals = player_demographics["Gender"].value_counts()
gender_demographics_percents = gender_demographics_totals / num_players * 100
gender_demographics = pd.DataFrame({"Total Count": gender_demographics_totals, "Perc

gender_demographics = gender_demographics.round(2)
gender_demographics
```

Out[43]:

	Total Count	Percentage of Players
Male	484	84.03
Female	81	14.06
Other / Non-Disclosed	11	1.91

In [44]:

```
gender_purchase_total = purchase_data.groupby(["Gender"]).sum()["Price"].rename("Tot
gender_average = purchase_data.groupby(["Gender"]).mean()["Price"].rename("Average P
gender_counts = purchase_data.groupby(["Gender"]).count()["Price"].rename("Purchase 

avg_total_per_person = gender_purchase_total / gender_demographics["Total Count"]

gender_data = pd.DataFrame({"Purchase Count": gender_counts, "Average Purchase Price
gender_data["Average Purchase Price"] = gender_data["Average Purchase Price"].map("$
gender_data["Total Purchase Value"] = gender_data["Total Purchase Value"].map("${:,.
gender_data ["Purchase Count"] = gender_data["Purchase Count"].map("{:,}".format)
gender_data["Avg Total Purchase per Person"] = gender_data["Avg Total Purchase per P
gender_data = gender_data.loc[:, ["Purchase Count", "Average Purchase Price", "Total

gender_data
```

Out[44]:

	Purchase Count	Average Purchase Price	Total Purchase Value	Avg Total Purchase per Person
Gender				
Female	113	$3.20	$361.94	$4.47
Male	652	$3.02	$1,967.64	$4.07
Other / Non-Disclosed	15	$3.35	$50.19	$4.56

In [45]:

```
#Age Demographics
age_bins = [0, 9.90, 14.90, 19.90, 24.90, 29.90, 34.90, 39.90, 99999]
group_names = ["<10", "10-14", "15-19", "20-24", "25-29", "30-34", "35-39", "40+"]

player_demographics["Age Ranges"] = pd.cut(player_demographics["Age"], age_bins, lab

age_demographics_totals = player_demographics["Age Ranges"].value_counts()
age_demographics_percents = age_demographics_totals / num_players * 100
age_demographics = pd.DataFrame({"Total Count": age_demographics_totals, "Percentage

age_demographics = age_demographics.round(2)

age_demographics.sort_index()
```

Out[45]:

	Total Count	Percentage of Players
<10	17	2.95
10-14	22	3.82
15-19	107	18.58
20-24	258	44.79
25-29	77	13.37
30-34	52	9.03
35-39	31	5.38
40+	12	2.08

In [52]:

```
purchase_data["Age Ranges"] = pd.cut(purchase_data["Age"], age_bins, labels=group_na

age_purchase_total = purchase_data.groupby(["Age Ranges"]).sum()["Price"].rename("To
age_average = purchase_data.groupby(["Age Ranges"]).mean()["Price"].rename("Average
age_counts = purchase_data.groupby(["Age Ranges"]).count()["Price"].rename("Purchase

avg_person_total = age_purchase_total / age_demographics["Total Count"]

age_data = pd.DataFrame({"Purchase Count": age_counts, "Average Purchase Price": age

age_data["Average Purchase Price"] = age_data["Average Purchase Price"].map("${:,.2f
age_data["Total Purchase Value"] = age_data["Total Purchase Value"].map("${:,.2f}".f
age_data ["Purchase Count"] = age_data["Purchase Count"].map("{:,}".format)
age_data["Average Total Per Person"] = age_data["Average Total Per Person"].map("${:
age_data = age_data.loc[:, ["Purchase Count", "Average Purchase Price", "Total Purch

age_data
```

Out[52]:

	Purchase Count	Average Purchase Price	Total Purchase Value	Average Total Per Person
10-14	28	$2.96	$82.78	$3.76
15-19	136	$3.04	$412.89	$3.86
20-24	365	$3.05	$1,114.06	$4.32
25-29	101	$2.90	$293.00	$3.81
30-34	73	$2.93	$214.00	$4.12
35-39	41	$3.60	$147.67	$4.76
40+	13	$2.94	$38.24	$3.19
<10	23	$3.35	$77.13	$4.54

In [39]:

```
#Top Spenders

user_total = purchase_data.groupby(["SN"]).sum()["Price"].rename("Total Purchase Val
user_average = purchase_data.groupby(["SN"]).mean()["Price"].rename("Average Purchas
user_count = purchase_data.groupby(["SN"]).count()["Price"].rename("Purchase Count")

user_data = pd.DataFrame({"Total Purchase Value": user_total, "Average Purchase Pric

user_data["Average Purchase Price"] = user_data["Average Purchase Price"].map("${:,
user_data["Total Purchase Value"] = user_data["Total Purchase Value"].map("${:,.2f}"
```

```python
user_data = user_data.loc[:,["Purchase Count", "Average Purchase Price", "Total Purc

user_data.sort_values("Total Purchase Value", ascending = False)
```

Out[39]:

	Purchase Count	Average Purchase Price	Total Purchase Value
SN			
Haillyrgue51	3	$3.17	$9.50
Phistym51	2	$4.75	$9.50
Lamil79	2	$4.64	$9.29
Aina42	3	$3.07	$9.22
Saesrideu94	2	$4.59	$9.18
Arin32	2	$4.54	$9.09
Rarallo90	3	$3.02	$9.05
Baelollodeu94	2	$4.51	$9.03
Aelin32	3	$2.99	$8.98
Lisopela58	3	$2.95	$8.86
Saedaiphos46	3	$2.94	$8.83
Chanastnya43	3	$2.94	$8.82
Reunasu60	2	$4.41	$8.82
Raesty92	3	$2.91	$8.73
Sundadar27	2	$4.35	$8.71
Aerithllora36	2	$4.32	$8.64
Hada39	3	$2.86	$8.57
Chamilsala65	2	$4.28	$8.55
Silaera56	3	$2.83	$8.48
Frichocesta66	2	$4.19	$8.37
Chadista79	2	$4.17	$8.35
Pheodaisun84	3	$2.77	$8.31
Undosian34	2	$4.15	$8.30
Idai61	3	$2.74	$8.23
Lassimla92	2	$4.08	$8.17
Umolrian85	3	$2.71	$8.13
Zontibe81	3	$2.68	$8.03

Zhisrisu83	2	$3.94	$7.89
Sondastsda82	3	$2.63	$7.89
Aidaillodeu39	2	$3.93	$7.86
...	...	...	...
Shidai42	1	$1.33	$1.33
Jiskjask85	1	$1.33	$1.33
Eyista89	1	$1.29	$1.29
Philodil43	1	$1.29	$1.29
Mindilsa60	1	$1.28	$1.28
Jiskimsda56	1	$1.14	$1.14
Tyarithn67	1	$1.14	$1.14
Aisur51	1	$1.14	$1.14
Ilista82	1	$1.14	$1.14
Iduelis31	1	$1.10	$1.10
Yasur85	1	$1.10	$1.10
Eryon48	1	$1.10	$1.10
Aillyriadru65	1	$1.10	$1.10
Undjask33	1	$1.10	$1.10
Lirtassa52	1	$1.09	$1.09
Aelidru27	1	$1.09	$1.09
Yalaeria91	1	$1.06	$1.06
Aesurstilis64	1	$1.03	$1.03
Saida58	1	$1.03	$1.03
Euthe35	1	$1.03	$1.03
Frichjaskan98	1	$1.02	$1.02
Hala31	1	$1.02	$1.02
Eudanu84	1	$1.02	$1.02
Isurria36	1	$1.02	$1.02
Irilis75	1	$1.02	$1.02
Qilalista41	1	$1.02	$1.02
Ililsasya43	1	$1.02	$1.02
Aidai61	1	$1.01	$1.01
Chanirra79	1	$1.01	$1.01
Alo38	1	$1.00	$1.00

576 rows × 3 columns

In [40]:

