The measure of intelligence chosen by the authors is the well known Intelligent Quotient (IQ). Numerous tests have been developed to measure IQ; Herrnstein and Murray use the Armed Forces Qualification Test (AFQT), originally designed to measure the cognitive ability of military recruits. Psychologists traditionally treat IQ as a random variable having a normal distribution with mean $\mu = 100$ and standard deviation $\sigma = 15$. This distribution, or *bell curve,* is shown in Figure 5.16.

In their book, Herrnstein and Murray refer to five cognitive classes of people defined by percentiles of the normal distribution. Class I ("very bright") consists of those with IQs above the 95th percentile; Class II ("bright") are those with IQs between the 75th and 95th percentiles; Class III ("normal") includes IQs between the 25th and 75th percentiles; Class IV ("dull") are those with IQs between the 5th and 25th percentiles; and Class V ("very dull") are IQs below the 5th percentile. These classes are also illustrated in Figure 5.16.

Focus

a. Assuming that the distribution of IQ is accurately represented by the bell curve in Figure 5.16, determine the proportion of people with IQs in each of the five cognitive classes defined by Herrnstein and Murray.

b. Although the cognitive classes above are defined in terms of percentiles, the authors stress that IQ scores should be compared with z-scores, not percentiles. In other words, it is more informative to give the difference in z-scores for two IQ scores than it is to give the difference in percentiles. To demonstrate this point, calculate the difference in z-scores for IQs at the 50th and 55th percentiles. Do the same for IQs at the 94th and 99th percentiles. What do you observe?

c. Researchers have found that scores on many intelligence tests are decidedly nonnormal. Some distributions are skewed toward higher scores, other toward lower scores. How would the proportions in the five cognitive classes differ for an IQ distribution that is skewed right? Skewed left?

FIGURE 5.16
The distribution of IQ