

## Exercise 7

Describe all numbers  $x$  that are at a distance of  $\frac{1}{2}$  from the number  $-4$ . Express this using absolute value notation.

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### Solution

The distance from  $x$  to  $-4$ , represented by  $|x - (-4)|$ , or  $|x + 4|$ , must be equal to  $\frac{1}{2}$ .

$$|x + 4| = \frac{1}{2}$$

Remove the absolute value sign by placing  $\pm$  on the right side.

$$x + 4 = \pm \frac{1}{2}$$

$$x + 4 = \frac{1}{2} \quad \text{or} \quad x + 4 = -\frac{1}{2}$$

Subtract 4 from both sides of each equation.

$$x = -3.5 = -\frac{7}{2} \quad \text{or} \quad x = -4.5 = -\frac{9}{2}$$

Therefore,

$$x = \left\{ -\frac{9}{2}, -\frac{7}{2} \right\}.$$