3.18. (a) 0.0122. (b) 1 – 0.0122 = 0.9878. (c) 1 – 0.9616 = 0.0384. (d) 0.9616 – 0.0122 = 0.9494.

3.19. (a) Search Table A for 0.80: $z = 0.84$ (software: 0.8416). (b) Search Table A for 0.65: $z = 0.39$ (software: 0.3853).

3.20. About 16.6%: A score of 820 corresponds to a standard score of $\frac{820 - 1020}{207} = -0.97$, which yields 0.1660 in Table A.

3.22. About 2.5% of young women are taller than the mean height of young men because 69.3 inches corresponds to a standard score (on the women’s scale) of $z = \frac{69.3 - 64}{2.7} = 1.96$, which yields 0.0250 in Table A (or round to $z = 2$ and use the 68–95–99.7 rule to get the same result).

3.24. (a) About 5%: $x < 240$ corresponds to $z < -1.625$. Table A gives 5.16% for -1.63 and 5.26% for -1.62. Software (or averaging the two table values) gives 5.21%. (b) About 55%: $240 < x < 270$ corresponds to $-1.625 < z < 0.25$. The area to the left of 0.25 is 0.5987 = 60%; subtracting the answer from part (a) leaves about 55%. (c) About 279 days or longer: Searching Table A for 0.80 leads to $z > 0.84$, which corresponds to $x > 266 + 0.84(16) = 279.44$. (Using the software value $z > 0.8416$ gives $x > 279.47$.)

4.13. (a) A positive association between IQ and GPA would mean that students with higher IQs tend to have higher GPAs, and those with lower IQs generally have lower GPAs. The plot does show a positive association. (b) The relationship is positive, roughly linear, and moderately strong (except for three outliers). (c) The lowest point on the plot is for a student with an IQ of about 103 and a GPA of about 0.5.

4.15. (a) The lowest is about 107 calories, with about 145 mg of sodium; the highest is about 195 calories, with about 510 mg of sodium. (b) There is a positive association: High-calorie hot dogs tend to be high in salt, and low-calorie hot dogs tend to have low sodium. (c) The lower left point is an outlier. Ignoring this point, the remaining points seem to fall roughly on a line. The relationship is moderately strong.

4.17. (a) The correlation for the data in Figure 4.6 is positive but not near 1; the plot clearly shows a positive association, but with quite a bit of scatter (even if we ignore the three outliers). (b) The correlation for the data in Figure 4.7 is closer to 1 because the spread is considerably less in this scatterplot (and the outlier in this scatterplot strengthens the positive association).