

Name \_\_\_\_\_

Date \_\_\_\_\_ Pd. \_\_\_\_\_

### Notes: Absolute Value Inequalities

**Absolute Value Inequalities** When solving inequalities that involve absolute value, there are two cases to consider for inequalities involving  $<$  (or  $\leq$ ) and two cases to consider for inequalities involving  $>$  (or  $\geq$ ). Remember that inequalities with *and* are related to intersections, while inequalities with *or* are related to unions.

If  $|x| < n$ , then \_\_\_\_\_

If  $|x| > n$ , then \_\_\_\_\_

**Example**

Solve  $|3a + 4| < 10$ . Then graph the solution set.

## NOTES

### Distance and Absolute Value Equations and Inequalities

The relationship between distance and absolute value can be used to solve equations and inequalities graphically. The absolute value of a number is \_\_\_\_\_

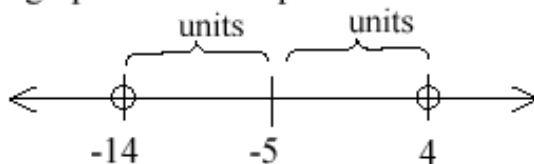
\_\_\_\_\_ The absolute value of the difference between two numbers is the distance between those numbers on the number line. For example, the distance between 5 and 8 on the number line can be represented by  $|5 - 8|$  or  $|8 - 5|$ . Using this relationship, the distance between some number,  $x$ , and 8 can be represented by  $|x - 8|$  or  $|8 - x|$ . Method 1 in Example 1 on page 346 illustrates the use of this relationship for solving an equation. Example 2 on page 346 illustrates how to use this relationship to write an absolute value equation given the graph of its solution.

A solution that uses this relationship to solve the inequality in Example 3 on page 347 is shown below:

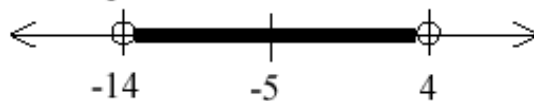
Solve:  $|t + 5| < 9$

Rewrite the expression within the absolute value symbol as a difference to clearly illustrate that  $|t + 5|$  represents the distance between some number,  $t$ , and  $-5$ .  $|\quad| < 9$

Use a number line to locate the numbers that are 9 units from  $-5$ . Refer to the original inequality to determine whether to graph these numbers using open or closed points.



The solutions to the original inequality are values that are less than 9 units from  $-5$ . Graph the solutions on the number line.



From the graph, write the solution to the inequality.

Solution:

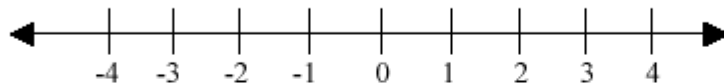
Name \_\_\_\_\_

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### Exit Card: Absolute Value Inequalities

BCR

- On the graph below or on the answer sheet, graph the solutions to  $|x - 2| \leq 1$



- Use mathematics to explain how you determined your answer. Use words, symbols, or both in your explanation.

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**Homework: Page 350 (30 – 33, 49 – 51)**

30.  $|v + 3| > 1$

31.  $|w - 6| \geq 3$

32.  $|3s + 2| > -7$

33.  $|3k + 4| \geq 8$

49. A thermostat with a 2-degree differential will keep the temperature within 2 degrees Fahrenheit of the temperature set point. Suppose your home has a thermostat with a 3-degree differential. If you set the thermostat at 68° F, what is the range of temperatures in the house?

50. Use the margin of error indicated in the graph ( $\pm 3\%$  points) to find the range of the percent of people who say protection of the environment should have priority over developing energy supplies (52%).

51. Tire pressure is measured in pounds per square inch (psi). Tires should be kept within 2 psi of the manufacturer's recommended inflation pressure for a tire is 30 psi, what is the range of acceptable pressures?