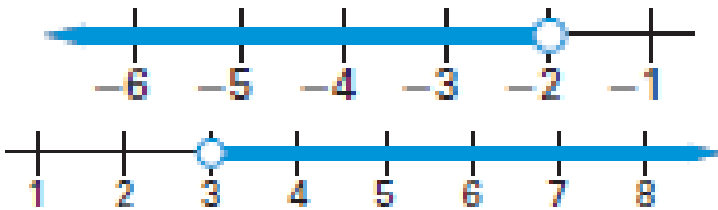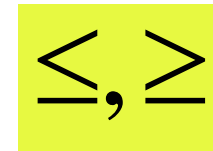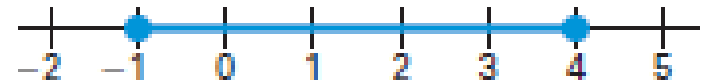# Review of Inequalities

Less than/
Greater than

$$<, >$$
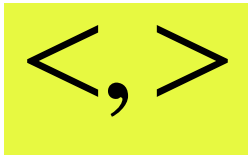
Represented with an open circle on a number line. Does not include the value

Less than or equal to/

Greater than or equal to

$$\leq, \geq$$

Represented with a closed circle on a number line. Includes the value.
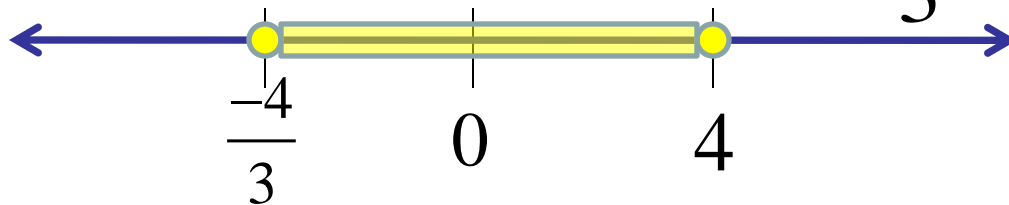
Solving Absolute Value Inequalities
"LESS THAN"

$$|3x - 4| \leq 8$$

1. Rewrite with a (-) sign on the left. Use another "less than" sign.

$$-8 \leq 3x - 4 \leq 8$$

$$+4 \qquad +4 \; +4$$

2. Solve for x on all three sides at once!

$$-4 \leq 3x \leq 12$$

3. Graph your answer on a number line.

$$\frac{-4}{3} \leq x \leq 4$$

X is "in between" the two numbers

Solving Absolute Value Inequalities

"GREAT**OR** THAN"

$$|-2x+11| > 5$$

KEEP first equation the same

CHANGE to a negative
FLIP the inequality

$$-2x+11 > 5$$ OR $$-2x+11 < -5$$

$$-2x > -6$$ OR $$-2x < -16$$

$$x < 3$$ OR $$x > 8$$

Like oars on a boat!

0   3   8
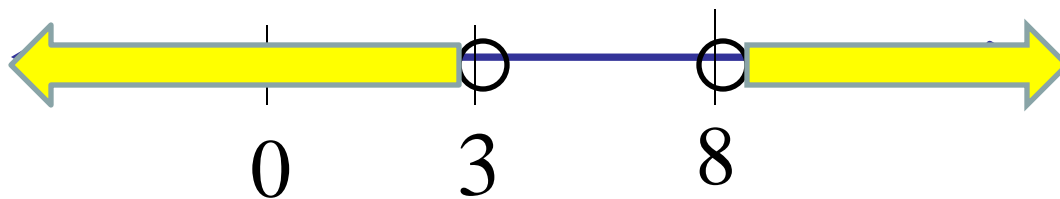
Ex: $|4x-2|+7<10$

$|4x-2|<3$

Isolate the absolute value first!

$-3<4x-2<3$

Put -3 on the other side, draw a less than sign

$-1<4x<5$

Solve

$-\dfrac{1}{4}<x<\dfrac{5}{4}$

$-\dfrac{1}{4}$ 0 $\dfrac{5}{4}$
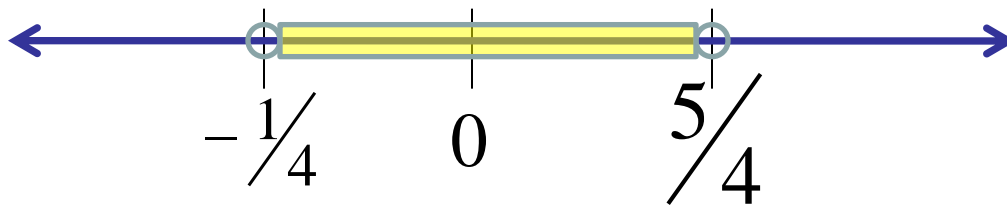
X is "in between" the two numbers

Ex:2

$$3|9x+5|+1>16$$

$$|9x+5|>5$$

$$9x+5>5$$

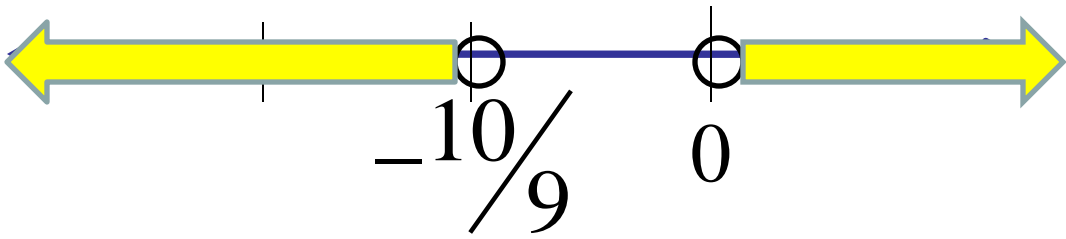$$9x+5<-5$$

$$9x>0$$

OR

$$9x<-10$$

$$x>0$$

OR

$$x<-\frac{10}{9}$$

$$-\frac{10}{9} \qquad 0$$

Like oars on a boat!

When things get weird...

When will an absolute value be BIGGER than a negative number?

$$|-2x+3| > -4$$ Every time! $\mathbb{R}$

When will an abs value be SMALLER than a negative number?

$$|-2x+3| < -4$$ Never! $\varnothing$ no solution

When will an abs value EQUAL a negative number?

$$|-2x+3| = -4$$ Never! $\varnothing$ no solution

Practice

$$|2x - 4| \geq 6$$

$$\left|\frac{1}{2}x + 5\right| - 6 < 5$$

$$|-3x + 7| + 3 \leq 2$$