

# Notes 12/4

A2

## absolute value inequalities

When  $|function| \leq$  or  $<$  (less than)

ex  $|x+4| \leq 10$

same

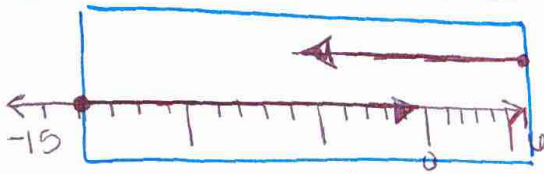
$$\begin{array}{r} x+4 \leq 10 \\ -4 \quad -4 \\ \hline x \leq 6 \end{array}$$

$$x \leq 6$$

switch inequality & sign

$$\begin{array}{r} x+4 \geq -10 \\ -4 \quad -4 \\ \hline x \geq -14 \end{array}$$

$$x \geq -14$$



overlap & solution.

final answer

$$-14 \leq x \leq 6 \\ [-14, 6]$$

\* overall when  $|function| \leq$  or  $<$  you can write the answer as one.

Short cut

$$|x+4| \leq 10$$

$$\begin{array}{r} -10 \leq x+4 \leq 10 \\ -4 \quad -4 \quad -4 \\ \hline -14 \leq x \leq 6 \end{array}$$

$$-14 \leq x \leq 6$$

\* only works for  $\leq$  &  $<$  \*  
less than

When  $|function| >$  or  $\geq$  (greater than)

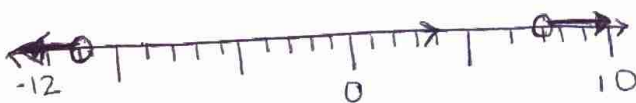
ex  $|x+2| > 9$

$$\begin{array}{r} x+2 > 9 \\ -2 \quad -2 \\ \hline x > 7 \end{array}$$

$$x > 7$$

$$\begin{array}{r} x+2 < -9 \\ -2 \quad -2 \\ \hline x < -11 \end{array}$$

$$x < -11$$



final answer

$$x > 7 \text{ \& } x < -11 \\ (-\infty, -11) \cup (7, \infty)$$

\* overall, in this case, you have to write two answers \*

## tougher problems

$$1. \quad 3|x+4| + 2 \leq 11$$

$$\frac{3|x+4|}{3} \leq \frac{9}{3}$$

$$|x+4| \leq 3$$

have to get absolute value alone 1st

since it is less than I can use the shortcut, write as 1

$$-3 \leq x+4 \leq 3$$

$$-7 \leq x \leq -1$$

$$[-7, -1]$$



$$2. \quad 2|x+1| - 4 > 10$$

$$\frac{2|x+1|}{2} > \frac{14}{2}$$

$$|x+1| > 7$$

since it's greater than I have to split into two inequalities

$$x+1 > 7$$

$$-1 \quad -1$$

$$x > 6$$

$$x+1 < -7$$

$$-1 \quad -1$$

$$x < -8$$

$$(-\infty, -8) \cup (6, \infty)$$

