

MODEL & DISCUSS

Amelia is participating in a 60-mile spin-a-thon. Her spin bike keeps track of the simulated number of miles she travels. She plans to take a 15-minute break within 5 miles of riding 30 miles.



Amelia spins at a constant 22 mph.

Spin-a-thon Schedule	
Event	Time
Start spinning	10:00 A.M.
Stop for break	■
Resume spinning	■

- A. Write a compound inequality that models the number of miles Amelia spins before taking a break.

- B. How is the number of miles Amelia spins before she takes a break related to the amount of time before she takes a break?

- C. **Make Sense and Persevere** About how many hours will Amelia spin before she takes a break? Discuss how you could use your mathematical model to complete the spin-a-thon schedule. © MP.1

HABITS OF MIND

Reason How is the time Amelia is spinning related to the distance she spins? © MP.2

**EXAMPLE 1**  **Try It!** Understand Absolute Value Equations

1. Solve.

a. $6 = |x| - 2$

b. $2|x + 5| = 4$

c. $|3x - 6| = 12$

EXAMPLE 2  **Try It!** Apply an Absolute Value Equation

2. What will be the minimum and maximum time that Kennedy will travel if she resets her cruising speed to 20 mi/h?

HABITS OF MIND

Generalize How is solving an absolute value equation similar to solving a regular equation? How is it different? © MP8



**EXAMPLE 3**  **Try It! Understand Absolute Value Inequalities**

3. Solve and graph the solutions of each inequality.

a. $|x| > 15$

b. $|x| \leq 7$

EXAMPLE 4  **Try It! Write an Absolute Value Inequality**

4. If the debate team increased their limit to \$200 plus or minus \$20, would they be able to afford Hotel D at \$55 per night? Explain.

HABITS OF MIND

Look for Relationships What do you notice about absolute value inequalities that is similar to compound inequalities? © MP.7

Do You UNDERSTAND?

1. **ESSENTIAL QUESTION** Why does the solution for an absolute value equation or inequality typically result in a pair of equations or inequalities?

2. **Reason** How is solving an absolute value equation similar to solving an equation that does not involve absolute value? How is it different? © MP.2

3. **Vocabulary** Describe how you would explain to another student why the *absolute value* of a number cannot be negative.

4. **Error Analysis** Yumiko solved $|x| > 5$ by solving $x > -5$ and $x < 5$. Explain the error Yumiko made. © MP.3

Do You KNOW HOW?

Solve each absolute value equation.

5. $5 = |x| + 3$

6. $|2x - 8| = 16$

Solve each absolute value inequality. Graph the solution.

7. $|3x - 6| \geq 9$

8. $|4x - 12| \leq 20$

9. On a road trip, Andrew plans to use his cruise control for 125 mi, plus or minus 20 mi. Write and solve an equation to find the minimum and maximum number of hours for Andrew's road trip.

