```
import pandas as pd

# Load dataset directly from GitHub
url = "https://raw.githubusercontent.com/datasciencedojo/datasets/master/titanic.csv"
df = pd.read_csv(url)

# Preview the first few rows
df.head()
```

	PassengerId	Survived	Pclass	Name	Sex	Age	SibSp	Parch	Ticket	Fare	Cabin	Embarked
0	1	0	3	Braund, Mr. Owen Harris	male	22.0	1	0	A/5 21171	7.2500	NaN	S
1	2	1	1	Cumings, Mrs. John Bradley (Florence Briggs Th...	female	38.0	1	0	PC 17599	71.2833	C85	C
2	3	1	3	Heikkinen, Miss. Laina	female	26.0	0	0	STON/O2. 3101282	7.9250	NaN	S
3	4	1	1	Futrelle, Mrs. Jacques Heath	female	35.0	1	0	113803	53.1000	C123	S

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
# Check for missing values
df.isnull().sum()
```

	0
PassengerId	0
Survived	0
Pclass	0
Name	0
Sex	0
Age	177
SibSp	0
Parch	0
Ticket	0
Fare	0
Cabin	687
Embarked	2

dtype: int64

Data Cleaning

```
# Fill missing Age values with median
df['Age'].fillna(df['Age'].median(), inplace=True)

# Fill missing Embarked values with the mode (most common value)
df['Embarked'].fillna(df['Embarked'].mode()[0], inplace=True)

# Drop Cabin column due to too many missing values
df.drop(columns=['Cabin'], inplace=True)
# Confirm that all missing values were handled
df.isnull().sum()
```

Show hidden output

✅ Cleaning Summary:

- Filled missing `Age` with median
- Filled missing `Embarked` with mode
- Dropped `Cabin` due to excessive missing values

Missing Values Check

```
# Survival rate overall
df['Survived'].value_counts(normalize=True) * 100
```

	proportion
Survived	
0	61.616162
1	38.383838

dtype: float64

✅ All missing values have been handled successfully.

```
# Survival rate by gender as percentages
survival_by_gender = df.groupby('Sex')['Survived'].mean() * 100
survival_by_gender = survival_by_gender.round(2)

# Display the result
print(survival_by_gender)
```

```
Sex
female    74.20
male      18.89
Name: Survived, dtype: float64
```

```
# Survival by passenger class
df.groupby('Pclass')['Survived'].mean()*100
```

	Survived
Pclass	
1	62.962963
2	47.282609
3	24.236253

dtype: float64

```
# Survival by embarkation port
df.groupby('Embarked')['Survived'].mean()*100
```

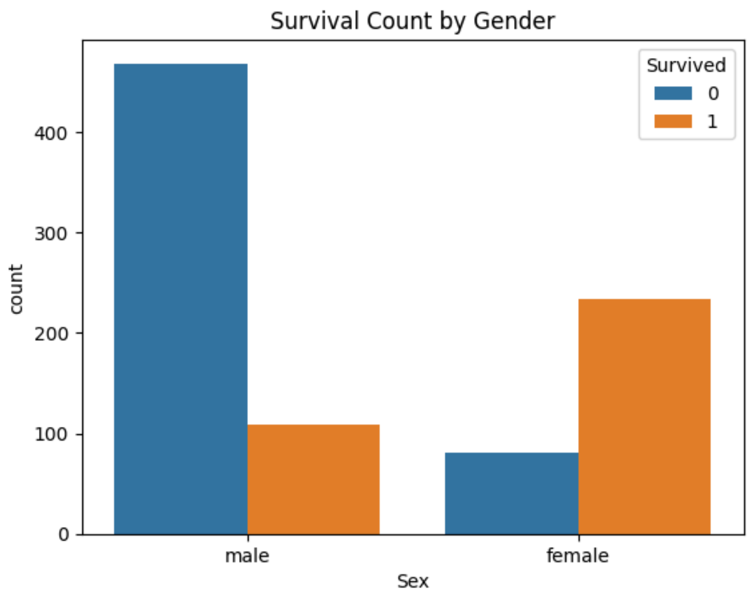
	Survived
Embarked	
C	55.357143
Q	38.961039
S	33.900929

dtype: float64

Exploratory Data Analysis (EDA)

🔹 Survival by Gender

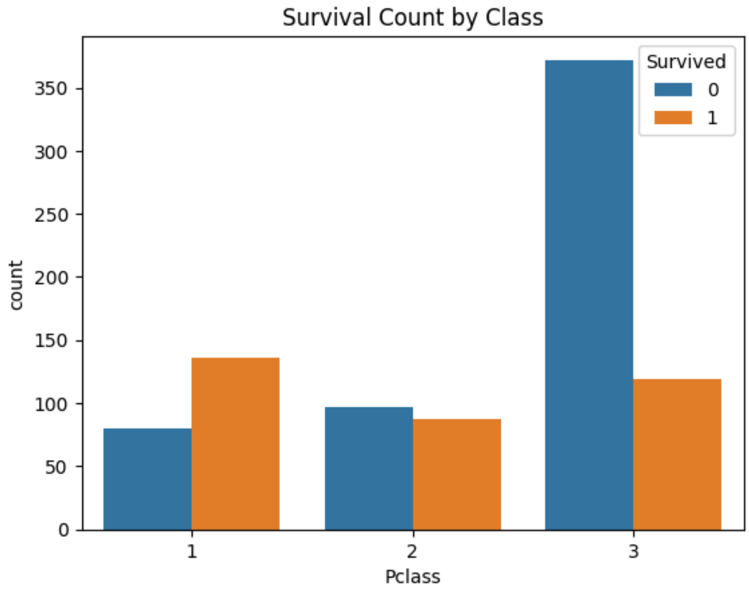
```
import seaborn as sns
import matplotlib.pyplot as plt

