3. If you know z and must convert to the equivalent x value, use Formula 6-2 by entering the values for μ, σ, and the z score found in Step 2, then solve for x. Based on Formula 6-2, we can solve for x as follows:

$$x = \mu + (z \cdot \sigma) \qquad \text{(another form of Formula 6-2)}$$

(If z is located to the left of the mean, be sure that it is a negative number.)

4. Refer to the sketch of the curve to verify that the solution makes sense in the context of the graph and in the context of the problem.

The following example uses this procedure for finding a value from a known area.

Example 3 Designing Aircraft Cabins

When designing an environment, one common criterion is to use a design that accommodates 95% of the population. What aircraft ceiling height will allow 95% of men to stand without bumping their heads? That is, find the 95th percentile of heights of men. Assume that heights of men are normally distributed with a mean of 69.5 in. and a standard deviation of 2.4 in.

Solution

Step 1: Figure 6-14 shows the normal distribution with the height x that we want to identify. The shaded area represents the 95% of men with heights that would allow them to stand without bumping their heads on the aircraft ceiling.

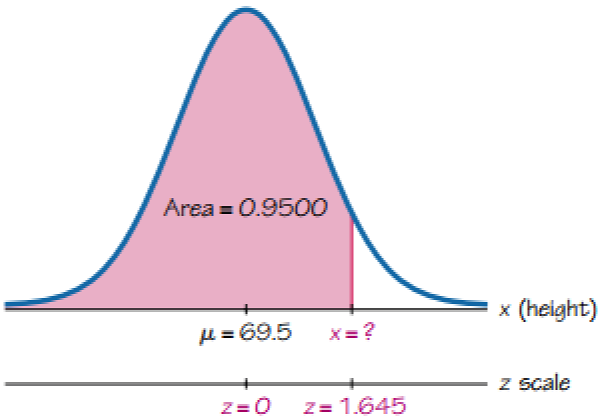
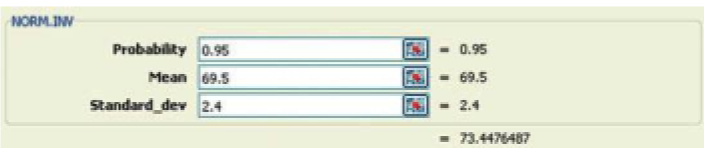


Figure 6-14 **Finding the 95th Percentile**

Step 2: To use technology, refer to the instructions at the end of this section. Technology will provide the value of x in Figure 6-14. For example, see the accompanying Excel display showing that $x = 73.4476487$, or 73.4 when rounded.

EXCEL



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