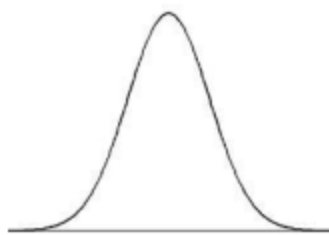


19. 0.0001 (Tech: 0.0000). The results suggest that the surveyed people did not respond accurately.
21. Probability of six or fewer: 0.1075 (Tech using normal approximation: 0.1080; Tech using binomial: 0.1034). Because that probability is not very small, the evidence against the rate of 20% is not very strong.
23. Probability of 170 or fewer: 0.0099 (Tech using normal approximation: 0.0098; Tech using binomial: 0.0089). Because the probability of 170 or fewer is so small with the assumed 20% rate, it appears that the rate is actually less than 20%.
25. a. 6; 0.4602 (Tech using normal approximation: 0.4583; tech using binomial: 0.4307)  
b. 101; 0.3936 (Tech using normal approximation: 0.3933; tech using binomial: 0.3932)  
c. The roulette game provides a better likelihood of making a profit.

## Chapter 6: Quick Quiz

1.  $\mu = 0$  and  $\sigma = 1$
- 2.



3.  $z = 2.05$  (Tech: 2.05375)
4. 0.8413
5. 0.0775 (Tech: 0.0776)
6. 0.1611 (Tech: 0.1618)
7. 0.0158 (Tech: 0.0156)
8. 4.898                      9. 0.0409
10. 82.31% (Tech: 82.26%)

## Chapter 6: Review Exercises

1. a. 0.9983    b. 0.9370    c. 0.8385  
d. -0.52    e. 0.1401
2. a. 7.93% (Tech: 7.89%)  
b. 1369.2 mm (Tech: 1369.4 mm)
3. a. 97.88%    b. 1742.6 mm
4. a. Normal    b. 21.1    c. 0.57
5. a. An unbiased estimator is a statistic that targets the value of the population parameter in the sense that the sampling distribution of the statistic has a mean that is equal to the mean of the corresponding parameter.  
b. Mean; variance; proportion    c. True
6. a. 85.08% (Tech: 85.12%). With about 15% of all men needing to bend, the design does not appear to be adequate, but the Mark VI monorail appears to be working quite well in practice.
7. a. 0.5753 (Tech: 0.5766)  
b. 0.9976. Yes, if the plane is full of male passengers, it is highly likely that it is overweight.
8. a. No. A histogram is far from bell-shaped. A normal quantile plot reveals a pattern of points that is far from a straight-line pattern.

- b. No. The sample size of  $n = 26$  does not satisfy the condition of  $n > 30$ , and the values do not appear to be from a population having a normal distribution.
9. 0.2296 (Tech using normal approximation: 0.2286; Tech using binomial: 0.2278). The occurrence of 787 offspring plants with long stems is not unusually low because its probability is not small. The results are consistent with Mendel's claimed proportion of  $3/4$ .
10. a. 0.7019 (Tech using normal approximation: 0.7024; Tech using binomial: 0.7100)  
b. 0.1148 (Tech using normal approximation: 0.1158; Tech using binomial: 0.1190)

## Chapter 6: Cumulative Review Exercises

1. a. \$10,300,000  
b. \$14,000,000  
c. \$5,552,027  
d. 30,825,003,810,000 square dollars  
e.  $z = 0.76$     f. Ratio    g. Discrete  
h. No, the starting players are likely to be the best players who receive the highest salaries.
2. a.  $\bar{A}$  is the event of selecting someone who does not have the belief that college is not a good investment. (This is not the same as selecting someone who believes that college is a good investment.)  
b. 0.9    c. 0.001  
d. The sample is a voluntary response (or self-selected) sample. This suggests that the 10% rate might not be very accurate, because people with strong feelings or interest about the topic are more likely to respond.
3. a. 0.0630 (Tech: 0.0627)  
b. 2643 g (Tech: 2642 g)  
c. 0.0005  
d. 0.3936 (Tech: 0.3923)
4. a. The vertical scale does not start at 0, so differences are somewhat distorted. By using a scale ranging from 1 to 29 for frequencies that range from 2 to 14, the graph is flattened, so differences are not shown as they should be.  
b. The graph depicts a distribution that is not exactly normal, but it is approximately normal because it is roughly bell-shaped.  
c. Minimum: 42 years; maximum: 70 years. Using the range rule of thumb, the standard deviation is estimated to be  $(70 - 42)/4 = 7$  years. The estimate of  $s = 7$  years is very close to the actual standard deviation of  $s = 6.6$  years, so the range rule of thumb works quite well here.
5. a. 0.001    b. 0.271  
c. The requirement that  $np \geq 5$  is not satisfied, indicating that the normal approximation would result in errors that are too large.  
d. 5.0    e. 2.1  
f. No, 8 is within two standard deviations of the mean and is within the range of values that could easily occur by chance.