```
#Most Popular Items

item_data = purchase_data.loc[:,["Item ID", "Item Name", "Price"]]
total_item_purchase = item_data.groupby(["Item ID", "Item Name"]).sum()["Price"].ren
average_item_purchase = item_data.groupby(["Item ID", "Item Name"]).mean()["Price"]
item_count = item_data.groupby(["Item ID", "Item Name"]).count()["Price"].rename("Pu

item_data_pd = pd.DataFrame({"Total Purchase Value": total_item_purchase, "Item Pric
item_data_pd["Item Price"] = item_data_pd["Item Price"].map("${:,.2f}".format)
item_data_pd ["Purchase Count"] = item_data_pd["Purchase Count"].map("{:,}".format)
item_data_pd["Total Purchase Value"] = item_data_pd["Total Purchase Value"].map("${:
item_data_pd = item_data_pd.loc[:,["Purchase Count", "Item Price", "Total Purchase V

item_data_pd.sort_values("Purchase Count", ascending=False)
```

Out[40]:

		Purchase Count	Item Price	Total Purchase Value
Item ID	**Item Name**			
145	**Fiery Glass Crusader**	9	$4.58	$41.22
108	**Extraction, Quickblade Of Trembling Hands**	9	$3.53	$31.77
82	**Nirvana**	9	$4.90	$44.10
92	**Final Critic**	8	$4.88	$39.04
75	**Brutality Ivory Warmace**	8	$2.42	$19.36
59	**Lightning, Etcher of the King**	8	$4.23	$33.84
19	**Pursuit, Cudgel of Necromancy**	8	$1.02	$8.16
60	**Wolf**	8	$3.54	$28.32
34	**Retribution Axe**	8	$2.22	$17.76
72	**Winter's Bite**	8	$3.77	$30.16
37	**Shadow Strike, Glory of Ending Hope**	8	$3.16	$25.28
103	**Singed Scalpel**	8	$4.35	$34.80
78	**Glimmer, Ender of the Moon**	7	$4.40	$30.80
71	**Demise**	7	$1.61	$11.27
117	**Heartstriker, Legacy of the Light**	7	$1.79	$12.53
7	**Thorn, Satchel of Dark Souls**	7	$1.33	$9.31

159	Oathbreaker, Spellblade of Trials	7	$3.08	$21.56
164	Exiled Doomblade	7	$1.63	$11.41
85	Malificent Bag	7	$1.75	$12.25
110	Suspension	7	$1.44	$10.08
53	Vengeance Cleaver	7	$2.05	$14.35
141	Persuasion	7	$3.19	$22.33
143	Frenzied Scimitar	6	$1.56	$9.36
40	Second Chance	6	$2.52	$15.12
93	Apocalyptic Battlescythe	6	$1.97	$11.82
102	Avenger	6	$3.44	$20.64
54	Eternal Cleaver	6	$2.50	$15.00
136	Ghastly Adamantite Protector	6	$3.58	$21.48
129	Fate, Vengeance of Eternal Justice	6	$1.54	$9.24
120	Agatha	6	$3.08	$18.48
...	...	...	...	...
158	Darkheart, Butcher of the Champion	2	$2.45	$4.90
173	Stormfury Longsword	2	$4.93	$9.86
168	Sun Strike, Jaws of Twisted Visions	2	$1.48	$2.96
115	Spectral Diamond Doomblade	2	$2.04	$4.08
30	Stormcaller	2	$2.21	$4.42
31	Trickster	2	$1.55	$3.10
132	Persuasion	2	$3.33	$6.66
56	Foul Titanium Battle Axe	2	$2.92	$5.84
63	Stormfury Mace	2	$4.99	$9.98
127	Heartseeker, Reaver of Souls	2	$3.92	$7.84
125	Whistling Mithril Warblade	2	$1.00	$2.00
48	Rage, Legacy of the Lone Victor	2	$2.48	$4.96
69	Frenzy, Defender of the Harvest	2	$1.98	$3.96
43	Foul Edge	2	$3.54	$7.08
6	Rusty Skull	2	$3.70	$7.40
33	Curved Axe	2	$1.16	$2.32
176	Relentless Iron Skewer	2	$2.84	$5.68
178	Oathbreaker, Last Hope of the Breaking Storm	12	$4.23	$50.76

91	Celeste	1	$4.17	$4.17
180	Stormcaller	1	$3.36	$3.36
90	Betrayer	1	$2.94	$2.94
134	Undead Crusader	1	$4.50	$4.50
104	Gladiator's Glaive	1	$1.93	$1.93
23	Crucifer	1	$1.99	$1.99
27	Riddle, Tribute of Ended Dreams	1	$3.30	$3.30
42	The Decapitator	1	$1.75	$1.75
118	Ghost Reaver, Longsword of Magic	1	$2.17	$2.17
47	Alpha, Reach of Ending Hope	1	$3.58	$3.58
126	Exiled Mithril Longsword	1	$2.00	$2.00
51	Endbringer	1	$4.66	$4.66

In [56]:

