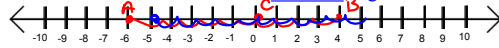## Chapter 1B Notes Absolute Value Equations

absolute value = the distance a number is away from zero on the number line.

- absolute value is distance so it's **NEVER** negative.

A number line from -10 to 10 with points A, C, B marked.

1. $|A| = 6$
2. $|B| = 4$
3. $|C| = 0$

4. $|6| = 6$
5. $|-3| = 3$
6. $|4-9| = 5$

$|-5|$

7. $|x| = 5$ $\{-5, 5\}$
8. $|x+1| = 5$ $\{-6, 4\}$
9. $|x-2| = 4$ $\{6, -2\}$

$x+1 = 5$

$x+1 = 5 \quad x+1 = -5$
$x = 4 \quad\quad x = -6$

$x - 2 = 4$
$x = 6$

$x - 2 = -4$
$x = -2$

$x^2 = 6$
$x^2 + 5x - 6 = 0$

$2|3x-7| + 5 = 1$

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

$\rightarrow |3x-7| = -2 \quad \varnothing$

$|x| = -5$

$3x - 7 = -2 \quad 3x - 7 = 2$

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To Solve Equations involving absolute value:

- **isolate** the absolute value. $|\underline{}| = \#$
- **rewrite** as two separate equations. $\underline{} = \# \text{ or } \underline{} = -\#$
- **solve** each equation.
- **check** solutions, could be extraneous. $\{2, \cancel{3}\}$
- **write** solutions in a solution set $\{\}$ or graph on a # line.

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Examples: Solve the following absolute value equations.

1. $|y+3|=8$

$y+3=8$ or $y+3=-8$

$y=5$ $y=-11$

$\{5,-11\}$

2. $3|p-5|=2p$

3030

$\dfrac{}{6}\dfrac{}{6}$

$|p-5|=\dfrac{2}{3}p$ $\{15,3\}$

$(p-5)^{\cdot 3}=\left(\dfrac{2}{3}p\right)^{\cdot 3}$ or $\left(p-5\right)^{\cdot 3}=\left(\dfrac{2}{3}p\right)^{\cdot 3}$

$3p-15=2p$ $3p-15=-2p$

$-2p+15-2p+15$ $-3p-3p$

$\overline{}$ $\overline{-15=-5p}$

$p=15$ $3=p$

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Examples: Solve the following absolute value equations.

3. $|15+m|=(-2m+3)$

$11\wedge$

$33 \neq -33$

$15+m=-2m+3$ or $15+m=-(-2m+3)$

$-3-m-m-3$ $15+m=2m-3$

$\overline{}$ $+3-m-m+3$

$12=-3m$ $\overline{18=m}$

$-4=m$ $\{-4\}$

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Chapter 1B Worksheet

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