This Python code performs a linear regression analysis to examine the relationship between Amazon book sales and ad spending.

A graph with a red line

AI-generated content may be incorrect.

**Interpretation:**

* **Regression Line Equation**:

Book Sales=22.11×Ad Spend−13,005\text{Book Sales} = 22.11 \times \text{Ad Spend} - 13,005Book Sales=22.11×Ad Spend−13,005

* **R² Score**: 0.948  
  This indicates a **very strong positive linear relationship**—about 95% of the variance in book sales is explained by ad spend.

*Code:*

*import pandas as pd*

*import numpy as np*

*import matplotlib.pyplot as plt*

*from sklearn.linear\_model import LinearRegression*

*from sklearn.metrics import r2\_score*

*# Step 1: Generate Sample Data*

*np.random.seed(42)*

*weeks = np.arange(1, 13)*

*ad\_spend = np.random.uniform(1000, 5000, size=12)*

*book\_sales = 20 \* ad\_spend + np.random.normal(0, 10000, size=12)*

*# Step 2: Create DataFrame*

*df = pd.DataFrame({*

*'Week': weeks,*

*'AdSpend': ad\_spend,*

*'BookSales': book\_sales})*

*# Step 3: Prepare Data for Linear Regression*

*X = df[['AdSpend']]*

*y = df['BookSales']*

*model = LinearRegression()*

*model.fit(X, y)*

*predictions = model.predict(X)*

*r2 = r2\_score(y, predictions)*

*# Step 4: Plot the Results*

*plt.figure(figsize=(10, 6))*

*plt.scatter(df['AdSpend'], df['BookSales'], color='blue', label='Actual Sales')*

*plt.plot(df['AdSpend'], predictions, color='red', linewidth=2, label='Regression Line')*

*plt.title('Linear Regression: Amazon Book Sales vs. Ad Spend')*

*plt.xlabel('Ad Spend ($)')*

*plt.ylabel('Book Sales ($)')*

*plt.legend()*

*plt.grid(True)*

*plt.tight\_layout()*

*plt.show(), model.coef\_[0], model.intercept\_, r2*