1. Suppose that 30% of the people in a population are obese. A sample of size 100 is taken from this population. Let $X$ be the number of obese people in the sample, and find the following.

(a) $P(X \leq 34)$  
(b) $P(X \geq 27)$  
(c) $P(23 \leq X \leq 36)$

2. Suppose 15% of a population has the flu, and we take a random sample of 70 people from this population. Let $X$ be the number of people in the sample with the flu, and find the following.

(a) $P(X < 11)$  
(b) $P(X > 9)$  
(c) $P(6 < X < 12)$

3. The masses of a population of birds are normally distributed with mean 65 grams and standard deviation 14 grams. Find the probability that a randomly selected bird will have a mass

(a) less than 80 grams.  
(b) greater than 70 grams.  
(c) between 60 and 75 grams.

4. Suppose scores on a biology exam are normally distributed with a mean of 74 and a standard deviation of 8. What percentage of students scored

(a) above 90?  
(b) between 80 and 90?  
(c) below 70?

5. If a population is normally distributed, what percentage of observations are

(a) within one standard deviation of the mean?  
(b) within two standard deviations of the mean?  
(c) within three standard deviations of the mean?

6. Suppose IQ scores are normally distributed with a mean of 100 and a standard deviation of 15. Find the following percentages without using your calculator, and then check your work with your calculator.

(a) The percentage of IQ scores between 85 and 115.  
(b) The percentage of IQ scores between 70 and 130.  
(c) The percentage of IQ scores between 55 and 145.
Answers

1. (a) 0.837
   (b) 0.776
   (c) 0.872

2. (a) 0.516
   (b) 0.617
   (c) 0.560

3. (a) 0.858
   (b) 0.360
   (c) 0.402

4. (a) 2%
   (b) 20%
   (c) 31%

5. (a) 68%
   (b) 95%
   (c) 99.7%

6. (a) 68%
   (b) 95%
   (c) 99.7%