

```

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

# Create sample data
data = {
    'Name': ['Alice', 'Bob', 'Charlie', 'David', 'Emma'],
    'Age': [20, 22, None, 19, 20], # Introduce a missing value
    'Grade': [85, 78, 90, 92, 88],
    'Favorite_Subject': ['Math', 'English', 'Science', 'History',
'Art']
}

# Create DataFrame
df = pd.DataFrame(data)

# Display the sample dataset
print("Sample Dataset:")
print(df)

# Data Cleaning

# Check for missing values
missing_values = df.isnull().sum()
print("\nMissing Values:")
print(missing_values)

# Drop rows with missing values
df_cleaned = df.dropna()

# Remove duplicates if any
df_cleaned = df_cleaned.drop_duplicates()

# Display the cleaned dataset
print("\nCleaned Dataset:")
print(df_cleaned)

# Data Visualization

# Plotting age distribution
plt.hist(df_cleaned['Age'].values, bins=5, color='skyblue',
edgecolor='black')
plt.title('Age Distribution')
plt.xlabel('Age')
plt.ylabel('Frequency')
plt.grid(True)
plt.show()

```

Sample Dataset:

| | Name | Age | Grade | Favorite_Subject |
|---|---------|------|-------|------------------|
| 0 | Alice | 20.0 | 85 | Math |
| 1 | Bob | 22.0 | 78 | English |
| 2 | Charlie | NaN | 90 | Science |
| 3 | David | 19.0 | 92 | History |
| 4 | Emma | 20.0 | 88 | Art |

Missing Values:

| | |
|------------------|---|
| Name | 0 |
| Age | 1 |
| Grade | 0 |
| Favorite_Subject | 0 |

dtype: int64

Cleaned Dataset:

| | Name | Age | Grade | Favorite_Subject |
|---|-------|------|-------|------------------|
| 0 | Alice | 20.0 | 85 | Math |
| 1 | Bob | 22.0 | 78 | English |
| 3 | David | 19.0 | 92 | History |
| 4 | Emma | 20.0 | 88 | Art |

