**Question 1:**

import numpy as py

arr\_elements = []

for i in range(3):

row\_elements = []

for j in range(4):

row\_elements.append(np.random.randint(1, 101))

arr\_elements.append(row\_elements)

data = np.array(arr\_elements)

required\_row = data[1]

print(f”required\_row: {required\_row}”)

required\_col = []

for i in range(3):

required\_col.append(data[i][-1])

print(f”required\_col: {required\_col}”)

**Output:**



**Question 2:**

import pandas as pd

input\_data = {

"Name": ["Emp A.", "Emp B.", "Emp C.", "Emp D.", "Emp E."],

"Age": [25, 28, 27, 29, 31],

"City": ["Down Street", "Up Street", "Wall Street", "New Road", "Green Circle"],

"Salary": [1000, 1000, 2500, 1500, 2000]

}

df = pd.DataFrame(input\_data)

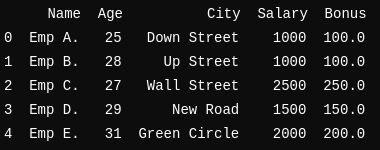
df["Bonus"] = df["Salary"] \* 0.1

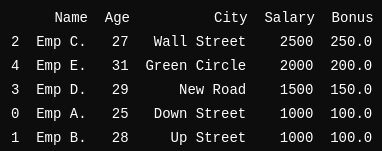
print(df)

sorted\_df = df.sort\_values(by="Salary", ascending=False)

print(sorted\_df)

**Output:**





**Question 3:**

import matplotlib.pyplot as plt

x\_values = []

y\_values = []

for i in range(-10, 11):

x\_values.append(i)

y\_values.append(2\*i\*\*2 + 3\*i + 5)

plt.plot(x\_values, y\_values, marker='o', label='y = 2x^2 + 3x + 5')

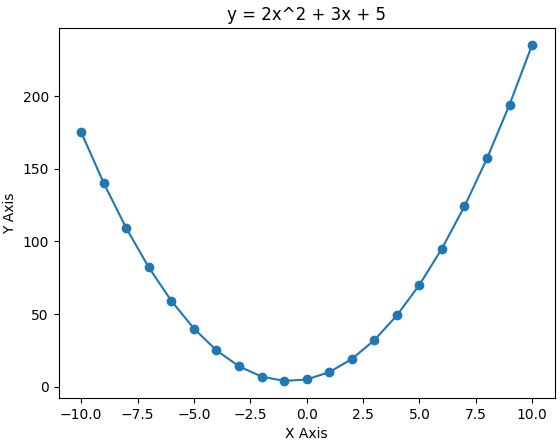
plt.xlabel("X Axis")

plt.ylabel("Y Axis")

plt.title("y = 2x^2 + 3x + 5")

plt.show()

**Output:**



**Question 4:**

import matplotlib.pyplot as plt

x\_values = list(range(1, 11))

y\_values = [2 \* x + 3 for x in x\_values]

scatter\_y\_values = [5, 7, 8, 5, 6, 9, 10, 8, 7, 5]

hist\_values = [1, 2, 2, 3, 3, 3, 4, 4, 5, 5, 5, 5, 6, 6, 7]

bar\_labels = ["A", "B", "C", "D", "E"]

bar\_values = [5, 7, 3, 8, 6]

fig, axs = plt.subplots(2, 2, figsize=(10, 8))

# Line graph

axs[0, 0].plot(x\_values, y\_values, marker='o', label='y = 2x + 3')

axs[0, 0].set\_title("Line Graph")

axs[0, 0].set\_xlabel("X Axis")

axs[0, 0].set\_ylabel("Y Axis")

axs[0, 0].legend()

axs[0, 0].grid(True)

# Scatter plot

axs[0, 1].scatter(x\_values, scatter\_y\_values, color='r', label='Scatter')

axs[0, 1].set\_title("Scatter Plot")

axs[0, 1].set\_xlabel("X Axis")

axs[0, 1].set\_ylabel("Y Axis")

axs[0, 1].legend()

axs[0, 1].grid(True)

# Histogram

axs[1, 0].hist(hist\_values, bins=6, color='g', alpha=0.7, label='Histogram')

axs[1, 0].set\_title("Histogram")

axs[1, 0].set\_xlabel("Value Ranges")

axs[1, 0].set\_ylabel("Frequency")

axs[1, 0].legend()

