In [41]:

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

In [42]:

```
data = pd.read_csv("titanic.csv")
```

In [43]:

```
data.head()
```

Out[43]:

	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 (Lily May Peel)	female	35.0	1	0	113803	53.1000	C123	S
4	5	0	3	Allen, Mr. William Henry	male	35.0	0	0	373450	8.0500	NaN	S

In [53]:

```
print("Dataset Information:")
print(data.info())
```

```
Dataset Information:
<class 'pandas.core.frame.DataFrame'>
Index: 889 entries, 0 to 890
Data columns (total 12 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   PassengerId  889 non-null    int64  
 1   Survived     889 non-null    int64  
 2   Pclass       889 non-null    int64  
 3   Name         889 non-null    object 
 4   Sex          889 non-null    object 
 5   Age          889 non-null    float64
 6   SibSp        889 non-null    int64  
 7   Parch        889 non-null    int64  
 8   Ticket       889 non-null    object 
 9   Fare         889 non-null    float64
 10  Cabin        889 non-null    object 
 11  Embarked     889 non-null    object 
dtypes: float64(2), int64(5), object(5)
memory usage: 90.3+ KB
None
```

In [45]:

```
missing_values = data.isnull().sum()
print("\nMissing Values per Column:")
print(missing_values)
```

```
Missing Values per Column:
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
```

In [46]:

```
data.isnull().sum()
```

Out[46]:
```
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
```

In [47]:
```
data.dropna(subset=["Embarked"], inplace=True)
data["Cabin"].fillna("Unknown", inplace=True)
data["Age"].fillna(data["Age"].mean(), inplace=True)
```

