b. Find the probability that 12 randomly selected men will have a mean weight that is greater than 167 lb (so that their total weight is greater than the gondola maximum capacity of 2004 lb).

c. Does the gondola appear to have the correct weight limit? Why or why not?

18. Pulse Rates of Women Women have pulse rates that are normally distributed with a mean of 77.5 beats per minute and a standard deviation of 11.6 beats per minute (based on Data Set 1 in Appendix B).

a. Find the percentiles P_1 and P_{99}.

b. Dr. Puretz sees exactly 25 female patients each day. Find the probability that 25 randomly selected women have a mean pulse rate between 70 beats per minute and 85 beats per minute.

c. If Dr. Puretz wants to select pulse rates to be used as cutoff values for determining when further tests should be required, which pulse rates are better to use: the results from part (a) or the pulse rates of 70 beats per minute and 85 beats per minute from part (b)? Why?

19. Redesign of Ejection Seats When women were allowed to become pilots of fighter jets, engineers needed to redesign the ejection seats because they had been originally designed for men only. The ACES-II ejection seats were designed for men weighing between 140 lb and 211 lb. Weights of women are now normally distributed with a mean of 165.0 lb and a standard deviation of 45.6 lb (based on Data Set 1 in Appendix B).

a. If 1 woman is randomly selected, find the probability that her weight is between 140 lb and 211 lb.

b. If 36 different women are randomly selected, find the probability that their mean weight is between 140 lb and 211 lb.

c. When redesigning the fighter jet ejection seats to better accommodate women, which probability is more relevant: the result from part (a) or the result from part (b)? Why?

20. Loading a Tour Boat The Ethan Allen tour boat capsized and sank in Lake George, New York, and 20 of the 47 passengers drowned. Based on a 1960 assumption of a mean weight of 140 lb for passengers, the boat was rated to carry 50 passengers. After the boat sank, New York State changed the assumed mean weight from 140 lb to 174 lb.

a. Given that the boat was rated for 50 passengers with an assumed mean of 140 lb, the boat had a passenger load limit of 7000 lb. Assume that the boat is loaded with 50 male passengers, and assume that weights of men are normally distributed with a mean of 182.9 lb and a standard deviation of 40.8 lb (based on Data Set 1 in Appendix B). Find the probability that the boat is overloaded because the 50 male passengers have a mean weight greater than 140 lb.

b. The boat was later rated to carry only 14 passengers, and the load limit was changed to 2436 lb. If 14 passengers are all males, find the probability that the boat is overloaded because their mean weight is greater than 174 lb (so that their total weight is greater than the maximum capacity of 2436 lb). Do the new ratings appear to be safe when the boat is loaded with 14 male passengers?

21. Doorway Height The Boeing 757-200 ER airliner carries 200 passengers and has doors with a height of 72 in. Heights of men are normally distributed with a mean of 69.5 in. and a standard deviation of 2.4 in. (based on Data Set 1 in Appendix B).

a. If a male passenger is randomly selected, find the probability that he can fit through the doorway without bending.

b. If half of the 200 passengers are men, find the probability that the mean height of the 100 men is less than 72 in.

c. When considering the comfort and safety of passengers, which result is more relevant: the probability from part (a) or the probability from part (b)? Why?

d. When considering the comfort and safety of passengers, why are women ignored in this case?