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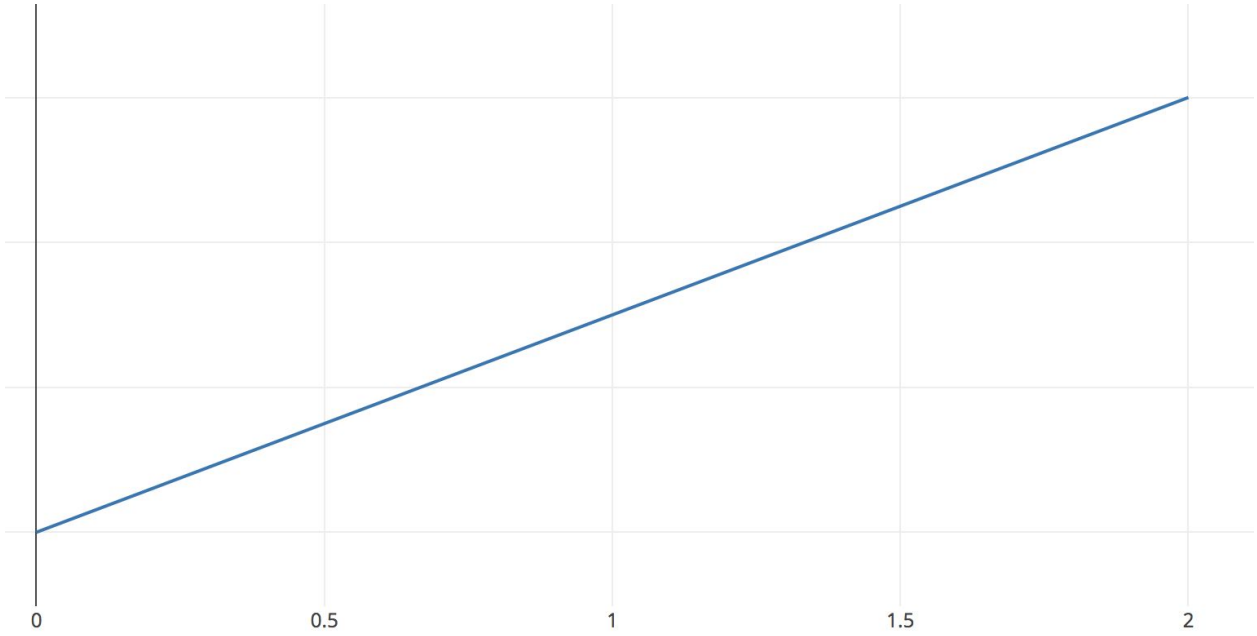
ISC 1057 Dr. Slice

Homework 5

1.

a. a = (65 - 50) / (2 - 0) = 7.5
b = 50 (the first point represents b because x = 0.)
Answer: S(x) = 7.5(x) + 50

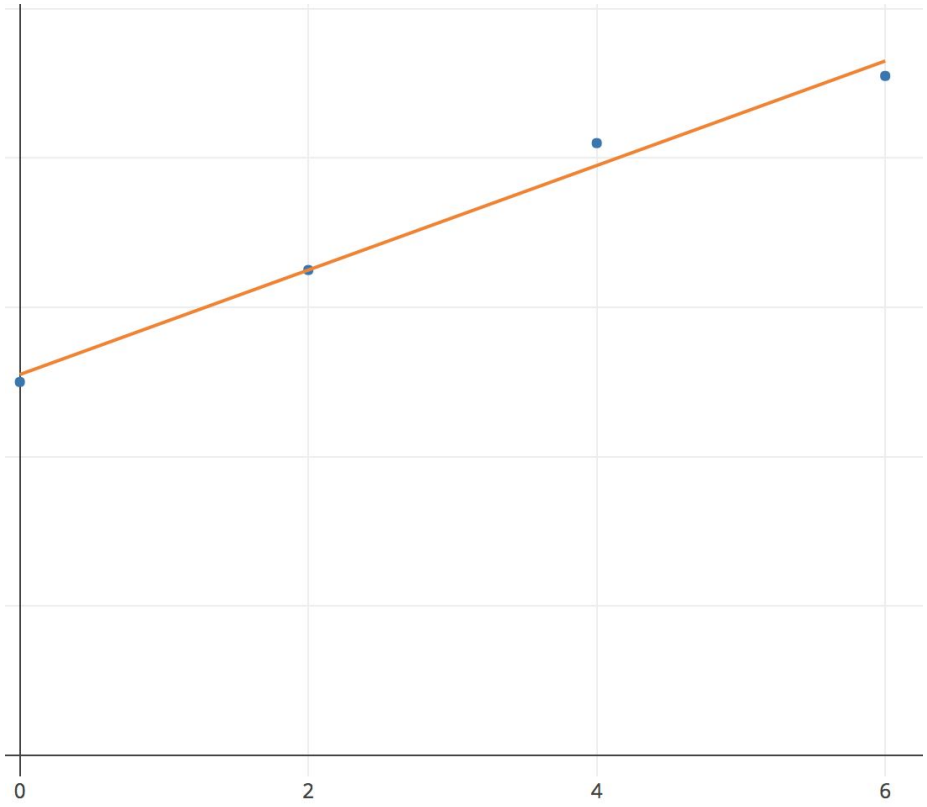
b.



