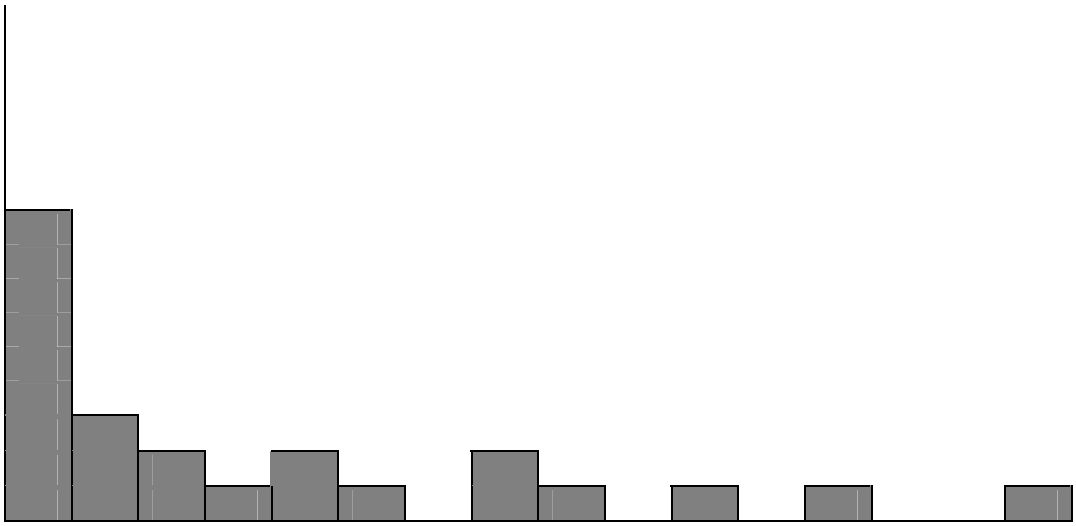
AP Statistics **Normal Model and z-scores**

1. CATTLE The Virginia Cooperative Extension reports that the mean weight of yearling Angus steers is 1152 pounds. Suppose the weight of all such animals can be described by a normal distribution with a standard deviation of 84 pounds.

a) How many standard deviations from the mean would a steer weighing 1000 pounds be?

b) Which would be more unusual, a steer weighing 1000 pounds or one weighing 1250 pounds?

2. TV WATCHING A survey of 200 college students conducted during the week of March 15, 1999, showed the following distribution of the number of hours of TV watched per week:



The mean is 3.66 hours, with a standard deviation of 4.93 hours.

a) According to the normal model, what percent of students will watch fewer than 1 standard deviation below the mean number of hours?

b) For these data, what does that mean? Explain.

c) Would the median of number of hours be lower or higher than the mean?

d) Explain the problem in using a normal model for these data.

3. BODY TEMPERATURES Most people think that the normal adult body temperature is 98.6°F. That figure, based on a 19^{th}-century study, has recently been challenged. In a 1992 article in the Journal of the American Medical Association, researchers reported that a more accurate figure may be 98.2°F. Furthermore, the standard deviation appeared to be around 0.7°F. Assume that a normal distribution is appropriate.

a) In what interval would you expect most people's body temperature to be? Explain.

b) What fraction of people would be expected to have body temperatures above 98.6°F?

c) Below what body temperature are the coolest 20% of all people?

4. TIRES A tire manufacturer believes that the treadlife of its snow tires can be described by a normal distribution with a mean of 32,000 and a standard deviation of 2500 miles.

a) If you buy a set of tires, would it be reasonable for you to hope they'll last 40,000 miles? Explain.

b) Approximately what fraction of these tires can be expected to last less than 30,000 miles?

c) Approximately what percent of these tires can be expected to last between 30,000 and 35,000 miles?

d) Estimate the IQR for the treadlife.

e) In planning a marketing strategy, a local tire dealer wants to offer a refund to any customer whose tires fail to last a certain number of miles. However, the dealer does not want to take too big a risk. If the dealer is willing to give refunds to no more than 1 of every 25 customers, for what mileage can he guarantee these tires to last?

5. KINDERGARTEN Companies who design furniture for elementary school classrooms produce a variety of sizes for kids of different ages. The heights of kindergarten children follow a normal model with a mean of 38.2 inches and a standard deviation of 1.8 inches.

a) What proportion of kindergarten kids should the company expect to be less than 3 feet tall?

b) In what height interval should the company find the middle 80% of kindergarteners?

c) At least how tall are the biggest 10% of kindergarteners?