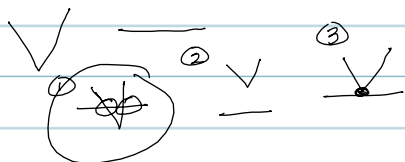


SECTION 1.6

ABSOLUTE VALUE EQUATIONS & INEQUALITIES

EX #1
 $|x-3|=7$



CHECK:

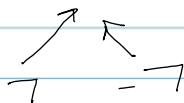
$$|x-3|=7$$

$$|10-3|=7$$

$$|7|=7$$

$$7=7 \checkmark$$

$$|x-3|=7$$



* 2 possibilities:
(answers)

$$x-3=7$$

$$+3 \quad +3$$

$$x=10$$

$$x-3=-7$$

$$+3 \quad +3$$

$$x=-4$$

$$x=-4$$

$$|-4-3|=7$$

$$|-7|=7$$

$$7=7 \checkmark$$

EX #2

$$3|x+5|-4=13$$

$$3x-4=13$$

CHECK: $x = \frac{2}{3}$

$$3|\frac{2}{3}+5|-4=13$$

$$3|\frac{2}{3}+\frac{15}{3}|-4=13$$

$$3|\frac{17}{3}|-4=13$$

$$3 \cdot \frac{17}{3} - 4 = 13$$

$$13=13 \checkmark$$

CHECK

$$3|x+5|-4=13$$

$$3|x+5|=17$$

$$|x+5|=\frac{17}{3}$$

$$x+5=\frac{17}{3}$$

$$x=\frac{17}{3}-5$$

$$x=\frac{17}{3}-\frac{15}{3}$$

$$x=\frac{2}{3}$$

$$x+5=-\frac{17}{3}$$

$$x=-\frac{17}{3}-5$$

$$x=-\frac{17}{3}-\frac{15}{3}$$

$$x=-\frac{32}{3}$$

CHECK: $x = -\frac{32}{3}$

$$3|x+5|-4=13$$
$$3|-\frac{32}{3}+5|-4=13$$
$$3|-\frac{32}{3}+\frac{15}{3}|-4=13$$
$$3|-\frac{17}{3}|-4=13$$
$$3 \cdot \frac{17}{3} - 4 = 13$$
$$13 = 13 \checkmark$$

EX #3

$$|x-5| = -12$$
$$x-5 = -12$$
$$x = -7$$

no soln

$$x-5 = 12$$
$$x = 17$$

$$|17-5| = 12$$
$$|12| = -12$$
$$12 = -12$$

NO

CHECK:

$$|-7-5| = -12$$
$$|-12| = -12$$
$$12 = -12$$

NO

* IT DOESN'T TOUCH TIL

LOGICAL OPERATORS

AND → INTERSECTION → \cap
COMMON

OR → UNION → \cup
EVERYTHING

$$A = \{1, 2, 3, 4, 5\}$$

$$B = \{2, 4, 6, 8\}$$

$$C = \{1, 3, 5, 7\}$$

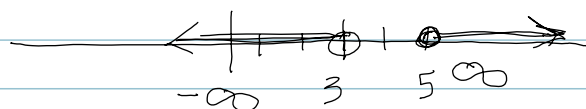
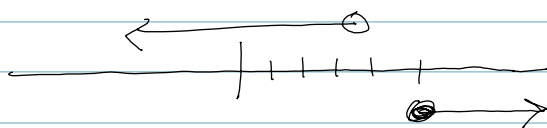
$$A \cap B = \{2, 4\}$$

$$B \cap C = \{ \} \text{ or } \emptyset$$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 8\}$$

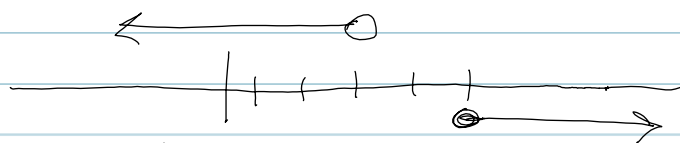
$$X < 3 \text{ or } X \geq 5$$

OR \rightarrow EVERYTHING



$$(-\infty, 3) \cup [5, \infty) \text{ interval notation}$$

$$X < 3 \text{ and } X \geq 5$$

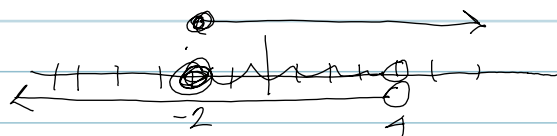


and \rightarrow common (overlap)