c. We do make errors in this case because we assume the data has a perfectly linear relationship (it does not).

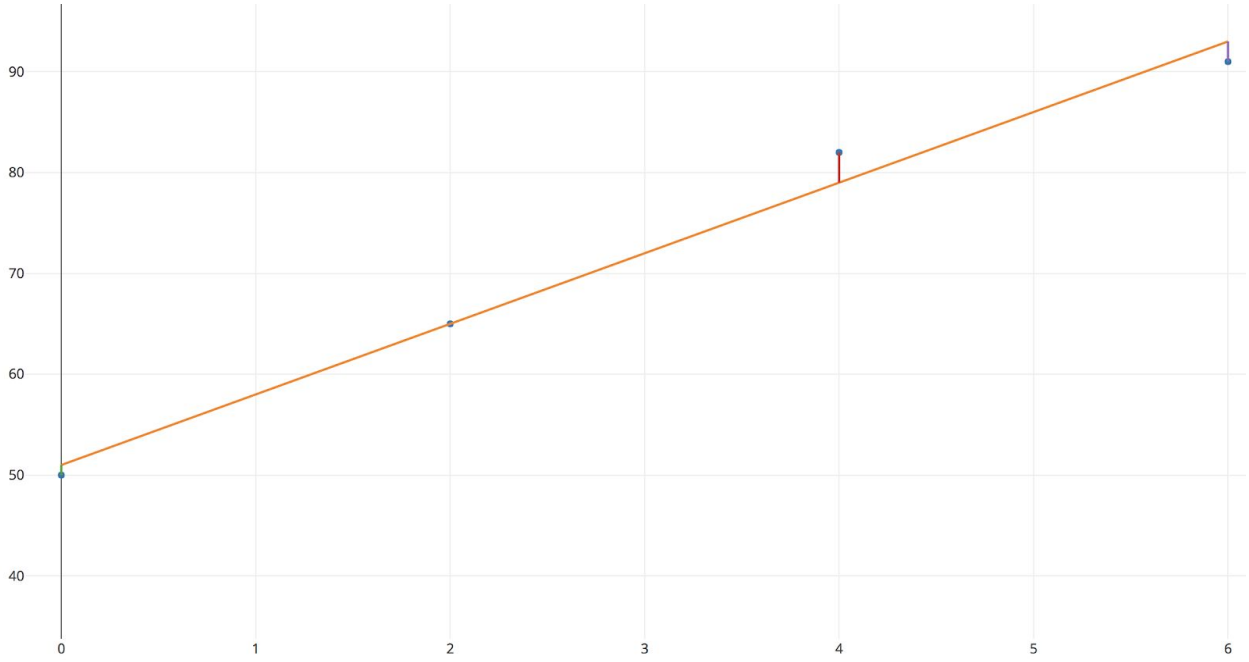
d. S(x) = 7.5(5) + 50
Answer: 85

2.

a. 

This line seems like a good fit, as the sum of the squares of the residuals seem to be very small.

b. **Answer:** Square Residual = (Actual value - predicted value)^2



c. $S(x) = 7(x) + 51$
$S(5) = 7(5) + 51$
Answer: $S(5) = 86$

$S(8) = 7(8) + 51$
Answer: $S(8) = 107$

The prediction for a student that studied eight hours is better because it's within the domain of values you measured (interpolation), while the prediction for a student that studied for eight hours is not (extrapolation). Also, S(x) is outside of the range of values you could possibly get on a test ($S(x) \leq 100$).

d. The slope of the line would decrease if we put a point at (7, 91.5) because on our original equation ($S(x) = 7(x) + 51$), the predicted score of someone who studied 7 hours is 100, leading to a large negative residual (100 - 91.5). In order to minimize the sum of the squared residuals, the slope would have to become less steep.