rates ($\beta_1 > 0$). $t_s = 6.06$. $H_0$ is rejected. There is sufficient evidence ($P$-value $< 0.0005$) to conclude that trees from higher altitudes tend to have higher respiration rates.

**12.6.6** **(a)** – (iii), **(b)** – (i), **(c)** – (ii)

**12.7.1** **(a)** The dashed lines, which tell us where the true (population) regression line lies.
**(b)** The wide band is the prediction band.
**(c)** With less data both bands would be wider.

**12.S.1** 0.24 gm

**12.S.3** **(a)** Estimated mean = 0.85 kg; estimated SD = 0.17 kg

**12.S.6** **(a)** $s_e = 0.137$ cm
**(b)** $H_0: \rho = 0$ or $H_0: \beta_1 = 0$. $t_s = 3.01$. $H_0$ is rejected. There is sufficient evidence ($0.02 < P\text{-value} < 0.04$) to conclude that a positive correlation between diameter of forage branch and wing length.

## Unit IV

**IV.4** 0.143.

**IV.5** **(a)** $r^2 = 0.23^2 = 0.0529$. We can account for 5.3% of the variability in price by using fiber in a regression model.
**(b)** $\hat{y} = 17.42 + 0.62 \times 2.63 = 17.42 + 1.63 = 19.05$, so the residual is $17.3 - 19.05 = -1.75$.
**(c)** The typical size of an error in predicting price is around 3.1 cents/ounce.

**IV.7** **(a)** The $F$ statistic is $7.445/7.74 = 0.96$.
**(b)** There is essentially no evidence that the mean number of tree species per 0.1 hectare plot differs along the three rivers.
**(c)** We need random samples of independent observations from normally distributed populations that have a common standard deviation.

**IV.12** **(a)** $b_1 = -0.9061 \times \left(\frac{5.4176}{11.0090}\right) = -0.4459$,
$b_0 = 41.6858 - (-0.4459 \times 39.4034) = 59.2557$.
$\hat{y} = 59.256 - 0.446x$
**(b)** $\hat{y} = 59.256 - 0.446 \times 30 = 45.876$
**(c)** $\mu_{Y|X=30} = 59.256 - 0.446 \times 30 = 45.876$
**(d)** Since 30mm falls within the range of observed wing lengths, the prediction is an interpolation.
**(e)** We would expect hummingbird B's wings to beat about 0.446 Hz less (slower) than hummingbird A's.

## Chapter 13

**13.2.1** A chi-square test of independence would be appropriate. The null hypothesis of interest is $H_0$: $p_1 = p_2$, where $p_1 = \Pr\{\text{clinically important improvement if given clozapine}\}$ and $p_2 = \Pr\{\text{clinically important improvement if given haloperidol}\}$. A confidence interval for $p_1 - p_2$ would also be relevant.

**13.2.10** A two-sample comparison is called for here, but the data do not support the condition of normality. Thus, the Wilcoxon-Mann-Whitney test, or a randomization test, is appropriate.

**13.2.12** It would be natural to consider correlation and regression with these data. For example, we could regress $Y$ = forearm length on $X$ = height; we could also find the correlation between forearm length and height and test the null hypothesis that the population correlation is zero.