Interpretation

The proportion of women taller than 70 in. is 0.0087, or 0.87%. That is, just under 1% of women meet the minimum height requirement of 70 in. Tall Clubs International allows only the tallest of women.

Example 2 Airline Flight Crew Requirement

The Chapter Problem stated that British Airways and many other airlines have a requirement that a member of the cabin crew must have a height between 62 in. and 73 in. (or between 5 ft 2 in. and 6 ft 1 in.). Given that men have normally distributed heights with a mean of 69.5 in. and a standard deviation of 2.4 in., find the percentage of men who satisfy that height requirement.

Solution

Figure 6-13 shows the shaded region representing heights of men between 62 in. and 73 in.

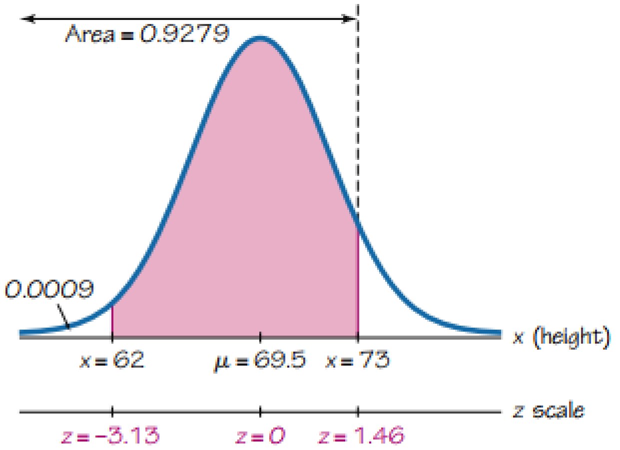

Figure 6-13 Heights of Men

Step 1: See Figure 6-13, which incorporates this information: Men have heights that are normally distributed with a mean of 69.5 in. and a standard deviation of 2.4 in. The shaded region represents the men who satisfy the height requirement by having a height between 62 in. and 73 in.

Step 2: To use technology, refer to the instructions at the end of this section. Technology will show that the shaded area in Figure 6-13 is 0.9267.

If using Table A-2, we cannot find the shaded area directly, but we can find it indirectly by using the same procedures from Section 6-2, as follows: (1) Find the cumulative area from the left up to 73 in. (or $z = 1.46$); (2) find the cumulative area from the left up to 62 in. (or $z = -3.13$); (3) find the difference between those two areas. The heights of 73 in. and 62 in. are converted to z scores by using Formula 6-2 as follows:

$$\text{For } x = 73 \text{ in.: } z = \frac{x - \mu}{\sigma} = \frac{73 - 69.5}{2.4} = 1.46 \quad (z = 1.46 \text{ yields an area of } 0.9279.)$$

$$\text{For } x = 62 \text{ in.: } z = \frac{x - \mu}{\sigma} = \frac{62 - 69.5}{2.4} = -3.13 \quad (z = -3.13 \text{ yields an area of } 0.0009.)$$