Name_____ Date _____

2.6 Solving Absolute Value Inequalities

For use with Exploration 2.6

Essential Question How can you solve an absolute value inequality?

1 EXPLORATION: Solving an Absolute Value Inequality Algebraically

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 find the solutions of the absolute value inequality.

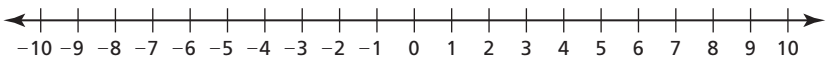
c. How can you use linear inequalities to solve an absolute value inequality?

2 EXPLORATION: Solving an Absolute Value Inequality Graphically

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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?

Name _____ Date _____

3 EXPLORATION: Solving an Absolute Value Inequality Numerically

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

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.

	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)

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?

Communicate Your Answer

4. How can you solve an absolute value inequality?

5. What do you like or dislike about the algebraic, graphical, and numerical methods for solving an absolute value inequality? Give reasons for your answers.

Name_____ Date _____

2.6 Notetaking with Vocabulary

For use after Lesson 2.6

In your own words, write the meaning of each vocabulary term.

absolute value inequality

absolute deviation

Notes:

Core Concepts

Solving Absolute Value Inequalities

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

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

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

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

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

Notes:

Name _____ Date _____

2.6 Notetaking with Vocabulary (continued)

Extra Practice

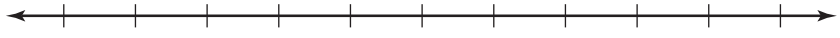
In Exercises 1–9, solve the inequality. Graph the solution, if possible.

1. $|y + 2| < 8$

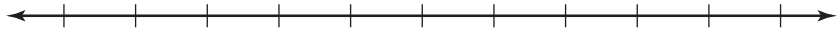
2. $\left|\frac{q}{3}\right| > 2$

3. $3|2a + 5| + 10 \leq 37$

4. $|y - 3| \leq 4$



5. $|3 + r| - 4 < 0$

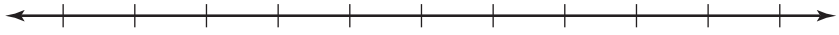


Name_____ Date _____

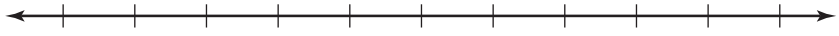
2.6 Notetaking with Vocabulary (continued)

6. $|f + 12| > -4$

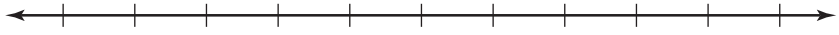
7. $\left|\frac{x}{4} - 7\right| < -2$



8. $|4x - 7| + 8 \geq 17$



9. $6|3 - k| + 14 > 14$



10. At a certain company, the average starting salary s for a new worker is \$25,000. The actual salary has an absolute deviation of at most \$1800. Write and solve an inequality to find the range of the starting salaries.