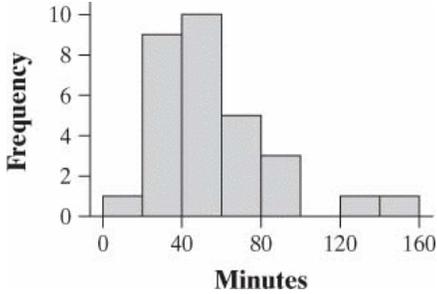


Key Midterm Review Chapter 1 and 2

Chapter 1

1. D 2. E 3. B 4. B. 5. C 6. C 7. B 8. C 9. E 10. B 11. D

12. (a) Here is a histogram.



(b) The first quartile is the median of the bottom 15 data points, or the 8th data value. Therefore, it is 30 minutes. The third quartile is the 23rd data point (the median of the top 15 data points), which is 77. So $IQR = 77 - 30 = 47$. Any point below $30 - 1.5(47) = -34.5$ or above $77 + 1.5(47) = 145.5$ is an outlier. So the observation of 151 minutes is an outlier. (c) It would be better to use the median and IQR to describe the center and spread of this distribution because it is skewed to the right.

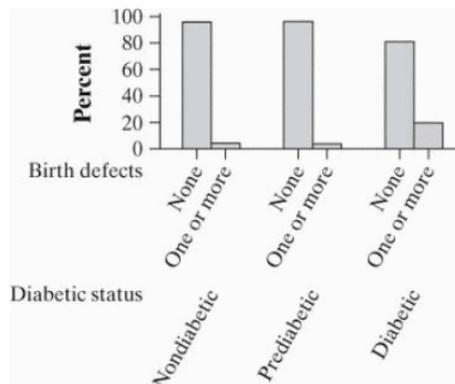
13. (a)

Birth Defects	Diabetic Status			Total
	Nondiabetic	Prediabetic	Diabetic	
None	754	362	38	1154
One or more	31	13	9	53
Total	785	375	47	1207

(b)

Birth Defects	Diabetic Status		
	Nondiabetic	Prediabetic	Diabetic
None	96.1%	96.5%	80.9%
One or more	3.9%	3.5%	19.1%

(c) Here is the bar graph



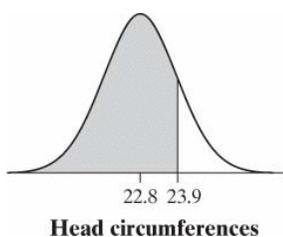
(d) There does appear to be an association. Nondiabetics and prediabetics appear to have babies with birth defects at about the same rate. However, women with diabetes have a much higher rate of babies with birth defects.

CHAPTER 2

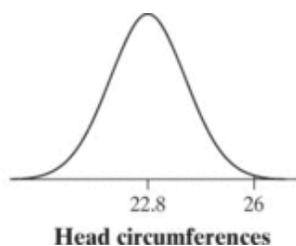
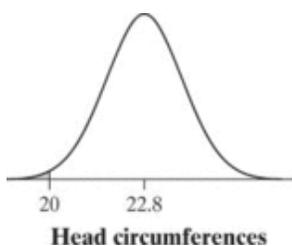
1. E 2. D 3. B 4. B. 5. A 6. D 7. C 8. E 9. E 10. C

11 (a) Jane's performance was better. She did more curlups than 85% of girls her age. This means that she qualified for both the Presidential award and for the National award. Matt did more curl-ups than 50% of boys his age. This means that less than 50% of the boys his age did better than he did, whereas less than 15% of the girls her age did better than Jane. Matt qualified for the National award, but did not qualify for the Presidential award. **(b)** Since Jane's position in her distribution is so much higher than Matt's position in his distribution, Jane's z -score is likely to be bigger than Matt's z -score.

12 (a) The z -value that corresponds to this soldier's head circumference is $z = \frac{23.9 - 22.8}{1.1} = 1$. So the proportion of observations lower than this is 0.8413 (using [Table A](#)). This means that this soldier's head circumference is in approximately the 84th percentile.



(b) Standardizing the left endpoint we get $z = \frac{20 - 22.8}{1.1} = -2.55$. Using [Table A](#), the area below -2.55 is 0.0054. Standardizing the right endpoint we get $z = \frac{26 - 22.8}{1.1} = 2.91$. The area below 2.91 (using [Table A](#)) is 0.9982, so the area above 2.91 is $1 - 0.9982 = 0.0018$. This means that the area in both tails is $0.0054 + 0.0018 = 0.0072$. So approximately 0.7% of soldiers require custom helmets.



(c) The quartiles of a standard Normal distribution are -0.67 and 0.67 . To find the quartiles of the head circumference distribution, we solve the following equations for x .

$$-0.67 = \frac{x - 22.8}{1.1} \Rightarrow x = -0.67(1.1) + 22.8 = 22.063$$

$$0.67 = \frac{x - 22.8}{1.1} \Rightarrow x = 0.67(1.1) + 22.8 = 23.537$$

This means that $Q_1 = 22.063$ and $Q_3 = 23.537$. So $IQR = Q_3 - Q_1 = 23.537 - 22.063 = 1.474$ inches.

13. No, these data do not seem to follow a Normal distribution. First, there is a large difference between the mean and the median. The mean is 48.25 and the median is 37.80. The Normal distribution is symmetric so the mean and median should be quite close in a Normally distributed data set. This data set appears to be highly skewed to the right. This can be seen by the fact that the mean is so much larger than the median. It can also be seen by the fact that the distance between the minimum and the median is $37.80 - 2 = 35.80$, but the distance between the median and the maximum is $204.90 - 37.80 = 167.10$.