

data collected to the nearest centimeter. After calculation the sample statistics often have to be rounded to the appropriate number of significant figures. The rules for rounding are very simple. A digit to be rounded is not changed if it is followed by a digit less than 5. If the digit to be rounded is followed by a digit greater than 5 or by 5 followed by other nonzero digits, it is increased by one. When the digit to be rounded is followed by a 5 standing alone or followed by zeros, it is unchanged if it is even and increased by one if it is odd. So a mean for the sedge data of 141.35 cm would be rounded to 141.4 cm, while a mean of 141.25 cm would be rounded to 141.2 cm. Rounding should be done for the standard deviation and variance.

### 1.11 Problems

1. If  $X_1 = 9$ ,  $X_2 = 8$ ,  $X_3 = 13$ ,  $X_4 = 6$ , and  $X_5 = 9$ , evaluate the following:

$$(a) \sum_{i=1}^5 X_i$$

$$(b) \sum_{i=2}^4 X_i$$

$$(c) \sum (X_i - \bar{X})$$

$$(d) \sum (X_i - \bar{X})^2$$

$$(e) \sum X_i^2$$

$$(f) \left( \sum X_i \right)^2$$

$$(g) \sum X_i^2 - \frac{(\sum X_i)^2}{n}$$

$$(h) \sum X_i - 9$$

$$(i) \sum_{i=1}^3 (X_i + 2)$$

$$(j) \sum_{i=1}^n 5$$

$$(k) \sum 2X_i$$

$$(l) 2 \sum X_i$$

2. The following data are the carapace (shell) lengths in centimeters of a sample of adult female green turtles, *Chelonia mydas*, measured while nesting at Heron Island in Australia's Great Barrier Reef. Calculate the following descriptive statistics for this sample: sample mean, corrected sum of squares, sample variance, standard deviation, and range. Remember to use the appropriate number of decimal places in these descriptive statistics and to include the correct units with all statistics.

110 105 117 113 95 115 98 97 93 120

3. The red-tailed tropic bird, *Phaethon rubricauda*, is an extremely rare sea bird that nests on several islands of the Queensland coast of Australia. As part of a conservation effort to manage these endangered birds, every nesting pair was measured and weighed. Below are the body weights of these birds (in kg).