

```

40 # Plot
41 plt.figure(figsize=(10,6))
42 plt.scatter(X, y, color='teal', alpha=0.7, label='Actual data')
43 plt.plot(
44     X_test.sort_values(by='petal length (cm)'),
45     model.predict(X_test.sort_values(by='petal length (cm)')),
46     color='red',
47     linewidth=3,
48     label='Regression Line'
49 )
50 plt.xlabel('Petal Length (cm)')
51 plt.ylabel('Petal Width (cm)')
52 plt.title('Iris Dataset - Linear Regression\n(petal length → petal
    ↪ width)')
53 plt.legend()
54 plt.grid(True, alpha=0.3)
55 plt.show()
56
57 # Predict new values
58 new = [[1.4], [4.0], [5.5]]
59 for length in new:
60     pred = model.predict([length])
61     print(f"Petal length {length[0]} cm → Predicted width: {pred[0]:.3f}
    ↪ cm")

```

Output:

```

1 Columns in dataset: ['sepal length (cm)', 'sepal width (cm)', 'petal length
    ↪ (cm)', 'petal width (cm)', 'target']
2
3 First 5 rows:
4     sepal length (cm)  sepal width (cm)  ...  petal width (cm)  target
5 0          5.1          3.5  ...          0.2          0
6 1          4.9          3.0  ...          0.2          0
7 2          4.7          3.2  ...          0.2          0
8 3          4.6          3.1  ...          0.2          0
9 4          5.0          3.6  ...          0.2          0
10
11 [5 rows x 5 columns]
12
13 =====
14 LINEAR REGRESSION: petal length → petal width
15 =====
16 Slope: 0.4132
17 Intercept: -0.3567
18 R2 Score: 0.9283
19 Petal length 1.4 cm → Predicted width: 0.222 cm
20 Petal length 4.0 cm → Predicted width: 1.296 cm
21 Petal length 5.5 cm → Predicted width: 1.916 cm

```