6.6 Solve Absolute Value Inequalities

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

| Before | You solved absolute value equations. |
| Now | You will solve absolute value inequalities. |
| Why | So you can analyze softball compression, as in Ex. 38. |

Key Vocabulary
• **absolute value,** *p. 66*
• **equivalent inequalities,** *p. 357*
• **compound inequality,** *p. 380*
• **absolute deviation,** *p. 391*
• **mean,** *p. 918*

Recall that $|x| = 3$ means that the distance between x and 0 is 3. The inequality $|x| < 3$ means that the distance between x and 0 is *less than* 3, and $|x| > 3$ means that the distance between x and 0 is *greater than* 3. The graphs of $|x| < 3$ and $|x| > 3$ are shown below.

Graph of $|x| < 3$
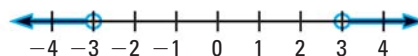
Graph of $|x| > 3$

EXAMPLE 1 Solve absolute value inequalities

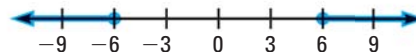**Solve the inequality. Graph your solution.**

a. $|x| \geq 6$

b. $|x| \leq 0.5$

Solution

a. The distance between x and 0 is greater than or equal to 6. So, $x \leq -6$ *or* $x \geq 6$.

▶ The solutions are all real numbers less than or equal to -6 *or* greater than or equal to 6.

b. The distance between x and 0 is less than or equal to 0.5. So, $-0.5 \leq x \leq 0.5$.

▶ The solutions are all real numbers greater than or equal to -0.5 *and* less than or equal to 0.5.

✓ **GUIDED PRACTICE**   for Example 1

Solve the inequality. Graph your solution.

1. $|x| \leq 8$

2. $|u| < 3.5$

3. $|v| > \dfrac{2}{3}$

SOLVING ABSOLUTE VALUE INEQUALITIES In Example 1, the solutions of $|x| \geq 6$ and $|x| \leq 0.5$ suggest that you can rewrite an absolute value inequality as a compound inequality.