Oct. 3, 2018

Sect. 3-4

Abs. Val. Eqns. & Ineqs.

Set Up

Solve

Solution Set

Solve: $|x| = 4$

$x = -4$ or $x = 4$

$\{-4, -4\}$ or $\{\pm 4\}$

$|x-1| = 7$

$x - 1 = -7$ or $x - 1 = 7$

$x = -6$ or $x = 8$

$\{-6, 8\}$

$$|x-2|+3=7$$
$$-3 \quad -3$$
$$|x-2|=4$$
$$x-2=4 \text{ or } x-2=-4$$
$$x=6 \text{ or } x=-2$$
$$\{-2,6\}$$

$$\frac{2|x-1|}{2}=\frac{-6}{2}$$
$$|x-1|=3$$
$$x-1=3 \text{ or } x-1=-3$$
$$x=4 \text{ or } x=-2$$
$$\{-2,4\}$$

$|x+6| = (3x-2)$ *Must Check

$x+6 = 3x-2$ or $x+6 = -(3x-2)$

$-2x = -8$ $x+6 = -3x+2$

$x = 4$ or $4x = -4$

$x = -1$

$\{-1, 4\}$ So $\{4\}$

$$|x+6| = 3x-2$$

$x = 4$

$$|4+6| \stackrel{?}{=} 3(4)-2$$

$$|10| \stackrel{?}{=} 12-2$$

$$10 \stackrel{?}{=} 10$$ ✓

$x = -1$

$$|-1+6| \stackrel{?}{=} 3(-1)-2$$

$$|5| \stackrel{?}{=} -3-2$$

$$5 \stackrel{?}{=} -5$$ ✗

Ineqs.

Rule: $|\text{stuff}| > \text{or} \geq$

set up as "or"

$|\text{stuff}| \leq \text{or} <$

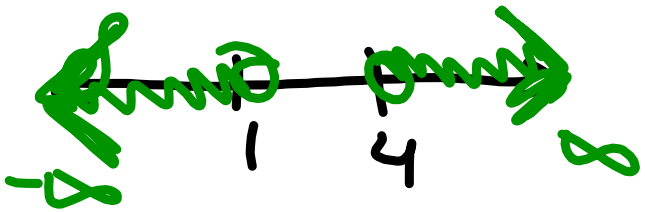
set up as double ineq.

$$|2x-5| > 3$$

$2x-5 > 3$ or $2x-5 < -3$

$2x > 8$ or $2x < 2$

$x > 4$ or $x < 1$



$$(-\infty, 1) \cup (4, \infty)$$

$$|3x+2| \leq 5$$

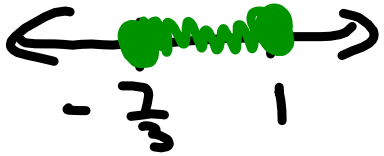
$$-5 \leq 3x+2 \leq 5$$

$$-2 \qquad -2 \qquad -2$$

$$-7 \leq 3x \leq 3$$

$$\frac{-7}{3} \leq \frac{3x}{3} \leq \frac{3}{3}$$

$$-\frac{7}{3} \leq x \leq 1$$



$$\Rightarrow \left[-\frac{7}{3}, 1\right]$$

Be Careful

$|x+5| = -3$

No Sol.

$\frac{-2|x+5|}{-2} = \frac{-6}{-2}$

$|x+5| = 3$

$|x+5| < -3$

No Sol.

$|x+5| > -3$

All real #s.

$(-\infty, \infty)$