

1. The scores of students on the ACT college entrance examination in 2009 followed a normal distribution with mean 21.1 and standard deviation 5.1.

- (a) What is the probability that a single randomly chosen student scored 23 or higher on the ACT?
- (b) What are the mean and standard deviation of the average ACT score \bar{x} for an SRS of 50 students?
- (c) What is the probability that the average ACT score of an SRS of 50 students is 23 or higher?
- (d) Would your answers to a, b, or c be affected if the distribution of ACT scores in the population was distinctly nonnormal?

2. An iPod has about 10,000 songs. The distribution of the play times for these songs is heavily skewed to the right with a mean of 225 seconds and a standard deviation of 60 seconds.

- a) Explain why you cannot safely calculate the probability that the mean play time \bar{x} is more than 4 minutes (240 seconds) for an SRS of 10 songs.
- b) Suppose we take an SRS of 36 songs instead. Explain how the central limit theorem allows us to find the probability that the mean play time is more than 240 seconds. Then calculate this probability.
- c) What is the probability that the range of songs in the sample of 36 is between 200 and 250 minutes?