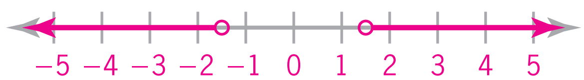
NAME ______________________________

Module 6 Solving Absolute Value Equations and Inequalities

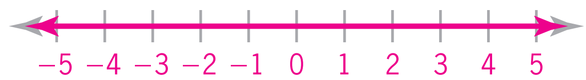
Lesson 4 Solving Inequalities Using "Absolute Value is Greater Than"

Solve each inequality and graph the solution set.

1. $|v| > 1.5$ **$v > 1.5$ or $v < -1.5$**



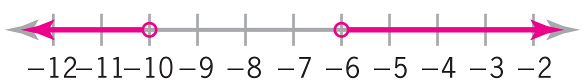
2. $\left|\frac{r}{3}\right| > -2$ $\Re$



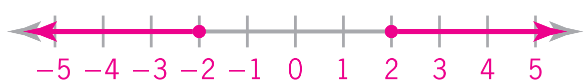
3. $|d - 2.75| \geq 3$ **$d \geq 5.75$ or $d \leq -0.25$**

4. $|2t - 4| \geq 6$ **$t \geq 5$ or $t \leq -1$**

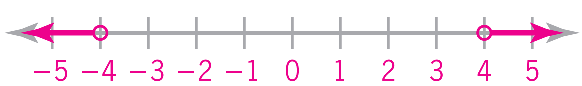
5. $\left|4 + \frac{w}{2}\right| > 1$ **$w > -6$ or $w < -10$**



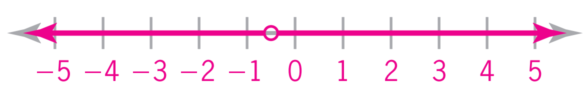
6. $|z| - 5 \geq -3$ **$z \geq 2$ or $z \leq -2$**



7. $\frac{|9w|}{3} > 12$ **$w > 4$ or $w < -4$**

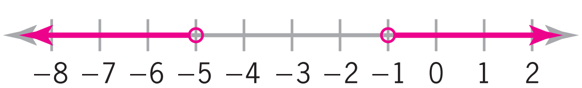


8. $4|2q + 1| > 0$ **$q \neq -0.5$**



Match the graph to the correct inequality.

9.



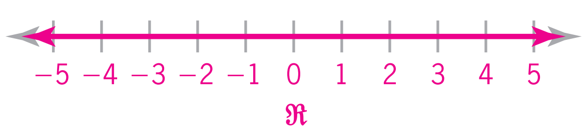
A. $\left|w + \frac{3}{2}\right| > 1$

(B.) $\left|\frac{w + 3}{2}\right| > 1$

C. $|w + 6| > 1$

D. $|3w + 2| > 1$

10.



A. $|2y + 4| < 9$

B. $|2y + 4| > 9$

(C.) $|2y + 4| > -9$

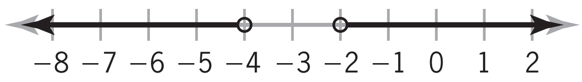
D. $|2y + 4| < -9$

Possible Journal Responses

1. The absolute value of an expression is always greater than or equal to zero (non-negative). So $|2g + 1| \geq 0$ is true for every value of g. $|2g + 1| > 0$, however, is not true when $|2g + 1| = 0$; that is, when $g = -0.5$.

Journal

1. Why is the inequality $|2g + 1| \geq 0$ true for all real numbers while $|2g + 1| > 0$ is not?
2. Write an absolute value inequality using "greater than" whose solution is graphed below. Explain how you found your answer.



3. Write a word problem whose solution set is represented by the graph in Journal question 2.
4. Explain the similarities and differences in the solution and graph of $|3m| > 12$ and $|3m| > 12$.
5. Find and explain the error in the following:

$$|2m| - 3 > 5$$

$2m - 3 > 5$	or	$2m - 3 < -5$
$2m - 3 + 3 > 5 + 3$	or	$2m - 3 + 3 < -5 + 3$
$2m > 8$	or	$2m < -2$
$\frac{2m}{2} > \frac{8}{2}$	or	$\frac{2m}{2} < \frac{-2}{2}$
$m > 4$	or	$m < -1$

Cumulative Review

Identify each number as a real number, rational number, integer, whole number, or natural number. You may have more than one answer for each number.

1. 0 **real, rational, integer, whole**
2. −5 **real, rational, integer**
3. $\sqrt{7}$ **real**
4. $\frac{3}{4}$ **real, rational**
5. $-\frac{3}{4}$ **real, rational**
6. 1,345,789 **real, rational, integer, whole, natural**
7. $\frac{10}{5}$ **real, rational, integer, whole, natural**
8. π **real**
9. 20.24563 **real, rational**
10. 0.3 **real, rational**

Possible Journal Responses *(continued)*

2. **Looking at the graph, notice that the distance between −2 and −4 is 2. This gives the absolute value of some expression is less than 1 (1 is half of 2). The number −3 is exactly between −2 and −4. This means the graph is translated 3 units to the left of the origin. The inequality $|x + 3| > 1$ satisfies the solution set.**
3. **A chemist needs to keep a solution at a temperature that is no more than 1 degree from −3°.**
4. **The inequality $|3m| > 12$ is the same as the disjunction $m > 4$ or $m < -4$. The inequality $|3m| < 12$ is the same as the conjunction $m < 4$ and $m > -4$. The disjunction consists of the numbers greater than 4 or less than −4. The conjunction consists of the numbers between −4 and 4.**
5. **The inequality $|2m| - 3 > 5$ is equivalent to the inequality $|2m| > 8$. This translates into the disjunction $2m > 8$ or $2m < -8$, not $2m > 8$ or $2m < -2$.**