# Bar chart

axs[1, 1].bar(bar\_labels, bar\_values, color='b', label='Bars')

axs[1, 1].set\_title("Bar Chart")

axs[1, 1].set\_xlabel("Categories")

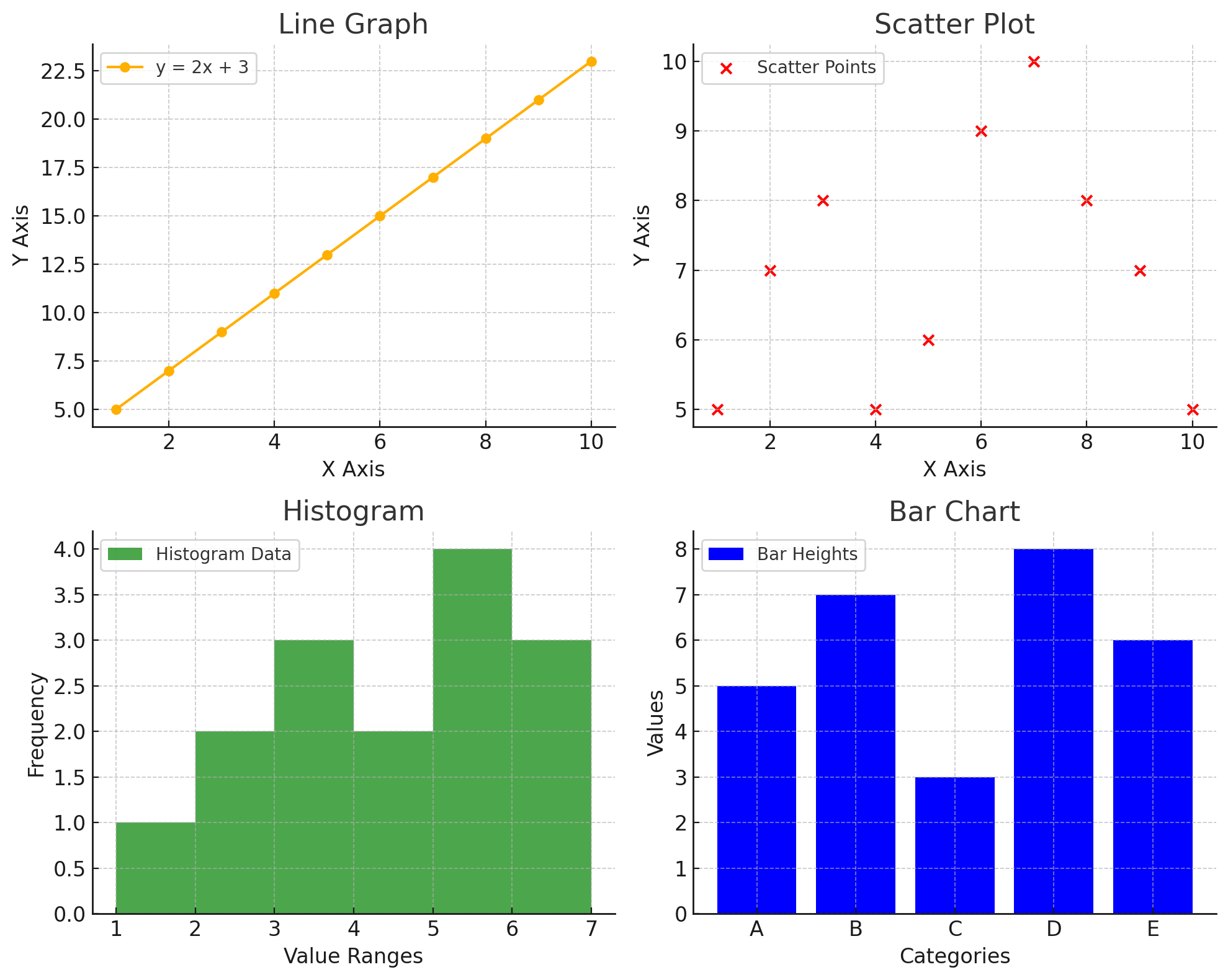
axs[1, 1].set\_ylabel("Values")

axs[1, 1].legend()

plt.tight\_layout()

plt.show()

**Output:**

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