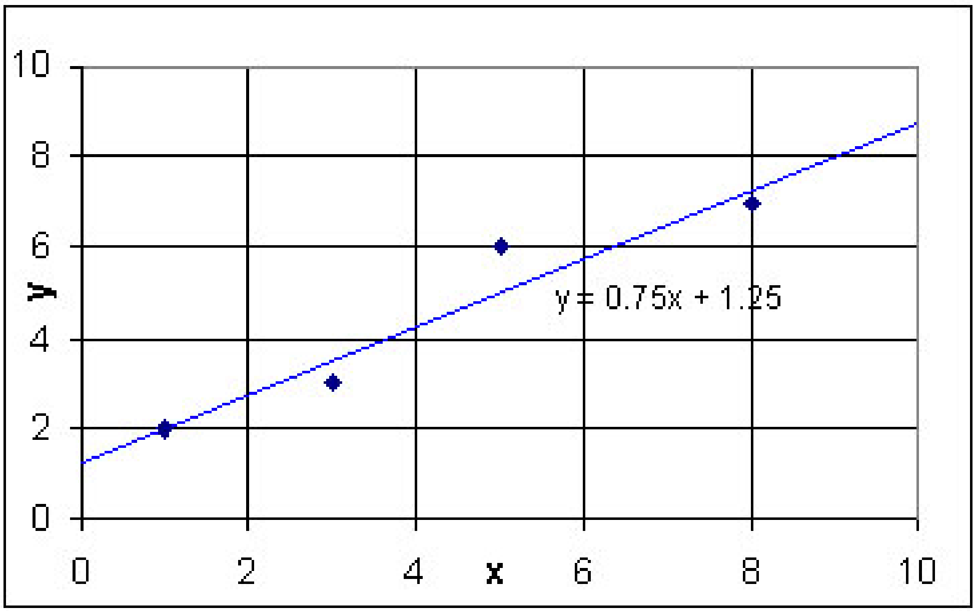
1. The errors

$$\begin{aligned} e_1 &= |2 - 0.75(1) - 1.25| = 0, \\ e_2 &= |3 - 0.75(3) - 1.25| = 0.5, \\ e_3 &= |6 - 0.75(5) - 1.25| = 1, \\ e_4 &= |7 - 0.75(8) - 1.25| = 0.25. \end{aligned}$$

Sum of squares of the errors is $0^2 + 0.5^2 + 1^2 + 0.25^2 = 1.3125$. Below is the graph.



2. a. Model A shows an increasing relationship, while Model B shows a decreasing relationship. Below is the graph. b. The sum of the squares of the errors for Model A is

$$|4 - 0.4(1) - 2.6|^2 + |3 - 0.4(3) - 2.6|^2 + |6 - 0.4(5) - 2.6|^2 + |5 - 0.4(8) - 2.6|^2$$
$$= 1^2 + 0.8^2 + 1.4^2 + 0.8^2 = 4.24.$$

The sum of the squares of the errors for Model B is

$$|4 + 0.4(1) - 6.2|^2 + |30.4(3) - 6.2|^2 + |6 + 0.4(5) - 6.2|^2 + |5 + 0.4(8) - 6.2|^2$$
$$= 1.8^2 + 2^2 + 1.8^2 + 2^2 = 14.48.$$

Thus, Model A is better.

c. The formula from the appendix gives the mean as $\bar{x} = \frac{1+3+5+8}{4} = 4.25$. The coefficients for the line are given by:

$$a = \frac{(1-4.25)4 + (3-4.25)3 + (5-4.25)6 + (8-4.25)5}{(1-4.25)^2 + (3-4.25)^2 + (5-4.25)^2 + (8-4.25)^2} = \frac{6.5}{26.75} = 0.243$$

$$b = \frac{(4 - 0.243(1)) + (3 - 0.243(3)) + (6 - 0.243(5)) + (5 - 0.243(8))}{4} = 3.467,$$

which is the least squares best fit line shown on the graph. Researcher A had the better intuition by this measure, but clearly insufficient data were collected for a good analysis.