

Solving for x: Lesson 15

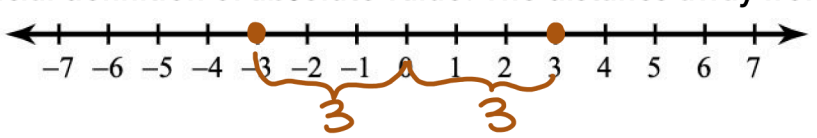
Solving Absolute Value Equations: Notes

Name: Answer Key

MATH 4 ALL

Absolute Value is shown with: ||

Official definition of *absolute value*: The distance away from 0



A number line from -7 to 7 with tick marks at every integer. Two red dots are placed at -3 and 3. Brackets below the line connect each dot to the 0 mark, with the number '3' written below each bracket. To the right of the number line, the equation $|-3| = |3| = 3$ is written, with the '3' at the end underlined.

$|-3| = |3| = 3$

Absolute Value:

- Turns the value inside positive.
- If the inside is already positive, the absolute value is powerless.

$$|-45| = 45$$

$$|87| = 87$$

Evaluate.

$$-|-5| = -5$$

$$|17 - 4| = 13$$

$$|8 - 10| = 2$$

Solve: $|x + 3| = 6$

$$\begin{array}{r} x+3=6 \\ -3 \quad -3 \\ \hline x=3 \end{array} \quad \begin{array}{r} x+3=-6 \\ -3 \quad -3 \\ \hline x=-9 \end{array}$$

$$x=3, -9$$

Solving absolute value equations:

1. Get the absolute value by itself.
2. Check if the absolute value equals a negative number. If it does, there is no solution!
3. Branch into two equations:
 - 1) Copy without absolute value signs
 - 2) Copy absolute value = negative answer
4. Solve both equations.

Solve for x: $\frac{|x-7|}{2} - 4 = 3$

~~$\frac{|x-7|}{2} - 4 = 3$~~
 $\frac{|x-7|}{2} = 7$

$|x-7| = 14$

$x-7 = 14$
 $+7 \quad +7$

 $x = 21$

$x-7 = -14$
 $+7 \quad +7$

 $x = -7$

$x = 21, -7$