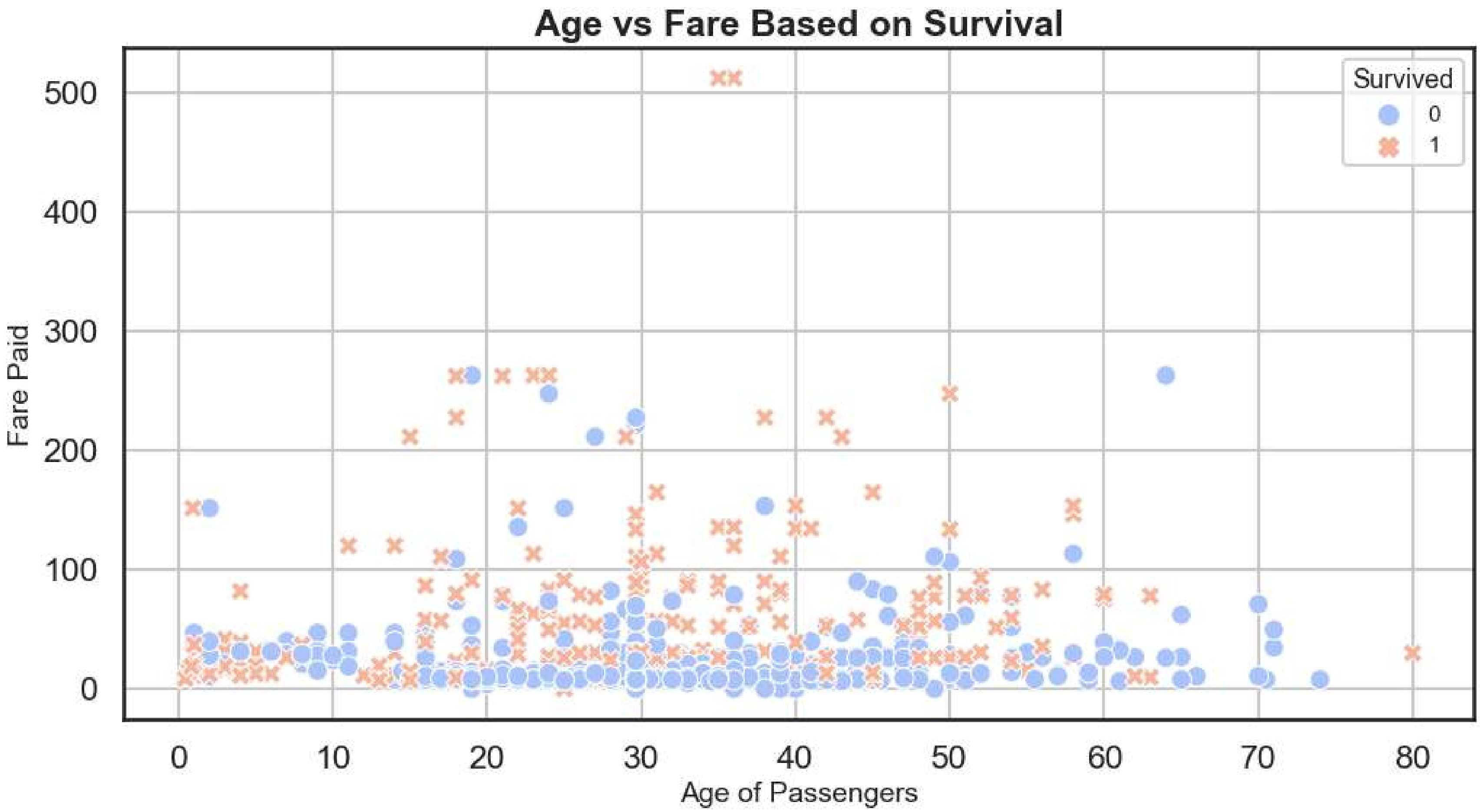
In [48]:
```
data.isnull().sum()
```

Out[48]:
```
PassengerId    0
Survived       0
Pclass         0
Name           0
Sex            0
Age            0
SibSp          0
Parch          0
Ticket         0
Fare           0
Cabin          0
Embarked       0
dtype: int64
```

In [49]:
```
data.duplicated().sum()
```

Out[49]:
```
0
```

In [50]:
```
sns.set(style="white", context="talk")
plt.figure(figsize=(12, 6))
sns.scatterplot(data=data, x="Age", y="Fare", hue="Survived", style="Survived", palette="coolwarm", s=100)
plt.title("Age vs Fare Based on Survival", fontsize=18, fontweight='bold')
plt.xlabel("Age of Passengers", fontsize=14)
plt.ylabel("Fare Paid", fontsize=14)
plt.legend(title="Survived", loc="upper right", title_fontsize='13', fontsize='11')
plt.grid(True)
plt.show()
```



INSIGHTS:

-Higher fares are generally associated with a higher probability of survival.

