

Absolute Value Equations and Inequalities Guide Notes

The three types of open sentences that can involve absolute value:

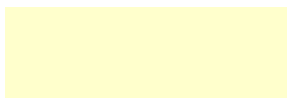
A. ABSOLUTE VALUE EQUATIONS: $|x| = n$

When solving equations involving absolute value, we need to consider these cases

- a. The value inside the absolute value symbols is **positive**.



- b. The value inside the absolute value symbols is **negative**.



If $|x| = n$, then _____ or _____.

Sample Problem 1: Solve each equation and graph the solution set.

1. $|x - 5| = 3$



2. $|3x + 4| = 17$



3. $|2x - 5| - 9 = 6$

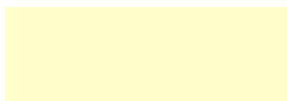


Absolute Value Equations and Inequalities Guide Notes

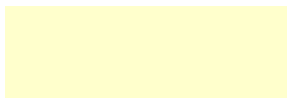
B. ABSOLUTE VALUE INEQUALITIES: $|x| < n$

When solving inequalities of the form $|x| < n$, we need to find the **Intersection** of these cases:

- a. The value inside the absolute value symbols is **less than the positive value of n** .



- b. The value inside the absolute value symbols is **greater than the negative value of n** .



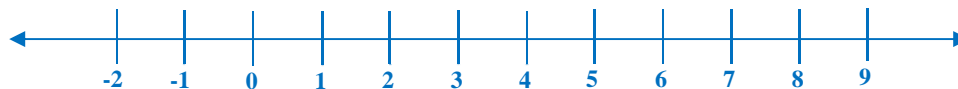
If $|x| < n$, then _____ and _____.

It also applies for $|x| \leq n$:

If $|x| \leq n$, then _____ and _____.

Sample Problem 2: Solve each inequality and graph the solution set.

1. $|x - 6| < 2$



2. $|3x + 7| \leq 23$



3. $|3x - 9| - 4 < 14$



Absolute Value Equations and Inequalities Guide Notes

C. ABSOLUTE VALUE INEQUALITIES: $|x| > n$

When solving inequalities of the form $|x| > n$, we need to find the union of these cases:

- a. The value inside the absolute value symbols is **GREATER THAN THE POSITIVE VALUE OF n** .

$$x > n$$

- b. The value inside the absolute value symbols is **LESS THAN THE NEGATIVE VALUE OF n** .

$$x < -n$$

If $|x| > n$, then _____ or _____.

It also applies for $|x| \geq n$:

If $|x| \geq n$, then _____ or _____.

Sample Problem 3: Solve each equation and graph the solution set.

1. $|x + 3| \geq 11$



2. $|2x - 5| > 21$



3. $|2x + 7| - 6 \geq 15$



Absolute Value Equations and Inequalities Guide Notes

Sample Problem 4: The starting players of the school's varsity basketball team have an average scoring point between 9 and 20. Write an absolute value inequality describing the average scoring point of the starting players.

Step 1 Write the inequality.

Step 2 Determine the midpoint.

Step 3 Determine the distance from the midpoint.

Step 4 Write the absolute value inequality. (Use appropriate inequality symbol)