NO SOLUTIONS The absolute value of a number is never negative. So, when an absolute value expression equals a negative number, there are *no solutions*.

EXAMPLE 4 Decide if an equation has no solutions

Solve $|3x + 5| + 6 = -2$, if possible.

$|3x + 5| + 6 = -2$ Write original equation.

$|3x + 5| = -8$ Subtract 6 from each side.

▸ The absolute value of a number is never negative. So, there are no solutions.

ABSOLUTE DEVIATION The **absolute deviation** of a number x from a given value is the absolute value of the difference of x and the given value: absolute deviation $= |x - \text{given value}|$.

EXAMPLE 5 Use absolute deviation

BASKETBALLS Before the start of a professional basketball game, a basketball must be inflated to an air pressure of 8 pounds per square inch (psi) with an absolute error of 0.5 psi. (*Absolute error* is the absolute deviation of a measured value from an accepted value.) Find the minimum and maximum acceptable air pressures for the basketball.

Solution

Let p be the air pressure (in psi) of a basketball. Write a verbal model. Then write and solve an absolute value equation.

Absolute error	=	Measured air pressure	−	Accepted air pressure
↓		↓		↓
0.5	**=**	$\|$ **p**	**−**	**8** $\|$

$0.5 = |p - 8|$ Write original equation.

$0.5 = p - 8$ *or* $-0.5 = p - 8$ Rewrite as two equations.

$8.5 = p$ *or* $7.5 = p$ Add 8 to each side.

▸ The minimum and maximum acceptable pressures are 7.5 psi and 8.5 psi.

✓ GUIDED PRACTICE for Examples 4 and 5

Solve the equation, if possible.

5. $2|m - 5| + 4 = 2$

6. $-3|n + 2| - 7 = -10$

7. The absolute deviation of x from 7.6 is 5.2. What are the values of x that satisfy this requirement?