3. (a) cor(gasMileage ~ weight, data = cars)

(b) names(houses)

(c) filter(houses, sqFt > 2000)

(d) sum(sample(c(rep(1, 13), rep(0, 39)), size = 5))

(e) gf_boxplot(~ sqFt, data = houses)

(f) lm(gasMileage ~ weight, data = cars)

4. The interquartile range and median are resistant.

5. (a) The distribution is unimodal, right-skewed, with no conspicuous outliers.

(b) The mean is > (greater than) the median.

6. Here $$s = \sqrt{\frac{1}{3}\left[(15-10)^2 + (8-10)^2 + (6-10)^2 + (11-10)^2\right]} = \sqrt{\frac{1}{3}(25+4+16+1)}$$

$$= \sqrt{46/3} \doteq 3.916.$$

7. (a) As the description says, data is kept for each state in the U.S. States are the cases.

(b) What variable is measured on states is the reported number of bear sightings, a discrete variable.

8. (a) The correlation is close to (-1).

(b) It is the point near $(30, 32)$.

(c) $\hat{y} = 86.153 - 1.597\,x$

(d) At $x = 32.3$, the predicted value is $\hat{y} = 86.153 - 1.597(32.3) = 34.57$

So, the residual is $y - \hat{y} = 32.5 - 34.57 = -2.07$.

9. (a) The group distribution is the same whether looking at females or males. Knowing sex does not help in predicting group, so the two variables — sex and group — have no association.

(b) Though not appearing to be linear, there looks to be a negative association between x and y.

(c) There is enough difference between boxplots to seem plausible that you could more accurately predict score if you know group affiliation. Thus, group and score do seem to have an association.

10. Estimating $Q_1 = 62$ and $Q_3 = 50$, we get $IQR = 62 - 50 = 12$.

11. (a) $Pr(X \geq 4) = Pr(X = 4) + Pr(X = 6) = 0.4 + 0.25 = 0.65$

(b) $Pr(X \geq 4 \mid X \geq 2) = \dfrac{Pr(X \geq 4 \text{ and } X \geq 2)}{Pr(X \geq 2)} = \dfrac{Pr(X \geq 4)}{Pr(X \geq 2)} = \dfrac{0.65}{0.25 + 0.4 + 0.25} =$

$= \dfrac{13}{18} \doteq 0.7222$

(c) $E(X) = (0)(0.1) + (2)(0.25) + (4)(0.4) + (6)(0.25) = 3.6$

12. $Pr(\text{Red}) = Pr(\text{Red and } A) + Pr(\text{Red and } B)$

$= Pr(\text{Red} \mid A)\, Pr(A) + Pr(\text{Red} \mid B)\, Pr(B)$

$= \left(\frac{2}{6}\right)\left(\frac{4}{7}\right) + \left(\frac{4}{6}\right)\left(\frac{2}{8}\right)$

$= \dfrac{5}{14} \doteq 0.3571$