Absolute Value Equations

When solving absolute value equations, remember you are creating two separate problems to solve. Consider the statement $|?| = 2$***; if this is true, then there must be a 2 or a -2 inside the absolute value symbols. The same thinking is used for absolute value equations. If you are told*** $|x+3| = 7$***, you can conclude that*** $x+3$ ***must be equal to either 7 or -7. This would give you the desired result.***

Example

$$2|x-7|+6=18$$

The first step to solving this equation is to isolate the absolute value.

$$2|x-7|+6=18$$

$$2|x-7|=12 \qquad \textit{Subtract 6 to both sides.}$$

$$|x-7|=6 \qquad \textit{Divide both sides by 2.}$$

Now you must create two separate problems to solve. Recall the sample above, if the absolute value of $x-7$ ***is equal to 6, then*** $x-7$ ***must be equal to either 6 or -6. Set up two problems showing this.***

	$x-7=6$	***or***	$x-7=-6$	
Add 7 to both sides to solve.	$x=13$		$x=1$	***Add 7 to both sides to solve.***

$$x=\{1,13\} \qquad \textit{Our solution set is 1 and 13.}$$