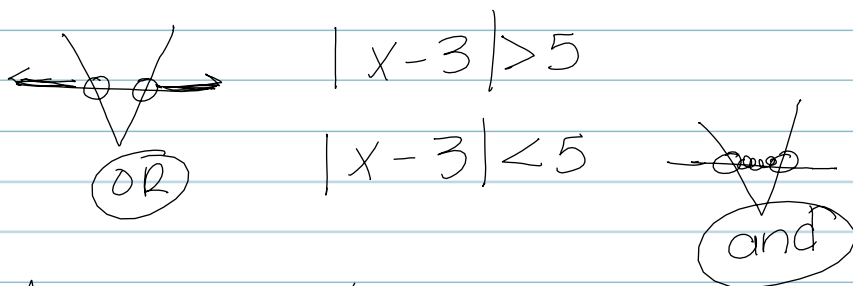
soln \rightarrow no soln

$$X \geq -2 \text{ and } X < 4$$

and \rightarrow common



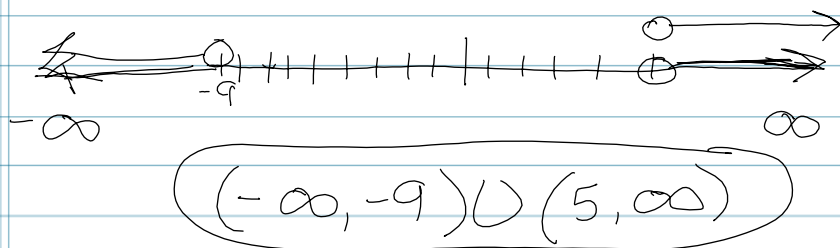
$$[-2, 4)$$



ABSOLUTE VALUE
GREATER THAN (ORS)

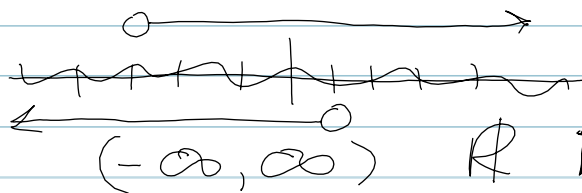
$|x+2| > 7 \rightarrow$ OR
union or everything

$x+2 > 7$ OR $x+2 < -7$
 $x > 5$ OR $x < -9$ (graph)



$|x+1| > -2$

\rightarrow OR
 $x+1 > -2$ OR $x+1 < 2$
 $x > -3$ OR $x < 1$



* means infinity to neg infinity

$|x+1| > -2$

POS # > -2

all of them $(-\infty, \infty)$

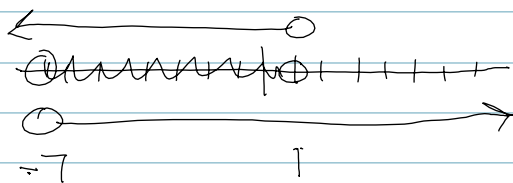
ABSOLUTE VALUE LESS THANS (AND)

$$|x+3| < 4$$

$$x+3 < 4 \text{ and } x+3 > -4$$

-3 -3 common -3 -3

$$x < 1 \qquad x > -7$$

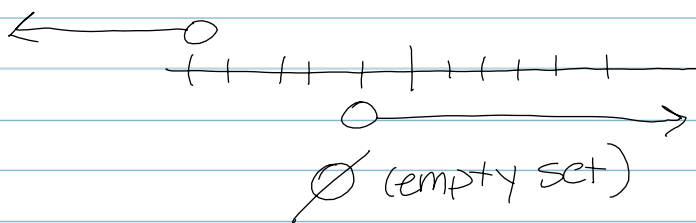


$$(-7, 1)$$

$$|x+3| < -2 \quad \text{*special case (negative)}$$

$$x+3 < -2 \text{ and } x+3 > 2$$

$$x < -5 \text{ and } x > -1$$



$$|x+3| < -2$$

POS
< -2