PERFECT SQUARES The square of an integer is called a **perfect square**. As shown in Example 1, the square root of a perfect square is an integer. As you will see in Example 2, you need to approximate a square root if the radicand is a whole number that is *not* a perfect square.

EXAMPLE 2 Approximate a square root

FURNITURE The top of a folding table is a square whose area is 945 square inches. Approximate the side length of the tabletop to the nearest inch.

Solution

You need to find the side length s of the tabletop such that $s^2 = 945$. This means that s is the positive square root of 945. You can use a table to determine whether 945 is a perfect square.

Number	28	29	30	31	32
Square of number	784	841	900	961	1024

As shown in the table, 945 is *not* a perfect square. The greatest perfect square less than 945 is 900. The least perfect square greater than 945 is 961.

$900 < 945 < 961$ **Write a compound inequality that compares 945 with both 900 and 961.**

$\sqrt{900} < \sqrt{945} < \sqrt{961}$ **Take positive square root of each number.**

$30 < \sqrt{945} < 31$ **Find square root of each perfect square.**

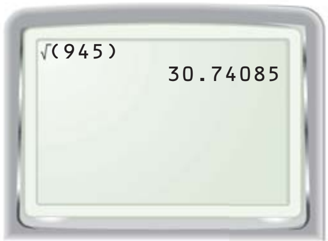
Because 945 is closer to 961 than to 900, $\sqrt{945}$ is closer to 31 than to 30.

▶ The side length of the tabletop is about 31 inches.

USING A CALCULATOR In Example 2, you can use a calculator to obtain a better approximation of the side length of the tabletop.

[2nd] [√] 945 [)] [ENTER]

The side length is about 30.74 inches, which is closer to 31 than to 30.



✓ GUIDED PRACTICE for Example 2

Approximate the square root to the nearest integer.

5. $\sqrt{32}$ **6.** $\sqrt{103}$ **7.** $-\sqrt{48}$ **8.** $-\sqrt{350}$

IRRATIONAL NUMBERS The square root of a whole number that is not a perfect square is an example of an *irrational number*. An **irrational number**, such as $\sqrt{945} = 30.74085...$, is a number that cannot be written as a quotient of two integers. The decimal form of an irrational number neither terminates nor repeats.