READING

You can use the words *between* and *beyond* to describe absolute value inequalites. For example, $|x| < 2$ means that x is between -2 *and* 2; $|x| > 2$ means that x is beyond -2 *or* beyond 2.

KEY CONCEPT *For Your Notebook*

Solving Absolute Value Inequalities

- The inequality $|ax + b| < c$ where $c > 0$ is equivalent to the compound inequality $-c < ax + b < c$.
- The inequality $|ax + b| > c$ where $c > 0$ is equivalent to the compound inequality $ax + b < -c$ *or* $ax + b > c$.

In the inequalities above, $<$ can be replaced by $\leq$ and $>$ can be replaced by $\geq$.

EXAMPLE 2 Solve an absolute value inequality

Solve $|x - 5| \geq 7$. Graph your solution.

$|x - 5| \geq 7$ — Write original inequality.

$x - 5 \leq -7$ *or* $x - 5 \geq 7$ — Rewrite as compound inequality.

$x \leq -2$ *or* $x \geq 12$ — Add 5 to each side.

▶ The solutions are all real numbers less than or equal to -2 *or* greater than or equal to 12. Check several solutions in the original inequality.

EXAMPLE 3 Solve an absolute value inequality

Solve $|-4x - 5| + 3 < 9$. Graph your solution.

$|-4x - 5| + 3 < 9$ — Write original inequality.

$|-4x - 5| < 6$ — Subtract 3 from each side.

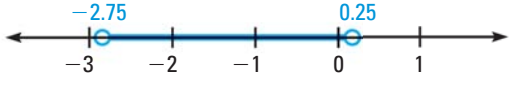
$-6 < -4x - 5 < 6$ — Rewrite as compound inequality.

$-1 < -4x < 11$ — Add 5 to each expression.

$0.25 > x > -2.75$ — Divide each expression by -4. Reverse inequality symbol.

$-2.75 < x < 0.25$ — Rewrite in the form $a < x < b$.

▶ The solutions are all real numbers greater than -2.75 *and* less than 0.25.



Animated Algebra at classzone.com

GUIDED PRACTICE for Examples 2 and 3

Solve the inequality. Graph your solution.

4. $|x + 3| > 8$ **5.** $|2w - 1| < 11$ **6.** $3|5m - 6| - 8 \leq 13$