6.5 Solve Absolute Value Equations

TEKS A.7.A, A.7.B

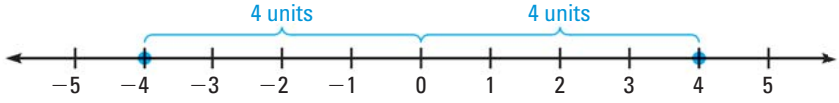
Before You solved linear equations.

Now You will solve absolute value equations.

Why? So you can analyze rules of a competition, as in Ex. 43.

Key Vocabulary
- **absolute value equation**
- **absolute deviation**
- **absolute value,** *p. 66*

The absolute value of a number a, written $|a|$, is the distance between a and 0 on a number line. An **absolute value equation**, such as $|x| = 4$, is an equation that contains an absolute value expression. The equation $|x| = 4$ means that the distance between x and 0 is 4. The solutions of the equation are 4 and -4, because they are the only numbers whose distance from 0 is 4.



EXAMPLE 1 Solve an absolute value equation

Solve $|x| = 7$.

Solution

The distance between x and 0 is 7. So, $x = 7$ *or* $x = -7$.

▸ The solutions are 7 and -7.

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✓ GUIDED PRACTICE for Example 1

1. Solve **(a)** $|x| = 3$ and **(b)** $|x| = 15$.

SOLVING ABSOLUTE VALUE EQUATIONS In Example 1, notice that the expression inside the absolute value symbols equals 7 or the opposite of 7. This suggests the following rule for solving an absolute value equation.

KEY CONCEPT *For Your Notebook*

Solving an Absolute Value Equation

The equation $|ax + b| = c$ where $c \geq 0$ is equivalent to the statement $ax + b = c$ *or* $ax + b = -c$.