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 - given value|.

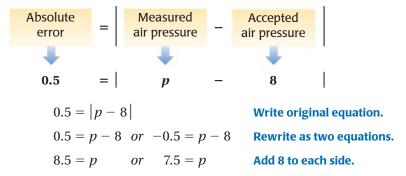
EXAMPLE 5 Use absolute deviation

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.



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?