# 1. Survival by Gender
sns.countplot(x='Sex', hue='Survived', data=df)
plt.title('Survival Count by Gender')
plt.show()
```



- Females had a much higher survival rate (74%) compared to males (~19%).

🔹 Survival by Passenger Class

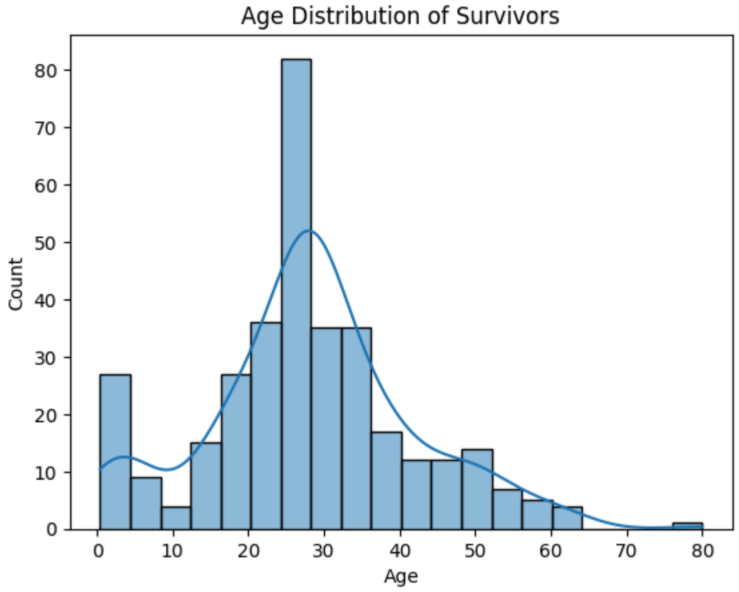
```
# 2. Survival by Class
sns.countplot(x='Pclass', hue='Survived', data=df)
plt.title('Survival Count by Class')
plt.show()
```



- 1st class passengers were more likely to survive.

🔹 Age Distribution of Survivors

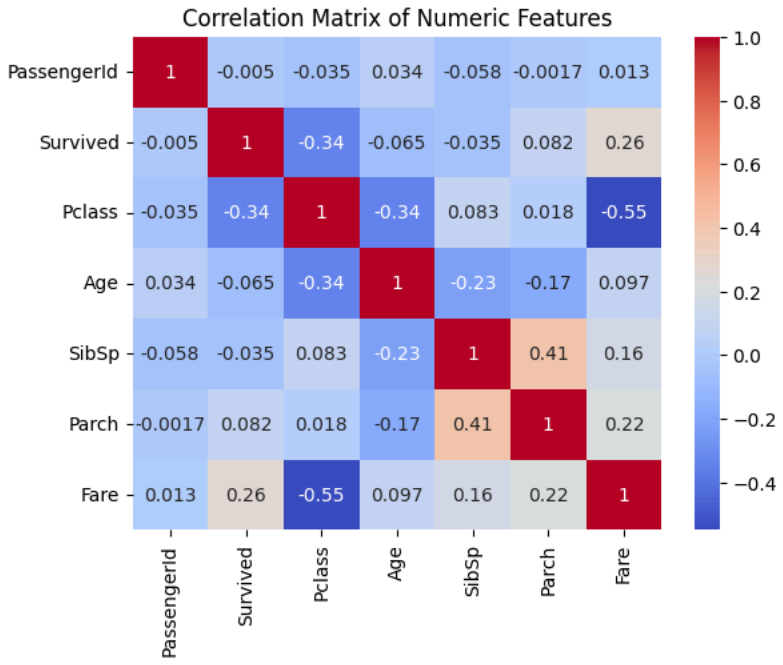
```
# 3. Age Distribution of Survivors
sns.histplot(df[df['Survived'] == 1]['Age'], kde=True, bins=20)
plt.title('Age Distribution of Survivors')
plt.show()
```



- Most survivors were aged 20–30.
- Young children (0–5) also had high survival.

◆ Correlation Heatmap

