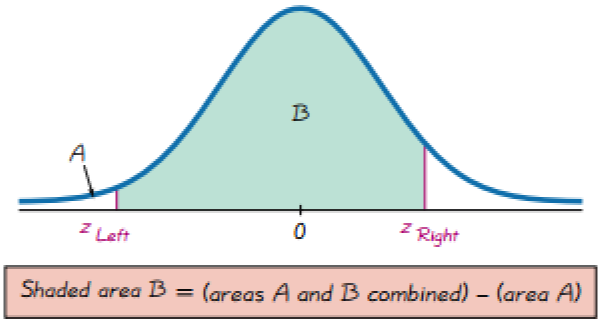

Figure 6-8 **Finding the Area between Two z Scores**

Probabilities such as those in the preceding examples can also be expressed with the following notation.

Notation

$P(a < z < b)$	denotes the probability that the z score is between a and b.
$P(z > a)$	denotes the probability that the z score is greater than a.
$P(z < a)$	denotes the probability that the z score is less than a.

Using this notation, $P(-2.50 < z < -1.00) = 0.1525$, states in symbols that the probability of a z score falling between -2.50 and -1.00 is 0.1525 (as in Example 5).

Finding *z* Scores from Known Areas

Examples 3, 4, and 5 all involved the standard normal distribution, and they were all examples with this same format: Given z scores, find areas (or probabilities). In many cases, we need a method for reversing the format: Given a known area (or probability), find the corresponding z score. In such cases, it is really important to avoid confusion between z scores and areas. Remember, z scores are *distances* along the horizontal scale, but areas (or probabilities) are regions under the curve. (Table A-2 lists z-scores in the left column and across the top row, but areas are found in the *body* of the table.) We should also remember that z scores positioned in the left half of the curve are always negative. If we already know a probability and want to find the corresponding z score, we use the following procedure.

Procedure for Finding a *z* Score from a Known Area

1. Draw a bell-shaped curve and identify the region under the curve that corresponds to the given probability. If that region is not a cumulative region from the left, work instead with a known region that is a cumulative region from the left.
2. Use technology or Table A-2 to find the z score. With Table A-2, use the cumulative area from the left, locate the closest probability in the *body* of the table, and identify the corresponding z score.

Example 6 Bone Density Test

Use the same bone density test scores described in Example 3. Those scores are normally distributed with a mean of 0 and a standard deviation of 1, so they meet the requirements of a standard normal distribution. Find the bone density score corresponding to P_{95}, the 95th percentile. That is, find the bone density score that separates the bottom 95% from the top 5%. See Figure 6-9.