11-8 (p.369)
(b)

$$\begin{aligned} b &= \frac{\Sigma(X-\bar{X})(Y-\bar{Y})}{\Sigma(X-\bar{X})^2} \\ &= \frac{9.1}{18.3} \\ &\approx 0.497 \end{aligned}$$

$$\begin{aligned} a &= \bar{Y} - b\bar{X} \\ &= 5.8 - \frac{9.1}{18.3}(5.8) \\ &\approx 2.92 \end{aligned}$$

$$\hat{Y} = 2.92 + 0.497X$$

(c) For a father who is 6 feet tall:
i) 6
ii) 5.8
iii) 5.9

For a father who is 5 feet tall:
i) 5
ii) 5.8
iii) 5.4

Choice iii performs best.

(d) less, although still more; not so well, although still better; will not

12-15 (p. 392)
(a)

$$b = \frac{46100}{36400} \approx 1.27$$

$$a = 140 - \frac{46100}{36400}(110) \approx 0.687$$

$$\hat{Y} = 0.687 + 1.27X$$

(c) Prediction for X=180.

$$s \approx 29.2$$

$$t^4_{.025} = 2.78$$

$$229 \pm (2.78)(29.2)\sqrt{\frac{1}{6} + \frac{4900}{36400}}$$
$$(184 \quad , \quad 274)$$

(d) Prediction for X=180 if last year's had been unavailable.

$$\bar{Y} \quad \pm \quad t^{n-1}_{.025}\frac{s}{\sqrt{n}}$$
$$140 \quad \pm \quad (2.57)\frac{\sqrt{\frac{61800}{5}}}{\sqrt{6}}$$
$$(23.4 \quad , \quad 257)$$

(e) Confidence interval in part (c) is much narrower and is centered better.

12-16 (p. 393)
(a) $\Sigma(Y - \hat{Y})^2 \approx 3416$ (used to get s in 12-15c)

(b) If $\hat{Y} = 10 + X$, $\Sigma(Y - \hat{Y})^2 \approx 8400$. Have to recalculate $\hat{Y}$ to do it.

12-18 (p. 393)
(a) The "7"'s which are "out of line" with the others look suspicious.

(b)

$$b = \frac{1222}{113.8} \approx 10.74$$

$$a = 68.2 - \frac{1222}{113.8}(3.46) \approx 31.05$$

$$\hat{Y} = 31.05 + 10.74X$$

(c) $\hat{Y} = a + b(2) \approx 52.52$ So almost 53 minutes later is the prediction for the next eruption.

(d) about 50%

(e)

$$
\begin{aligned}
(a + bX_0) &\quad - \quad t^{105}_{.10}\sqrt{s^2}\sqrt{\frac{1}{n} + \frac{(X_0 - \bar{X})^2}{\Sigma(X - \bar{X})^2} + 1} \\
(31.05 + (10.74)(2)) &\quad - \quad 1.29\sqrt{44.7}\sqrt{\frac{1}{107} + \frac{(2 - 3.46)^2}{113.8} + 1} \\
(43.79 &\quad , \quad \infty)
\end{aligned}
$$

(f)

$$
\begin{aligned}
(a + bX_0) &\quad - \quad t^{105}_{.10}\sqrt{s^2} \\
(31.05 + (10.74)(2)) &\quad - \quad 1.29\sqrt{44.7} \\
(43.91 &\quad , \quad \infty)
\end{aligned}
$$

The approximation is about as adequate for $X = 2$ as for $X = 5$, since both are about the same distance away from $\bar{X}$. The approximations only differ from the answers obtained through the method in part (e) by 0.12, which is about 7.2 seconds.