```
#most profitable items
item_data_pd.sort_values("Total Purchase Value", ascending=False)
```

Out[56]:

		Purchase Count	Item Price	Total Purchase Value
Item ID	Item Name			
63	Stormfury Mace	2	$4.99	$9.98
29	Chaos, Ender of the End	5	$1.98	$9.90
173	Stormfury Longsword	2	$4.93	$9.86
1	Crucifer	3	$3.26	$9.78
38	The Void, Vengeance of Dark Magic	4	$2.37	$9.48
143	Frenzied Scimitar	6	$1.56	$9.36
7	Thorn, Satchel of Dark Souls	7	$1.33	$9.31
18	Torchlight, Bond of Storms	2	$4.65	$9.30
129	Fate, Vengeance of Eternal Justice	6	$1.54	$9.24
166	Thirsty Iron Reaver	3	$3.07	$9.21
123	Twilight's Carver	4	$2.28	$9.12

49	**The Oculus, Token of Lost Worlds**	3	$2.96	$8.88
156	**Soul-Forged Steel Shortsword**	5	$1.77	$8.85
161	**Devine**	5	$1.76	$8.80
149	**Tranquility, Razor of Black Magic**	5	$1.75	$8.75
107	**Splitter, Foe Of Subtlety**	4	$2.18	$8.72
169	**Interrogator, Blood Blade of the Queen**	4	$2.18	$8.72
122	**Unending Tyranny**	3	$2.85	$8.55
4	**Bloodlord's Fetish**	5	$1.70	$8.50
181	**Reaper's Toll**	5	$1.66	$8.30
19	**Pursuit, Cudgel of Necromancy**	8	$1.02	$8.16
142	**Righteous Might**	3	$2.62	$7.86
127	**Heartseeker, Reaver of Souls**	2	$3.92	$7.84
97	**Swan Song, Gouger Of Terror**	3	$2.50	$7.50
6	**Rusty Skull**	2	$3.70	$7.40
81	**Dreamkiss**	2	$3.61	$7.22
131	**Fury**	5	$1.44	$7.20
10	**Sleepwalker**	4	$1.79	$7.16
43	**Foul Edge**	2	$3.54	$7.08
152	**Darkheart**	4	$1.74	$6.96
...	**...**	...	...	...
162	**Abyssal Shard**	5	$2.67	$13.35
83	**Lifebender**	4	$3.33	$13.32
22	**Amnesia**	6	$2.18	$13.08
119	**Stormbringer, Dark Blade of Ending Misery**	3	$4.32	$12.96
76	**Haunted Bronzed Bludgeon**	4	$3.15	$12.60
172	**Blade of the Grave**	4	$3.14	$12.56
74	**Yearning Crusher**	3	$4.18	$12.54
117	**Heartstriker, Legacy of the Light**	7	$1.79	$12.53
85	**Malificent Bag**	7	$1.75	$12.25
79	**Alpha, Oath of Zeal**	3	$4.05	$12.15
105	**Hailstorm Shadowsteel Scythe**	4	$3.03	$12.12
182	**Toothpick**	3	$4.03	$12.09
148	**Warmonger, Gift of Suffering's End**	3	$4.03	$12.09

44	**Bonecarvin Battle Axe**	5	$2.38	$11.90
93	**Apocalyptic Battlescythe**	6	$1.97	$11.82
8	**Purgatory, Gem of Regret**	3	$3.93	$11.79
144	**Blood Infused Guardian**	6	$1.94	$11.64
61	**Ragnarok**	3	$3.87	$11.61
164	**Exiled Doomblade**	7	$1.63	$11.41
84	**Arcane Gem**	3	$3.79	$11.37
71	**Demise**	7	$1.61	$11.27
9	**Thorn, Conqueror of the Corrupted**	4	$2.73	$10.92
112	**Worldbreaker**	4	$2.60	$10.40
73	**Ritual Mace**	5	$2.05	$10.25
106	**Crying Steel Sickle**	3	$3.41	$10.23
151	**Severance**	3	$3.40	$10.20
110	**Suspension**	7	$1.44	$10.08
23	**Crucifer**	1	$1.99	$1.99
104	**Gladiator's Glaive**	1	$1.93	$1.93
42	**The Decapitator**	1	$1.75	$1.75

183 rows × 3 columns

```
In [ ]:
```