Compound Inequalities

Goal: To solve compound Inequalities

Sets

① set - a collection of objects

② Union - collection of all elements in two given sets.

$$A \quad B \longrightarrow \underbrace{A \cup B}_{\text{A union B}}$$

③ Intersection - the intersection of two sets, A and B, contains all the elements common to both A and B.

$$\underbrace{A \cap B}_{\text{A intersect B}}$$

ex Let $A = \{1,2,3,4\}$, $B = \{3,4,5\}$, and $C = \{6,7,8,9,10\}$

find

a) $A \cup B$

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

b) $A \cap B$

c) $A \cap C$

$\left.\begin{array}{l}\phi \\ \{\ \}\end{array}\right\}$ both Represent the empty set

$= \{3, 4\}$

Key words

"and" means intersection $\cap$

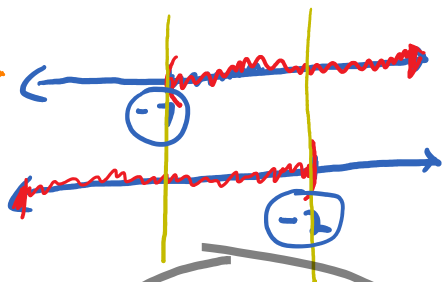
"or" means union $\cup$

ex Compound Inequalities

Graph and write in interval notation

a) $x > -7$ and $x < -2$

$\cap$

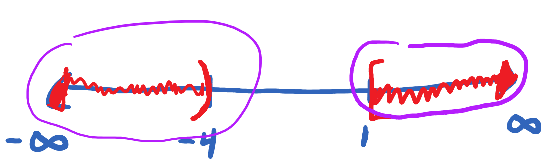


$\boxed{-7 < x < -2}$

$(-7, -2)$

b) $t < -4$ or $t \geq 1$

$\cup$



$(-\infty, -4) \cup [1, \infty)$

ex solve

a) $3 < 2t - 3 < 7$

$+3 \qquad +3 \quad +3$

$\frac{6}{2} < \frac{2t}{2} < \frac{10}{2}$

$3 < t < 5$

$(3, 5)$

b) $\frac{2x-1}{3} > 4$ or $\frac{3-2x}{3} \geq 5$

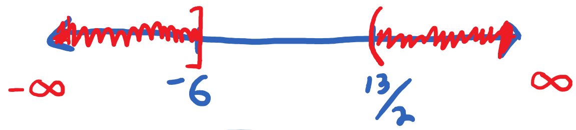
$\cancel{3} \cdot \frac{2x-1}{\cancel{3}} > 3 \cdot 4$ or $\cancel{3} \cdot \frac{3-2x}{\cancel{3}} \geq 3 \cdot 5$

$2x - 1 > 12$ or $3 - 2x \geq 15$

$2x > 13$

$x > \frac{13}{2}$ $\boxed{\text{or}}$ $x \leq -6$

$\cup$



$$(-\infty, -6] \cup \left(\frac{13}{2}, \infty\right)$$

ex $f(x) = x+2$, $\quad g(x) = 5$. Find all x such that $f(x) \geq g(x)$

$$x+2 \geq 5$$

$$x \geq 3$$

$$[3, \infty)$$