

Formula 6-2

$$z = \frac{x - \mu}{\sigma} \quad (\text{round } z \text{ scores to 2 decimal places})$$

Some calculators and computer software programs do not require the above conversion to z scores because probabilities can be found directly. However, if you use Table A-2 to find probabilities, you **must** first convert values to standard z scores. Whether using technology or Table A-2, it is important to clearly understand the above conversion principle, because it is an important foundation for concepts introduced in the following chapters.

Figure 6-11 illustrates the conversion from a nonstandard to a standard normal distribution. The area in any normal distribution bounded by some score x (as in Figure 6-11(a)) is the same as the area bounded by the equivalent z score in the standard normal distribution (as in Figure 6-11(b)). This shows that when working with a nonstandard normal distribution, you can use Table A-2 the same way it was used in Section 6-2, provided that you first convert the values to z scores.

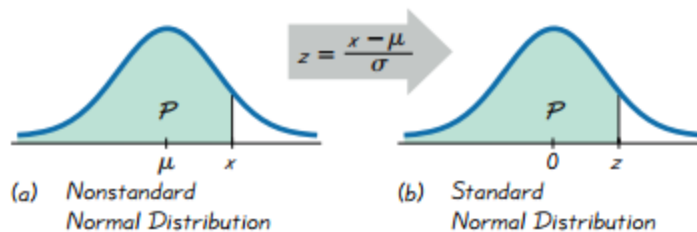


Figure 6-11 Converting Distributions

When finding areas with a nonstandard normal distribution, use the following procedure.

Procedure for Finding Areas with a Nonstandard Normal Distribution

1. Sketch a normal curve, label the mean and any specific x values, then *shade* the region representing the desired probability.
2. For each relevant value x that is a boundary for the shaded region, use Formula 6-2 to convert that value to the equivalent z score.
3. Use computer software or a calculator or Table A-2 to find the area of the shaded region. This area is the desired probability.

The following example applies these three steps to illustrate the relationship between a typical nonstandard normal distribution and the standard normal distribution.

Example 1 What Proportion of Women Are Eligible for Tall Clubs International?

The social organization Tall Clubs International has a requirement that women must be at least 70 in. tall. Given that women have normally distributed heights with a mean of 63.8 in. and a standard deviation of 2.6 in., find the percentage of women who satisfy that height requirement.