Statistics /
Module 7 - Linear Correlation and Regression

Topic 1: Finding x- and y-intercepts given the graph of a line on a grid

Topic 2: Classifying slopes given graphs of lines

Topic 3: Constructing a scatter plot
Problem 1: Construct a scatter plot for the data: (1, 2), (2, 4), (3, 3), (4, 5).
Answer: Plot points on a grid with x-axis (1 to 4) and y-axis (0 to 6). Place points at (1, 2), (2, 4), (3, 3), (4, 5). Label axes and scale appropriately.

Problem 2: Create a scatter plot for the data: (0, 1), (1, 3), (2, 2), (3, 4).
Answer: Plot points on a grid with x-axis (0 to 3) and y-axis (0 to 5). Mark points at (0, 1), (1, 3), (2, 2), (3, 4). Ensure clear axis labels and scaling.

Topic 4: Linear relationship and the sample correlation coefficient

Topic 5: Identifying correlation and causation

Topic 6: Sketching the least-squares regression line

Topic 7: Scatter plots and correlation

Topic 8: Interpreting the slope of the least-squares regression line
Problem 1: A regression line for hours studied (x) and test score (y) is $y = 5x + 60$. Interpret the slope.
Answer: The slope (5) means for each additional hour studied, the test score increases by 5 points, on average.

Problem 2: For a regression line $y = 2.5x + 10$, where x is hours worked and y is earnings in dollars, interpret the slope.
Answer: The slope (2.5) indicates that for each additional hour worked, earnings increase by $2.50, on average.

Topic 9: Interpreting the equation of the least-squares regression line to make predictions
Problem 1: Given the regression line $y = 3x + 4$ for hours studied (x) and score (y), predict the score for 5 hours.
Answer: Substitute $x = 5$: $y = 3(5) + 4 = 15 + 4 = 19$. The predicted score is 19.

Problem 2: For $y = 4x + 10$, where x is miles driven and y is fuel cost in dollars, predict the cost for 8 miles.
Answer: Substitute $x = 8$: $y = 4(8) + 10 = 32 + 10 = 42$. The predicted cost is $42.

Topic 10: Performing a simple linear regression

Topic 11: Classifying linear and nonlinear relationships from scatter plots
Problem 1: A scatter plot with points {(1, 2), (2, 4), (3, 6)} shows a pattern. Classify the relationship as linear or nonlinear.
Answer: The points form a straight line ($y = 2x$), so the relationship is linear.

Problem 2: For points {(1, 1), (2, 4), (3, 9)}, classify the relationship from the scatter plot.
Answer: The points suggest a quadratic pattern ($y = x^2$), not a straight line, so the relationship is nonlinear.

Topic 12: Interpreting the regression coefficients