```
# 4. Correlation Heatmap
# Select only numeric columns to avoid string-to-float errors
numeric_df = df.select_dtypes(include='number')
import seaborn as sns
import matplotlib.pyplot as plt

# Compute correlation matrix only on numeric columns
corr_matrix = numeric_df.corr()

# Plot the heatmap
sns.heatmap(corr_matrix, annot=True, cmap='coolwarm')
plt.title('Correlation Matrix of Numeric Features')
plt.show()
```

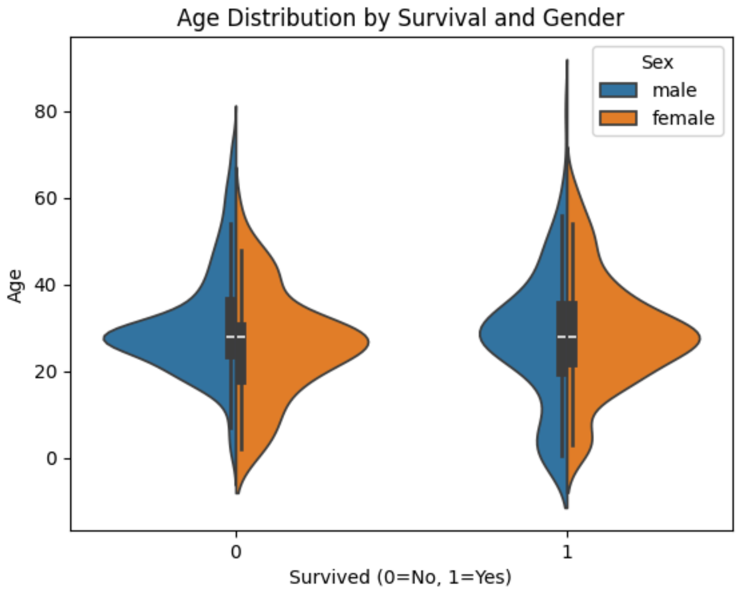


	PassengerId	Survived	Pclass	Age	SibSp	Parch	Fare
PassengerId	1	-0.005	-0.035	0.034	-0.058	-0.0017	0.013
Survived	-0.005	1	-0.34	-0.065	-0.035	0.082	0.26
Pclass	-0.035	-0.34	1	-0.34	0.083	0.018	-0.55
Age	0.034	-0.065	-0.34	1	-0.23	-0.17	0.097
SibSp	-0.058	-0.035	0.083	-0.23	1	0.41	0.16
Parch	-0.0017	0.082	0.018	-0.17	0.41	1	0.22
Fare	0.013	0.26	-0.55	0.097	0.16	0.22	1

- Strongest negative correlation: Pclass vs. Fare (-0.55)
- Survival positively correlates with Fare (+0.26)

Age and Gender Distribution by Survival Status

```
sns.violinplot(x='Survived', y='Age', hue='Sex', data=df, split=True)
plt.title('Age Distribution by Survival and Gender')
plt.xlabel('Survived (0=No, 1=Yes)')
plt.show()
```



- Most **non-survivors** were **males aged 20–40**, as shown in the left violin.
- The majority of **survivors were females**, with a broad age range — confirming the “women and children first” policy.
- A noticeable number of **young children** (under 10) survived, from both genders.
- Very few elderly passengers survived.