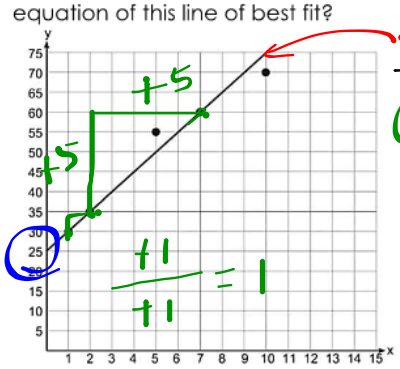
Unit 11: Comparing Linear, Quadratic, & Exponential Functions

Day 3 – Linear Regression Models

Calculating a Line of Best Fit

Example 1: A scatterplot was constructed on the graph below and a line of best fit was drawn. What is the equation of this line of best fit?



a. $y = x + 5$

b. $y = x + 25$

c. $y = 5x + 5$

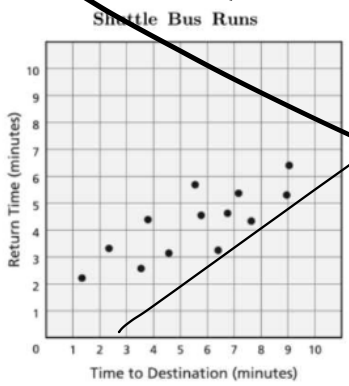
d. $y = 5x + 25$

trend line

$y = mx + b$ (slope, y-int)

$\frac{+5}{+5} = 1$

Example 2: An airport terminal runs shuttle buses to different parts of the airport. The scatterplot shows the times for each part of the airport and a number of round trips. Which equation is closest to the line of best fit?



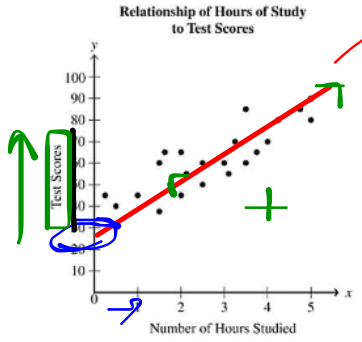
a. $y = \frac{3}{5}x + 1$

b. $y = \frac{3}{2}x + 1$

c. $y = \frac{3}{4}x + 2$

d. $y = \frac{5}{4}x + 2$

Example 3: Mrs. Dombrowski asked her students to report the number of hours they studied for their statistic test. The day after the test, she plotted the results on the scatterplot shown below.



a. $y = -10x + 30$

b. $y = -10x + 60$

c. $y = 0x + 30$

d. $y = 10x + 60$

$y = mx + b$

e. Interpret the y-intercept in relation to the context of the problem.

(0, 30) — # hrs studied, test score

At 0 hrs studied, a student will receive a 30% on their test

$m = \frac{\pm 10}{1} = \frac{\text{rise}}{\text{run}}$

A stud. will ↑ 10% per hr stud.

Algebra 1 Unit 11: Comparing Linear, Quadratic, and Exponential Functions Notes

f. Interpret the slope in relation to the context of the problem.

Example 4: A weather team records the weather each hour after sunrise one morning in May. The hours after sunrise and the temperature in degrees Fahrenheit are in the table below. Calculate a line of best fit.

$y = mx + b$

a. Line of best fit:

$y = 2.2x + 51.3$

Hours after sunrise	Temperature in °F
0	52
1	53
2	56
3	57
4	60
5	63
6	64
7	67

b. Interpret what the slope of each equation means in terms of the problem context.

$m = \frac{2.2\ °F}{1\ hr} = 2.2\ °F$ per hr

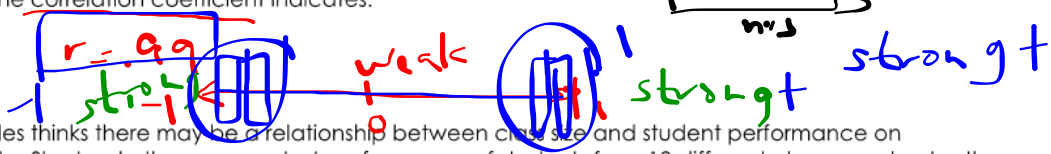
c. Interpret what the y-intercept of each equation means in terms of the problem context.

51.3 (0, 51.3) At sunrise, temp is 51.3 °F

51.3 °F

d. Explain what the correlation coefficient indicates:

C.C. $r = .99$ strong



Example 5: Charles thinks there may be a relationship between class size and student performance on standardized tests. She tracks the average test performance of students from 12 different classes and notes the number of students in each class in the table below. Is there a linear relationship between class size and average test score?

Class Size	Average Test Score
14	45
17	41
19	38
21	36
23	37
25	34
26	28
27	30
28	27
31	27
36	25
37	23

a. Line of best fit: $y = mx + b$

$y = -.9x + 56.2$

b. Interpret what the slope of each equation means in terms of the problem context.

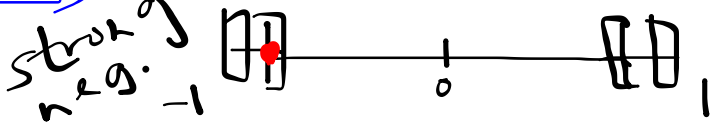
$m = \frac{-.9}{+1}$ = test scores drop approx 1 pt per student added

c. Interpret what the y-intercept of each equation means in terms of the problem context.

56.2 The test is worth 56 pts

d. Explain what the correlation coefficient indicates:

C.C. $r = -.96$



strong neg.

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