NAME ______________________________

Module 6 Solving Absolute Value Equations and Inequalities

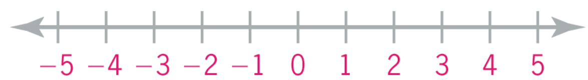
Lesson 3 Solving Inequalities Using "Absolute Value is Less Than"

independent practice

Solve each inequality and graph the solution set.

1. $|r| \leq 4$ **$-4 < r < 4$**

2. $\left|\frac{c}{5}\right| < -2$ **∅**



3. $|f - 3.5| \geq 4$ **$f \geq 7.5$ or ≤ -0.5**

4. $|5m - 5| \leq 20$ **$-3 \leq m \leq 5$**

5. $\left|3 + \frac{q}{2}\right| < 1$ **$-8 < q < -4$**

6. $|y| - 4 \leq -1$ **$-3 \leq y \leq 3$**

7. $\frac{|4w|}{2} < 6$ **$-3 < w < 3$**

8. $4|3b + 1| < 0$ **∅**

Match the graph to the correct inequality.

9.

A. $|c + 1.5| \leq 1$

B. $|c - 1| \leq -2.5$

(C.) $|c + 2.5| \leq 1$

D. $|c + 4.5| \leq 6$

10.

A. $4 + |x| \leq 6$

B. $2 + |x| < 2$

C. $2 + |x| \leq 2$

(D.) $4 + |x| < 6$

Journal

1. Why does the inequality $2|9k + 4| < 0$ have no solution?
2. Is $3(x + 2)| < 15$ the same as writing $3|x + 2| < 15$? Verify your answer by solving each inequality.
3. Write an absolute value inequality using "less than" whose solution is graphed below. Explain how you found your answer.

4. Explain why the inequality $|x| < 5$ can mean the distance between zero and x is less than 5.
5. Use your response to question 4 to explain what distance is represented by $|y - 3| < 2$.

Cumulative Review

Rewrite each sentence as an algebraic equation or inequality.

1. Four times a number b is equal to nineteen.
   $4b = 19$
2. Five less than a number m squared is two.
   $m^2 - 5 = 2$
3. Five is less than a number m squared.
   $5 < m^2$
4. The product of x, y, and z, is zero.
   $xyz = 0$
5. Twelve increased by m is greater than n increased by two.
   $12 + m > n + 2$
6. A number k increased by g is equal to the sum of k and h.
   $k + g = k + h$
7. Half of y decreased by seven is equal to z.
   $\frac{1}{2}y - 7 = z$
8. Ten divided by p is at least negative sixteen.
   $\frac{10}{p} \geq -16$
9. Seven times j is no more than k.
   $7j \leq k$
10. Eight more than the square root of x is nine.
   $8 + \sqrt{x} = 9$

Possible Journal Responses

1. The inequality expression $2|9k + 4| < 0$ has no solution because it means that 2 times the positive number $9k + 4$ is less than zero. The product of two positive numbers, however, is greater than or equal to zero.

2. Yes. Since 3 is positive $|3(x + 2)| = 3|x + 2|$. To verify the answer, you can solve each inequality:

$\lvert 3(x + 2)\rvert < 15$	$3\lvert x + 2\rvert < 15$
$3(x + 2) < 15$ and $3(x + 2) > -15$	$\lvert x + 2\rvert < 5$
$x + 2 < 5$ and $x + 2 > -5$	$x + 2 < 5$ and $x + 2 > -5$
$x < 3$ and $x > -7$	$x < 3$ and $x > -7$
$-7 < x < 3$	$-7 < x < 3$

3. The inequality expression $-3 < x < 3$ means $x > -3$ and $x < 3$. This is the same as $|x| < 3$.

4. This is true because $|x| < 5$ can be rewritten as $-5 < x < 5$. As you travel on the number line from 0 to 5, the greatest distance you will travel is 5. Likewise, if you travel from 0 to –5 the greatest distance traveled is also 5.

5. The distance between 0 and $(y - 3)$ is less than 2.