

Lesson 2.9: SWBAT solve and graph absolute value inequalities. Day 2
 Kick off: Take out your homework and answer the following questions.
 1) Solve and graph: $| -8n | \geq 48$ 2) Solve and graph: $| -7 + b | < 14$

Problem 1: $| -8n | \geq 48$

$$\begin{aligned} -8n &\geq 48 & -(-8n) &\geq 48 \\ \frac{-8n}{-8} &\geq \frac{48}{-8} & 8n &\geq 48 \\ n &\leq -6 & \frac{8n}{8} &\geq \frac{48}{8} \\ & & n &\geq 6 \end{aligned}$$

Problem 2: $| -7 + b | < 14$

$$\begin{aligned} -7 + b &< 14 & -(-7 + b) &< 14 \\ b &< 21 & 7 - b &< 14 \\ b &< 21 & -b &< 7 \\ b &< 21 & b &> -7 \end{aligned}$$

Number Line Graphs:

For $| -8n | \geq 48$, the number line shows closed circles at -6 and 6 , with arrows pointing outwards. Test points: $| -8(-6) | = 48$, $| -8(0) | = 0 < 48$, $| -8(6) | = 48$.
 For $| -7 + b | < 14$, the number line shows open circles at -7 and 21 , with arrows pointing inwards. Test points: $| -7 + (-8) | = 15 > 14$, $| -7 + (-7) | = 0 < 14$, $| -7 + 0 | = 7 < 14$, $| -7 + 21 | = 14$, $| -7 + 30 | = 23 > 14$.

Steps to solve and graph absolute value inequalities.

- 1) Derive 2 equations (positive & Negative)
- 2) Solve each equation!
- 3) Graph the solutions on the number line (just the answer points) ★
- 4) Use test points between them to check where to shade!

Solve and graph each of the following. Find the interval and builders notation of each.

1) $| 6b - 4 | \leq 32$

$$\begin{aligned} 6b - 4 &\leq 32 & -(6b - 4) &\leq 32 \\ 6b &\leq 36 & -6b + 4 &\leq 32 \\ \frac{6b}{6} &\leq \frac{36}{6} & -6b &\leq 28 \\ b &\leq 6 & -b &\leq \frac{28}{-6} \\ & & b &\geq \frac{14}{3} \end{aligned}$$

Interval Notation: $[\frac{14}{3}, 6]$

Builders Notation: $[-4.6, 6]$

Number line graph shows a closed circle at 6 and an open circle at -4.6 (labeled as -4.6 in the drawing), with a shaded region between them.

2) $| 9m - 3 | \geq 87$

Number line graph shows a number line with arrows at both ends, indicating no solution.

Builders Notation:

3) $| -6n - 3 | > 9$

Number line graph shows a number line with arrows at both ends, indicating no solution.


Builders Notation:

4) $| -7 - 2n | \geq 1$

Number line graph shows a number line with arrows at both ends, indicating no solution.


Interval Notation:

5) $|-3x + 3| > 6$




Builders Notation:

6) $|2n - 4| < 2$



Interval Notation:

7) $2 + |-4 + n| \leq 4$



Builders Notation: