

Solving simultaneously, $a = -1$ and $b = 13.2877\dots$

$$y = -1 + 13.2877\dots \log x$$

$$y(3) = -1 + 13.2877\dots \log 3 = 5.3398\dots$$

Interpolation, because $2 < 3 < 4$

12. Two points on the graph are (0, 5) and (3, 10). Because point (3, 10) is the inflection point, then, by symmetry, another point on the graph is $(3 + (3 - 0), 10 + (10 - 5)) = (6, 15)$. Using a graphing calculator to do logistic regression on these three points (using $L_1 = \{0, 3, 6\}$ and $L_2 = \{5, 10, 15\}$), you get

$$y = \frac{20}{1 + 3e^{-0.3662\dots x}}$$

13. Answers will vary.

Chapter 8 • Fitting Functions to Data

Exploration 8-1a

- $\hat{y} = 1.4x + 3.8$
- See table in Problem 5.
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- $0.4 - 1.8 + 3.0 - 2.2 + 0.6 = 0$
-

\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
6.6	0.4	0.16
10.8	-1.8	3.24
15.0	3.0	9.00
19.2	-2.2	4.84
23.4	0.6	0.36

$$SS_{\text{res}} = 17.65$$

- 6.

\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
6.7	0.3	0.09
10.9	-1.9	3.61
15.1	2.9	8.41
19.3	-2.3	5.29
23.5	0.5	0.25

$$SS_{\text{res}} = 17.65$$

The new equation doesn't fit the data as well.

- 7.

\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
6.8	0.2	0.04
11.3	-2.3	5.29
15.8	2.2	4.84
20.3	-3.3	10.89
24.8	-0.8	0.25

$$SS_{\text{res}} = 21.70$$

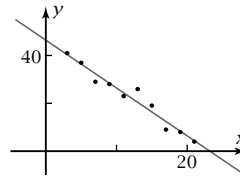
The two modified equations do not fit as well as the actual regression equation.

- Answers will vary.
- Answers will vary.

Exploration 8-2a

- $\hat{y} = -2x + 46.4$
 y decreases as x increases.

- 2.



It seems to fit fairly well.

- 3.

\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
40.4	0.6	0.36
36.4	0.6	0.36
32.4	-3.4	11.56
28.4	-0.4	0.16
24.4	-1.4	1.96
20.4	5.6	31.36
16.4	2.6	6.76
12.4	-3.4	11.56
8.4	-0.4	0.16
4.4	-0.4	0.16

4. $SS_{\text{res}} = 64.40$

- 5.

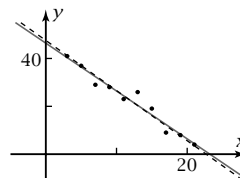
\hat{y}	$y - \hat{y}$	$(y - \hat{y})^2$
40	1	1
36	1	1
32	-3	9
28	0	0
24	-1	1
20	6	36
16	3	9
12	-3	9
8	0	0
4	0	0

$$SS_{\text{res}} = 66.00$$

The modified equation doesn't fit the data as well.

- $(\bar{x}, \bar{y}) = (12, 22.4)$
 $\hat{y}(\bar{x}) = -2(12) + 46.4 = 22.4 = \bar{y}$

- 7.



No, it's impossible to tell which is better just by looking.