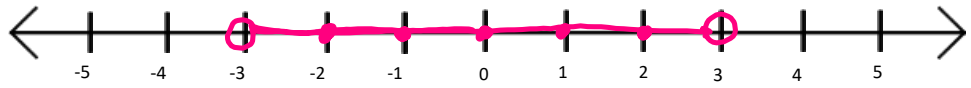
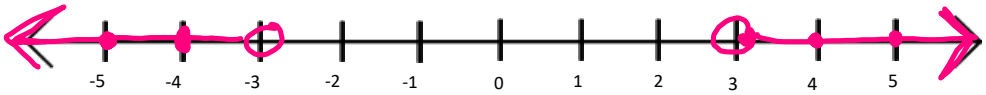
5.6 Solving Absolute Value Inequalities

What does it mean if you see...

and $|x| < 3$



or $|x| > 3$



Example 1

Solve and graph the solution set of $|3x + 4| < 8$.

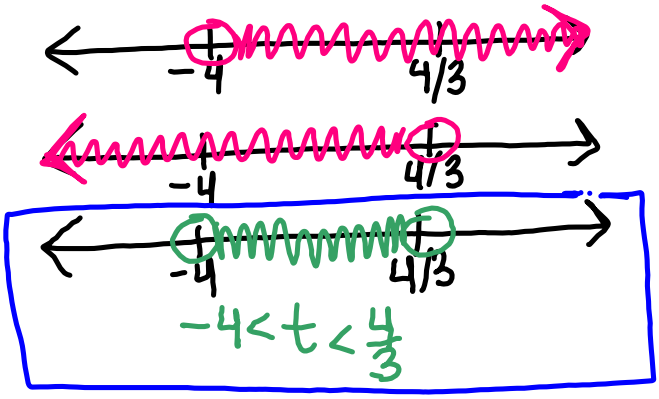
and

$3t + 4 > -8$
$-4 \quad -4$
$\frac{3t}{3} > \frac{-12}{3}$
$t > -4$

and

$3t + 4 < 8$
$-4 \quad -4$
$\frac{3t}{3} < \frac{4}{3}$
$t < \frac{4}{3}$

overlap



Example 2

Solve and graph the solution set of $|4t - 5| \geq 3$.

or

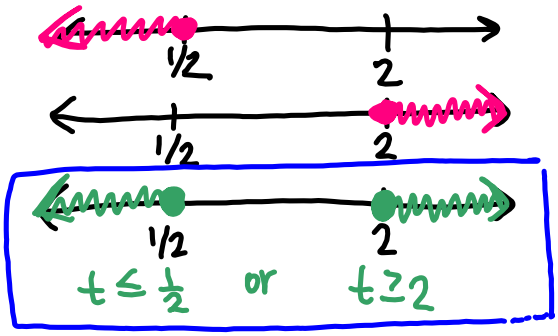
$4t - 5 \leq -3$ or $4t - 5 \geq 3$

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

$\frac{4t}{4} \leq \frac{2}{4} \qquad \frac{4t}{4} \geq \frac{8}{4}$

merge

$t \leq \frac{1}{2}$ or $t \geq 2$



Example 3

Solve and graph the solution set of $|2k + 1| \leq 12$.

and

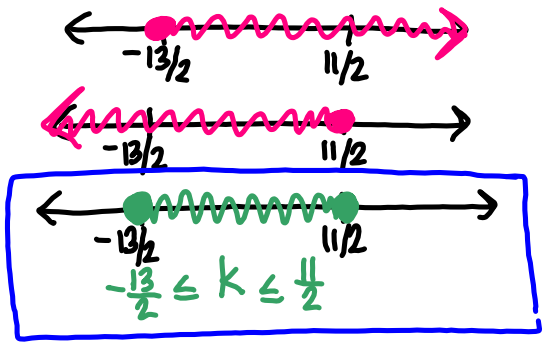
$2k + 1 \geq -12$ and $2k + 1 \leq 12$

$-1 \quad -1 \qquad -1 \quad -1$

$\frac{2k}{2} \geq \frac{-13}{2} \qquad \frac{2k}{2} \leq \frac{11}{2}$

overlap

$k \geq -\frac{13}{2}$ and $k \leq \frac{11}{2}$



Example 4

Solve and graph the solution set of $|\frac{1}{2}g + 3| \geq 5$.

or

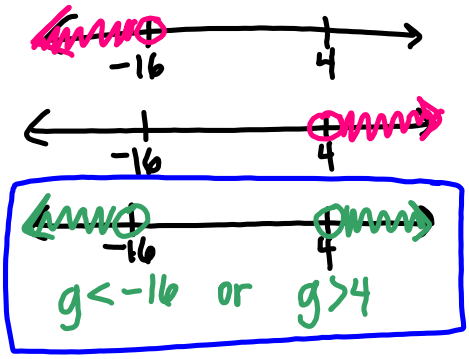
$\frac{1}{2}g + 3 < -5$ or $\frac{1}{2}g + 3 > 5$

$-3 \quad -3$ $\quad$ $-3 \quad -3$

$\frac{2}{1} \cdot \frac{1}{2}g < -8 \cdot \frac{2}{1}$ $\quad$ $\frac{2}{1} \cdot \frac{1}{2}g > 2 \cdot \frac{2}{1}$

merge

$g < -16$ or $g > 4$



Example 5

Solve and graph the solution set of $|h - 7| \leq 15$.

and

$h - 7 \geq -15$ and $h - 7 \leq 15$

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

$h \geq -8$ overlap and $h \leq 22$