Absolute Value Inequalities

Less than / less than or equal to:

If $|ax + b| \leq c$ where $c > 0$ then (conjunction)

$-c < ax + b < c$

Greater than / greater than or equal to:

If $|ax + b| > c$ where $c > 0$ then (disjunction)

$ax + b < -c$ OR $ax + b > c$

*Note: With the original inequality, c must be positive because absolute value is distance from 0

I. Solve and graph

1) $|x| \leq 8$

$-8 \leq x \leq 8$

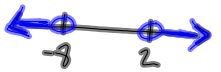
2) $|x + 3| > 5$

$x + 3 > 5$ $\quad -3 \quad -3$

$x > 2$

$x + 3 < -5$ $\quad -3 \quad -3$

$x < -8$



I. Solve and graph cont.

3) $3|5m - 6| - 8 \leq 13$

$+8 \quad +8$

$\frac{3|5m-6|}{3} \leq \frac{21}{3}$

$|5m - 6| \leq 7$

$-7 \leq 5m - 6 \leq 7$

$+6 \quad +6 \quad +6$

$-1 \leq 5m \leq 13$

$\frac{-1}{5} \leq m \leq 2\frac{3}{5}$

I. Solve and graph cont.

4) $2|(1/4)v - 5| + 4 \geq 14$

$-4 \quad -4$

$\frac{2|\frac{1}{4}v-5|}{2} \geq \frac{10}{2}$

$|\frac{1}{4}v - 5| \geq 5$

$\frac{1}{4}v - 5 \geq 5$ OR $\frac{1}{4}v - 5 \leq -5$

$+5 \quad +5$ $\qquad +5 \quad +5$

$4(\frac{1}{4}v) \geq (10)4$ $\qquad 4(\frac{1}{4}v) \leq (0)4$

$v \geq 40$ $\qquad v \leq 0$

II. Translate the sentence into an inequality, solve, and graph

5) Three more than the absolute deviation of -4x from 7 is greater than 10.

$|-4x - 7| + 3 > 10$

$-3 \quad -3$

$|-4x - 7| > 7$

$-4x - 7 > 7$ OR $-4x - 7 < -7$

$+7 \quad +7$ $\qquad +7 \quad +7$

$-4x > 14$ $\qquad -4x < 0$

$\frac{-4x}{-4} > \frac{14}{-4}$ $\qquad \frac{-4x}{-4} > \frac{0}{-4}$

$x < -3\frac{1}{2}$ $\qquad x > 0$