KEY

3.6 Absolute Value Equations and Inequalities

$|x| = 3$ x = -3 and 3

Solving an absolute value equation: First isolate the absolute value sign. Then set up 2 equations.

1. $|x| + 3 = 9$

$-3 \quad -3$

$|x| = 6$ → $x = 6$ or $x = -6$

You try:

2. $2|y| = 8$

$\frac{2}{2} \quad \frac{8}{2}$

$|y| = 4$ → $y = 4$ or $y = -4$

3. $|a| - 2 = 10$

$+2 \quad +2$

$|a| = 12$ → $a = 12$ or $a = -12$

Solving an absolute value equation:

4. $|2x + 5| = 11$

You need to write two equations

$2x + 5 = 11$

$-5 \quad -5$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

$2x + 5 = -11$

$-5 \quad -5$

$\frac{2x}{2} = \frac{-16}{2}$

$x = -8$

5. $|3y - 2| = 7$

Write two equations

$3y + 2 = 7$

$+2 \quad +2$

$\frac{3y}{3} = \frac{9}{3}$

$y = 3$

$3y - 2 = -7$

$+2 \quad +2$

$\frac{3y}{3} = \frac{-5}{3}$

$y = \frac{-5}{3}$

3.6 Notes

6. $|b+1| = -6$

Write two equations

* No SOLUTION → If absolute value is isolated and answer is negative, it is a no solution because absolute value is always positive.

Solve and graph the absolute value equations:

7. $|b| = 2$

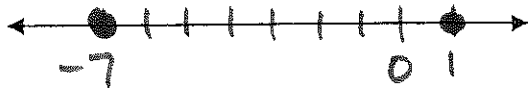
$b = 2$ $\quad b = -2$

8. $\frac{2|d+3|}{2} = \frac{8}{2}$

$|d+3| = 4$

$d+3 = 4$, $d = 1$

$d+3 = -4$, $d = -7$



9. $\frac{-2|7d|}{-2} = \frac{-14}{-2}$

$|7d| = 7$

$7d = 7$, $d = 1$

$7d = -7$, $d = -1$

Less thAND (<) and GreatOR (>) Absolute Value Inequalities: GreatOR LessThAND

Solve an absolute value inequality:

10. $|v-3| \geq 4$ (≥OR) GreatOR

$|v-3| \leq -4$ **OR** $|v-3| \geq 4$

$v-3 \leq -4$ $\quad +3 \quad +3$

$v \leq -1$

$v-3 \geq 4$ $\quad +3 \quad +3$

$v \geq 7$

$v \leq -1$ OR $v \geq 7$

3.6 Notes

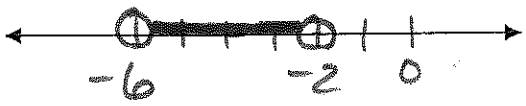
11. $a + 4 < 2$ (< AND) Less ThAND

$-2 < a + 4 < 2$

$a + 4 < 2$
$-4 \quad -4$
$a < -2$

and

$a + 4 > -2$
$-4 \quad -4$
$a > -6$



Solve and graph the inequalities:

12. $|3 - r| < 5$ Less ThAND

$3 - r < 5$
$-3 \quad -3$
$-r < 2$
$-1 \quad -1$

$3 - r > -5$
$-3 \quad -3$
$-r > -8$
$-1 \quad -1$

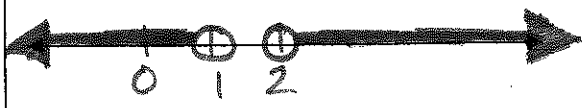
$r > -2$ AND $r < 8$

14. $|2x - 3| > 1$ Great OR

$2x - 3 > 1$
$+3 \quad +3$
$2x > 4$
$x > 2$

$2x - 3 < -1$
$+3 \quad +3$
$2x < 2$

OR $x < 1$



Questions, Highlight, Summarize

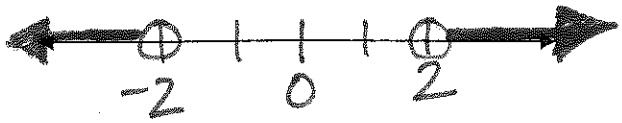
3.6 Notes

3.6 Practice

Directions: With a partner solve the following problems and graph the solution.

1. $|d| > 2$ Great OR

$d > 2$ OR $d < -2$

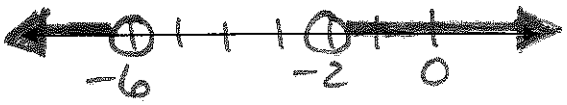


2. $|s + 4| > 2$ Great OR

$s+4 > 2$ OR $s+4 < -2$

$-4 \quad -4 \qquad -4 \quad -4$

$s > -2$ OR $s < -6$



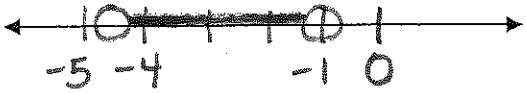
3. $|4y + 11| < 7$ Less Than AND

$4y+11 < 7$ $\qquad$ $4y+11 > -7$

$-11 \quad -11 \qquad -11 \quad -11$

$4y < -4$ $\qquad$ $4y > -18$

$y < -1$ AND $y > -4.5$



4. $-6|w - 3| < -24$

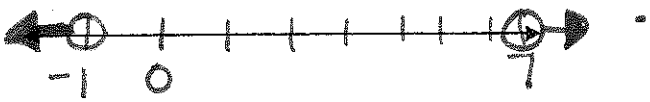
$\frac{-6}{-6} \quad \frac{-24}{-6}$

FLIP $|w-3| > 4$ Great OR

$w-3 > 4$ $\qquad$ $w-3 < -4$

$+3 \quad +3 \qquad +3 \quad +3$

$w > 7$ OR $w < -1$



5. $|a| = 9.5$

$a = 9.5$ $\qquad$ $a = -9.5$

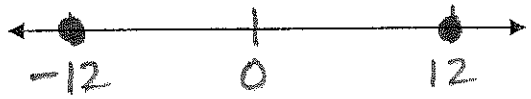
6. $|d| - 25 = -13$

$+25 \quad +25$

$|d| = 12$

$d = 12$

$d = -12$



7. $\frac{-4|7 + d|}{-4} = \frac{-44}{-4}$

$|7+d| = 11$

$7+d = 11$ $\qquad$ $7+d = -11$

$d = 4$ $\qquad$ $d = -18$

8. $-2|3j| - 8 \leq -20$

$+8 \quad +8$

FLIP $\frac{-2|3j|}{-2} \leq \frac{-12}{-2}$

$|3j| \geq 6$ Great OR

$\frac{3j}{3} \geq \frac{6}{3}$ OR $\frac{3j}{3} \leq \frac{-6}{3}$

$j \geq 2$ OR $j \leq -2$