**1.3**

**a.** How likely is it that more than half of the sampled computers will need or have needed warranty service? What is the expected number among the 100 that need warranty service? How likely is it that the number needing warranty service will exceed the expected number by more than 10?

**b.** Suppose that 15 of the 100 sampled needed warranty service. How confident can we be that the proportion of *all* such computers needing warranty service is between .08 and .22? Does the sample provide compelling evidence for concluding that more than 10% of all such computers need warranty service?

**1.12**

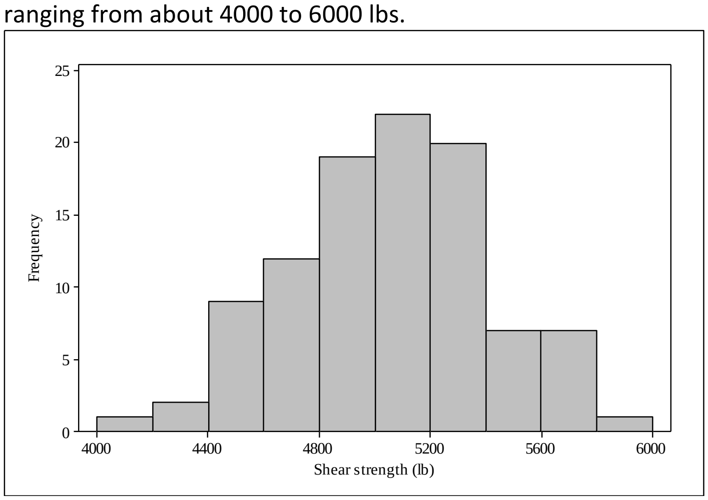
Using the H and L notation suggested in the previous exercise, the stem-and-leaf display would appear as follows:

| | | |
|---|---|---|
| 3L | 1 | |
| 3H | 56678 | |
| 4L | 000112222234 | |
| 4H | 5667888 | |
| 5L | 144 | |
| 5H | 58 | stem: tenths |
| 6L | 2 | leaf: hundredths |
| 6H | 6678 | |
| 7L | | |
| 7H | 5 | |

The stem-and-leaf display shows that .45 is a good representative value for the data. In addition, the display is not symmetric and appears to be positively skewed. The range of the data is .75 – .31 = .44, which is comparable to the typical value of .45. This constitutes a reasonably large amount of variation in the data. The data value .75 is a possible outlier.

**1.24**

The distribution of shear strengths is roughly symmetric and bell-shaped, centered at about 5000 lbs and ranging from about 4000 to 6000 lbs.



**1.36**

**a.** A stem-and leaf display of this data appears below:

| | | |
|---|---|---|
| 32 | 55 | stem: ones |
| 33 | 49 | leaf: tenths |
| 34 | | |
| 35 | 6699 | |
| 36 | 34469 | |
| 37 | 03345 | |
| 38 | 9 | |
| 39 | 2347 | |
| 40 | 23 | |
| 41 | | |
| 42 | 4 | |

The display is reasonably symmetric, so the mean and median will be close.

**b.** The sample mean is $\bar{x}$ = 9638/26 = 370.7 sec, while the sample median is $\tilde{x}$ = (369+370)/2 = 369.50 sec.

**c.** The largest value (currently 424) could be increased by any amount. Doing so will not change the fact that the middle two observations are 369 and 370, and hence, the median will not change. However, the value $x$ = 424 cannot be changed to a number less than 370 (a change of 424 – 370 = 54) since that will change the middle two values.

**d.** Expressed in minutes, the mean is (370.7 sec)/(60 sec) = 6.18 min, while the median is 6.16 min.

**1.38**

**a.** The reported values are (in increasing order) 110, 115, 120, 120, 125, 130, 130, 135, and 140. Thus the median of the reported values is 125.

**b.** 127.6 is reported as 130, so the median is now 130, a very substantial change. When there is rounding or grouping, the median can be highly sensitive to small change.

**1.44**

**a.** range = 49.3 – 23.5 = 25.8

**b.**

| $x_i$ | $(x_i - \bar{x})$ | $(x_i - \bar{x})^2$ | $x_i^2$ |
|---|---|---|---|
| 29.5 | –1.53 | 2.3409 | 870.25 |
| 49.3 | 18.27 | 333.7929 | 2430.49 |
| 30.6 | –0.43 | 0.1849 | 936.36 |
| 28.2 | –2.83 | 8.0089 | 795.24 |
| 28.0 | –3.03 | 9.1809 | 784.00 |
| 26.3 | –4.73 | 22.3729 | 691.69 |
| 33.9 | 2.87 | 8.2369 | 1149.21 |
| 29.4 | –1.63 | 2.6569 | 864.36 |
| 23.5 | –7.53 | 56.7009 | 552.25 |
| 31.6 | 0.57 | 0.3249 | 998.56 |
| $\Sigma x_i = 310.3$ | $\Sigma(x_i - \bar{x}) = 0$ | $\Sigma(x_i - \bar{x})^2 = 443.801$ | $\Sigma x_i^2 = 10072.41$ |

$$\bar{x} = 31.03;\ s^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1} = \frac{443.801}{9} = 49.3112$$

**c.** $s = \sqrt{49.3112} = 7.0222$

**d.** $s^2 = \dfrac{\Sigma x^2 - (\Sigma x)^2 / n}{n-1} = \dfrac{10072.41 - (310.3)^2 / 10}{9} = 49.3112$