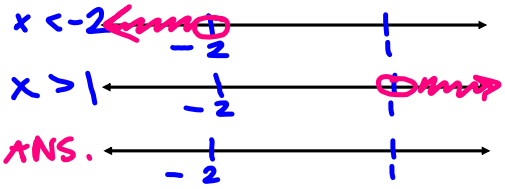
# 1.7 Solving Compound Linear Inequalities

A compound inequality is two inequalities joined by "and" or "or".

and: solutions need to satisfy both inequalities (which solutions they have in common)

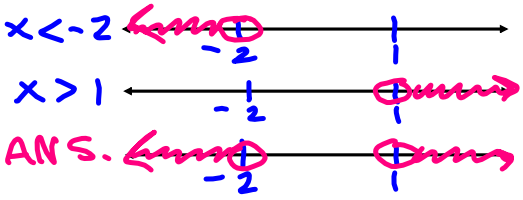
or: solutions need to satisfy either inequality (combination of the two solutions)

$x < -2$ and $x > 1$




Answer: no solution

$x < -2$ or $x > 1$




Answer: $x < -2$ or $x > 1$

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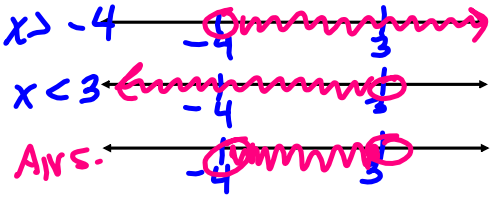
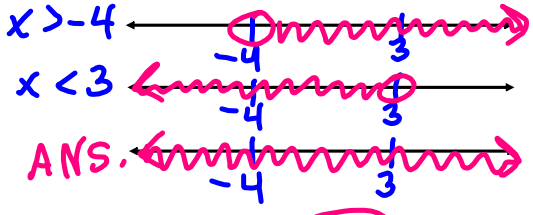
$x > -4$ and $x < 3$




Answer: $-4 < x < 3$

$x > -4$ or $x < 3$




Answer: $\mathbb{R}$

all real #'s

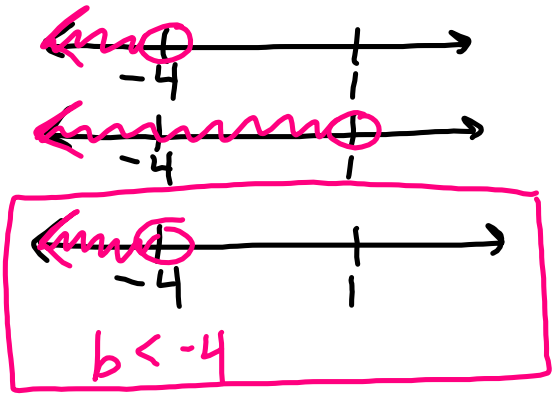
## Example 1: Solve and graph.

$\frac{1}{4}b + 3 < 2$ and $8b - 12 < -4$

$-3 \quad -3$ $\quad$ $+12 \quad +12$

$4 \cdot \frac{1}{4}b < -1 \cdot 4$ $\quad$ $\frac{8b}{8} < \frac{8}{8}$

$b < -4$ and $b < 1$

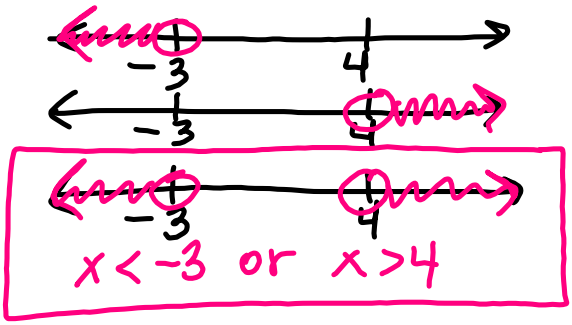



## Example 2: Solve and graph.

$x + 8 < 5$ or $x - 1 > 3$

$-8 \quad -8$ $\quad$ $+1 \quad +1$

$x < -3$ or $x > 4$



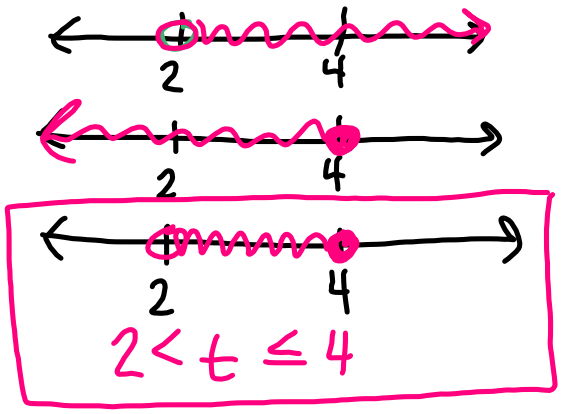
## Example 3: Solve and graph.

$3t + 5 > 11$ and $4t - 1 \leq 15$

$-5 \quad -5$ $\quad +1 \quad +1$

$\frac{3t}{3} > \frac{6}{3}$ $\quad \frac{4t}{4} \leq \frac{16}{4}$

$t > 2$ and $t \leq 4$




## Example 4: Solve and graph.

$-6g - 18 \leq 24$ or $3(g + 2) < -9$

$+18 \quad +18$

$\frac{-6g}{-6} \leq \frac{42}{-6}$

$g \geq -7$

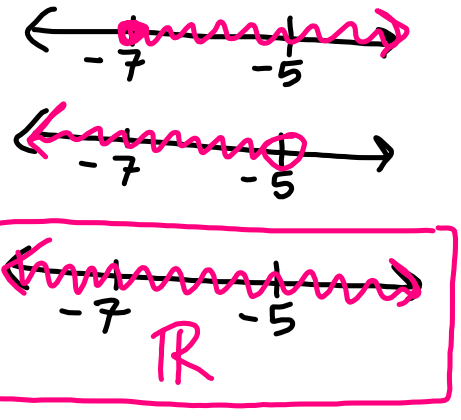
$3g + 6 < -9$

$-6 \quad -6$

$\frac{3g}{3} < \frac{-15}{3}$

$g < -5$

OR



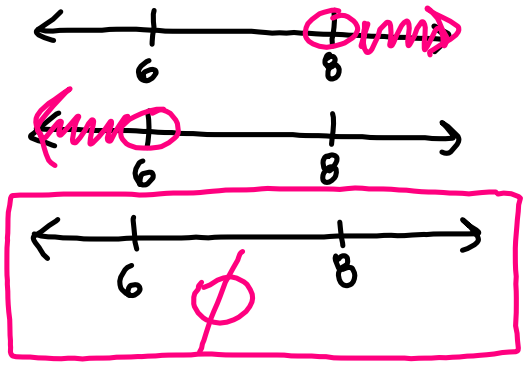
## Example 5: Solve and graph.

$3y - 4 > 20$ and $-2y + 7 > -5$

$+4 \quad +4$ $\qquad$ $-7 \quad -7$

$\frac{3y}{3} > \frac{24}{3}$ $\qquad$ $\frac{-2y}{-2} > \frac{-12}{-2}$

$y > 8$ and $y < 6$




## Example 6: Solve and graph.

$-10 \le \frac{1}{3}k - 8 \le -5$ $\qquad$ $-10 \le \frac{1}{3}k - 8$ & $\frac{1}{3}k - 8 \le 5$

$+8 \quad +8 \quad +8$

$3 \cdot -2 \le 3 \cdot \frac{1}{3}k \le 3 \cdot 3$

$-6 \le k \le 9$