Algebra I

6-5
Solve Absolute Value
Equations

Absolute Value - distance from zero
- makes its argument non-negative

Graph: $|x| = 3$

$x = \pm 3$

-3   0   3

When Solving, how do we deal with absolute value?

a) Check for no solution

$|x| = -3$

$\varnothing$

absolute value cannot be a negative number.

b) put $\pm$ on the other side.

Solve.

1) $6 + |x| = 14$

$6 - 6 + |x| = 14 - 6$
$|x| = 8$
$x = \pm 8$
$\{\pm 8\}$

2) $|x - 9| = 2$

$x - 9 = \pm 2$
$x - 9 + 9 = 9 \pm 2$
$x = 11 \text{ or } 7$
$\{11, 7\}$

3) $|3x + 17| = -27$

$\varnothing$

Solve.

4) $4 \cdot |2x + 8| + 6 = 30$

$4|2x+8| + 6 - 6 = 30 - 6$
$\dfrac{4|2x+8|}{4} = \dfrac{24}{4}$
$|2x+8| = 6$
$2x + 8 = \pm 6$
$2x + 8 - 8 = -8 \pm 6$
$\dfrac{2x}{2} = \dfrac{-2}{2} \text{ or } \dfrac{-14}{2}$
$x = -1 \text{ or } -7$
$\{-1, -7\}$

5) $-2 \cdot |-3x - 4| = -10$

$\dfrac{-2}{-2} \quad \dfrac{}{-2}$
$|-3x - 4| = 5$
$-3x - 4 = \pm 5$
$-3x - 4 + 4 = 4 \pm 5$
$\dfrac{-3x}{-3} = \dfrac{9}{-3} \text{ or } \dfrac{-1}{-3}$
$x = -3 \text{ or } \dfrac{1}{3}$
$\{-3, \dfrac{1}{3}\}$

Assignment:
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