Solve the equation.

1. $|w| = 7$

$w = 7, -7$

2. ~~$|d| = 19$~~

$\frac{-2d}{-2} = \frac{14}{-2}$ $\frac{-2d}{-2} = \frac{-14}{-2}$

$d = -7$ $d = 7$

3. $|m - 4| = 6$

4. $|-2d| = 14$

5. $|5b + 4| = 21$

6. $-6|9 + 4n| = 12$

What value of *a* makes the equation an identity? Explain your reasoning.

1. $3a(x - 4) = 8x - 16$

2. $10x + 7 - 4ax = 4ax + 3a$

3. $3x - 2 = 10x - 14 + 2a$

4. $7x + 9 - 2ax = 6ax + a$

Essential Question

How can you solve an absolute value inequality?

Work with a partner. Consider the absolute value inequality

$|x + 2| \leq 3$.

a. Describe the values of $x + 2$ that make the inequality true. Use your description to write two linear inequalities that represent the solutions of the absolute value inequality.

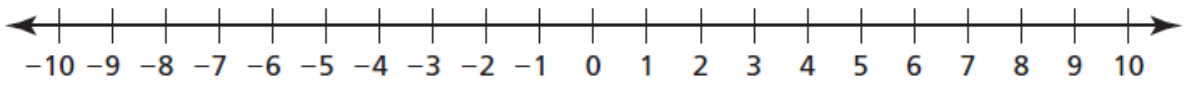
b. Use the linear inequalities you wrote in part (a) to fi nd the solutions of the absolute value inequality.

c. How can you use linear inequalities to solve an absolute value inequality?

Work with a partner. Consider the absolute value inequality

$|x + 2| \leq 3$.

a. On a real number line, locate the point for which $x + 2 = 0$.



b. Locate the points that are within 3 units from the point you found in part (a). What do you notice about these points?

c. How can you use a number line to solve an absolute value inequality?

Work with a partner. Consider the absolute value inequality

$|x + 2| \leq 3$.

a. Use a spreadsheet, as shown, to solve the absolute value inequality.

b. Compare the solutions you found using the spreadsheet with those you found in Explorations 1 and 2. What do you notice?

c. How can you use a spreadsheet to solve an absolute value inequality?

	A	B
1	***x***	**|x + 2|**
2	-6	4
3	-5	
4	-4	
5	-3	
6	-2	
7	-1	
8	0	
9	1	
10	2	

abs(A2 + 2)

Core Concept

Solving Absolute Value Inequalities

To solve $|ax + b| < c$ for $c > 0$, solve the compound inequality

$$ax + b > -c \quad \textit{and} \quad ax + b < c.$$

To solve $|ax + b| > c$ for $c > 0$, solve the compound inequality

$$ax + b < -c \quad \textit{or} \quad ax + b > c.$$

In the inequalities above, you can replace $<$ with $\leq$ and $>$ with $\geq$.

Solve each inequality. Graph each solution, if possible.

a. $|x + 7| \leq 2$ **b.** $|8x - 11| < 0$

Solve the inequality. Graph the solution, if possible.

1. $|x| \leq 3.5$ **2.** $|k - 3| < -1$ **3.** $|2w - 1| < 11$

Solve each inequality. Graph each solution.

a. $|c - 1| \geq 5$ **b.** $|10 - m| \geq -2$ **c.** $4|2x - 5| + 1 > 21$

Solve the inequality. Graph the solution.

4. $|x + 3| > 8$ **5.** $|n + 2| - 3 \geq -6$ **6.** $3|d + 1| - 7 \geq -1$

You are buying a new computer. The table shows the prices of computers in a store advertisement. You are willing to pay the mean price with an absolute deviation of at most $100. How many of the computer prices meet your condition?

7. WHAT IF? You are willing to pay the mean price with an absolute deviation of at most $75. How many of the computer prices meet your condition?

Concept Summary

Solving Inequalities

One-Step and Multi-Step Inequalities

- Follow the steps for solving an equation. Reverse the inequality symbol when multiplying or dividing by a negative number.

Compound Inequalities

- If necessary, write the inequality as two separate inequalities. Then solve each inequality separately. Include *and* or *or* in the solution.

Absolute Value Inequalities

- If necessary, isolate the absolute value expression on one side of the inequality. Write the absolute value inequality as a compound inequality. Then solve the compound inequality.

Exit Ticket: Solve and graph.

$|x - 7| < 13$

$|x + 4| \geq 8$