

3.7 Absolute Value EQUATION Notes

Caution: Don't confuse "absolute values" with "opposites."

For Example:

Simplify.

1. $|-8| = \underline{\hspace{2cm}}$

3. $|8| = \underline{\hspace{2cm}}$

2. $-(-8) = \underline{\hspace{2cm}}$

4. $-(8) = \underline{\hspace{2cm}}$

Absolute value is defined as the distance from .

Investigation:

Without solving algebraically, what could the value of x be?

$$|x + 5| = 7$$

It is ESSENTIAL that the steps for solving absolute value equations be followed in THIS order:

Step 1: Get the absolute value symbols alone.

Step 2: Immediately divide the problem into 2 cases.

Case 1: Drop the absolute value symbols and solve.

Case 2: Drop the absolute value symbols and *change the sign*. Solve.

Step 3: It is advisable to check your answers for mistakes or problems with no solution.

Examples ~ Solve.

<p>#1 $t - 7 = 8$</p> $t - 7 = 8 \qquad t - 7 = -8$ $t - 7 + 7 = 8 + 7 \qquad t - 7 + 7 = -8 + 7$ $t = 15 \quad \text{or} \quad t = -1$ <p>The solutions are 15 and -1.</p>	<p>#2 $5p + 25 = 15$</p> $ 5p + 25 - 25 = 15 - 25$ $ 5p = -10 \quad \rightarrow \text{No need}$ <p>for 2 cases because there is no solution. The result is ALWAYS positive after taking the absolute value of a quantity.</p>
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Exercises

Solve each equation. If there is no solution, write *no solution*.

1. $|m + 8| = 5$

2. $|3b - 1| = 11$

3. $|y + 17| - 25 = -10$

4. $|4s + 1| + 7 = 5$

5. $|2w - 4| + 18 = 15$

6. $\left|\frac{h}{3} + 4\right| - 2 = 5$

7. Write your own absolute value equation that has no solution, and explain why.