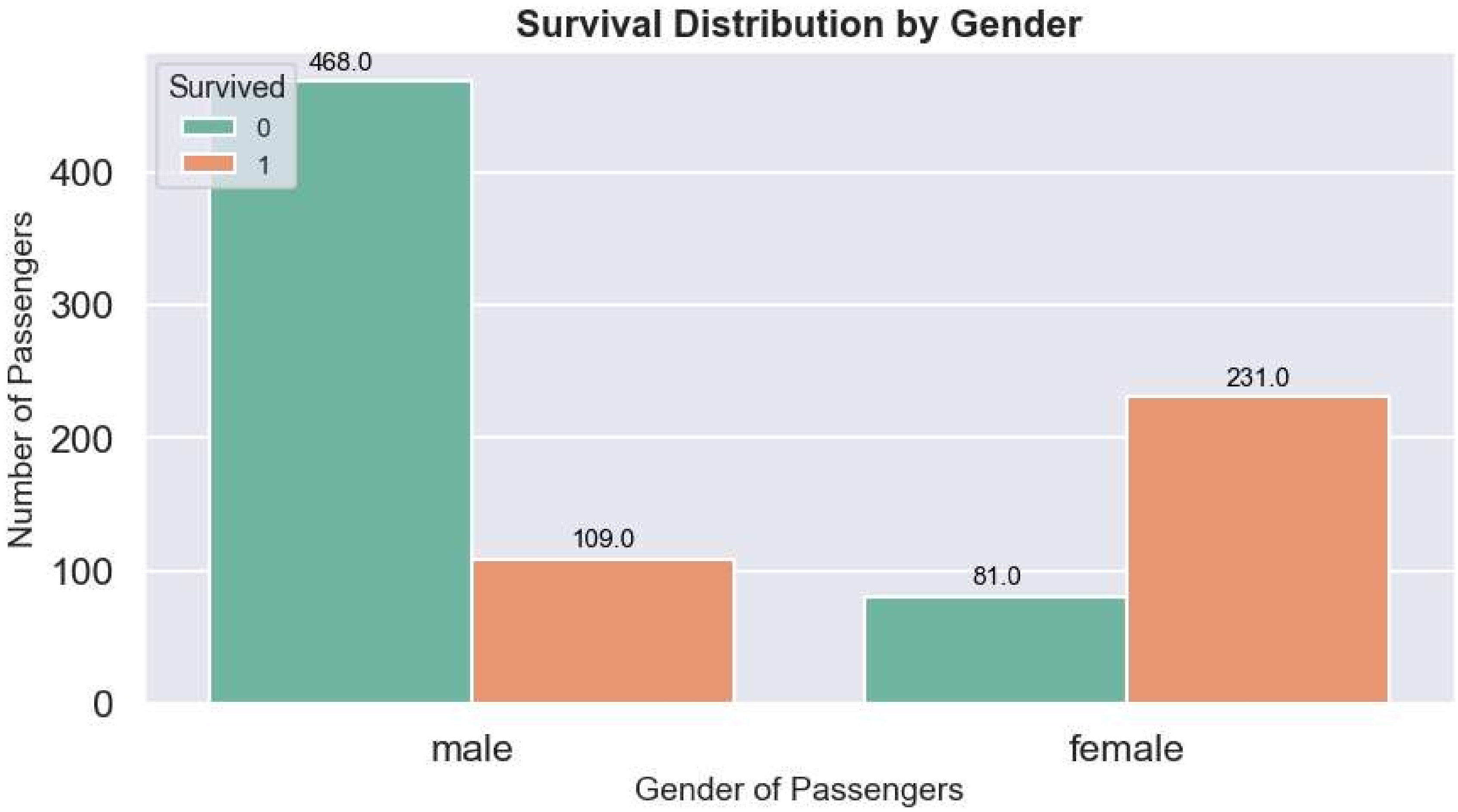
-Young children have a higher survival rate compared to other age groups.

-Passengers paying lower fares had a higher chance of not surviving.

In [51]:

```
sns.set(style="darkgrid", context="talk")
plt.figure(figsize=(10, 5))
sns.countplot(data=data, x="Sex", hue="Survived", palette="Set2")
```

```python
plt.title("Survival Distribution by Gender", fontsize=16, fontweight='bold')
plt.xlabel("Gender of Passengers", fontsize=14)
plt.ylabel("Number of Passengers", fontsize=14)
plt.legend(title="Survived", loc="upper left", title_fontsize='13', fontsize='11')
for p in plt.gca().patches:
    plt.gca().annotate(f'{p.get_height()}', (p.get_x() + p.get_width() / 2, p.get_height()),
                       ha='center', va='baseline', fontsize=11, color='black', xytext=(0, 5),
                       textcoords='offset points')
plt.show()
```



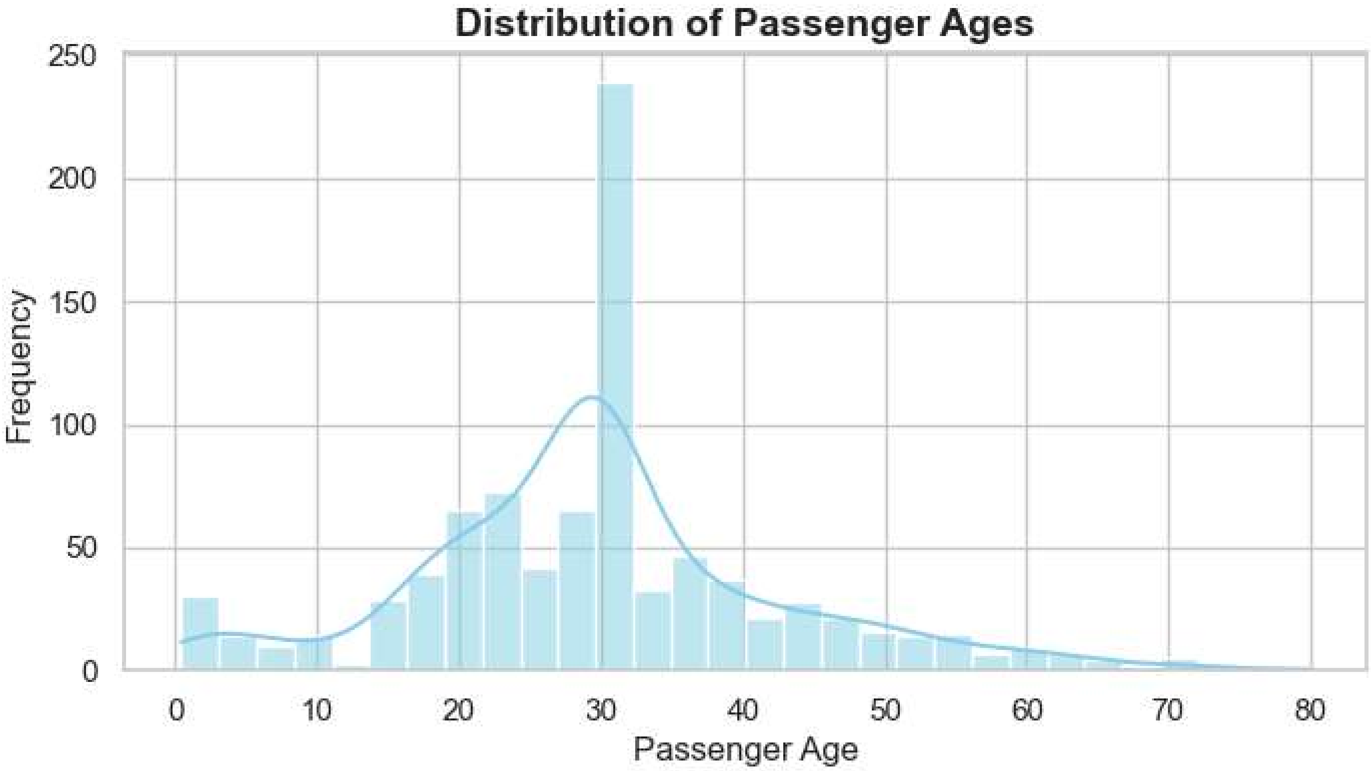
Insights:

-The survival rate for females (231) is significantly higher than for males (109).

-549 individuals survived out of the total sample.

In [54]:

```
sns.set(style="whitegrid", context="notebook")
plt.figure(figsize=(8, 4))
sns.histplot(data["Age"], kde=True, bins=30, color="skyblue")
plt.title("Distribution of Passenger Ages", fontsize=14, fontweight='bold')
plt.xlabel("Passenger Age", fontsize=12)
plt.ylabel("Frequency", fontsize=12)
plt.grid(True)
plt.show()
```



INSIGHTS:

-The distribution of passenger ages is right-skewed, indicating a larger proportion of younger passengers.

-The majority of passengers fall within the 20-30 age range, with a peak around 30 years old.

-There is a significant drop in passenger numbers after the age of 40, suggesting a lower proportion of older passengers.

In [ ]: