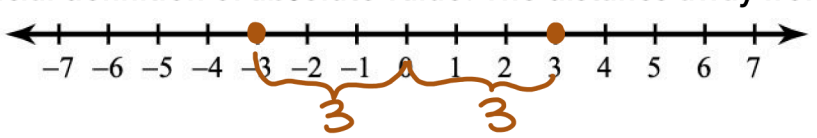# Solving Absolute Value Equations: Notes

Name: _**Answer Key**_

MATH 4 ALL

Absolute Value is shown with: _| |_

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

$|-3| = |3| =$ _**3**_

Absolute Value:

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

$$|-45| = \underline{\textbf{45}} \qquad\qquad |87| = \underline{\textbf{87}}$$

Evaluate.

$$-|-5| = \underline{\textbf{-5}} \qquad |17-4| = \underline{\textbf{13}} \qquad |8-10| = \underline{\textbf{2}}$$
$$\textbf{|13|} \qquad\qquad\qquad \textbf{|-2|}$$

Solve: $|x+3| = 6$

$$x+3=6 \qquad x+3=-6$$
$$\underline{-3\ -3} \qquad \underline{-3\ -3}$$
$$x=3 \qquad\quad x=-9$$

$$\boxed{x=3, -9}$$

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*: $\dfrac{|x-7|}{2} - 4 = 3$

$$\underline{\quad\quad +4 \quad +4 \quad\quad}$$

$$\cancel{2} \cdot \frac{|x-7|}{\cancel{2}} = 7 \cdot 2$$

$$|x-7| = 14$$

$$x - 7 = 14 \qquad\qquad x - 7 = -14$$
$$\underline{+7 \quad +7} \qquad\quad \underline{+7 \quad +7}$$
$$x = 21 \qquad\qquad\quad x = -7$$

$$\boxed{x = 21, -7}$$