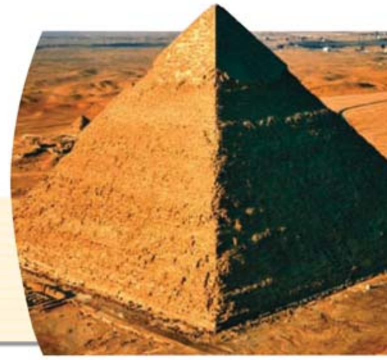
2.7 Find Square Roots and Compare Real Numbers

TEKS a.1, a.6; 8.1.C



Before You found squares of numbers and compared rational numbers.

Now You will find square roots and compare real numbers.

Why? So you can find side lengths of geometric shapes, as in Ex. 54.

Key Vocabulary
- **square root**
- **radicand**
- **perfect square**
- **irrational number**
- **real numbers**

Recall that the square of 4 is $4^2 = 16$ and the square of -4 is $(-4)^2 = 16$. The numbers 4 and -4 are called the *square roots* of 16. In this lesson, you will find the square roots of nonnegative numbers.

KEY CONCEPT *For Your Notebook*

Square Root of a Number

Words If $b^2 = a$, then b is a **square root** of a.

Example $3^2 = 9$ and $(-3)^2 = 9$, so 3 and -3 are square roots of 9.

All positive real numbers have two square roots, a positive square root (or *principal* square root) and a negative square root. A square root is written with the radical symbol $\sqrt{}$. The number or expression inside a radical symbol is the **radicand**.

radical symbol $\longrightarrow \sqrt{a} \longleftarrow$ radicand

Zero has only one square root, 0. Negative real numbers do not have real square roots because the square of every real number is either positive or 0.

EXAMPLE 1 Find square roots

Evaluate the expression.

READING The symbol $\pm$ is read as "plus or minus" and refers to both the positive square root and the negative square root.

a. $\pm\sqrt{36} = \pm 6$ — The positive and negative square roots of 36 are 6 and -6.

b. $\sqrt{49} = 7$ — The positive square root of 49 is 7.

c. $-\sqrt{4} = -2$ — The negative square root of 4 is -2.

GUIDED PRACTICE for Example 1

Evaluate the expression.

1. $-\sqrt{9}$ **2.** $\sqrt{25}$ **3.** $\pm\sqrt{64}$ **4.** $-\sqrt{81}$