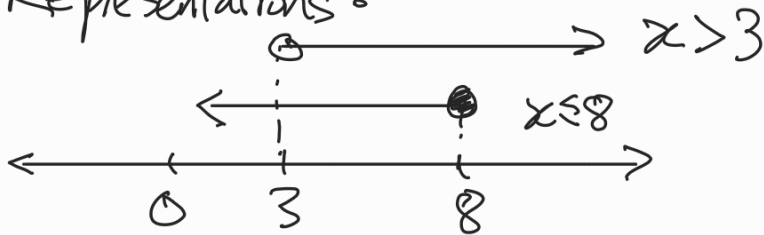


16 Inequalities

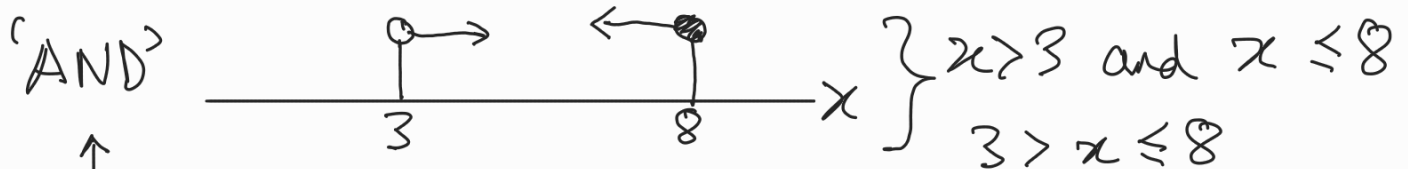
Review

- * If $a > b$ and $b > c$, then $a > c$
- * If $a > b$ then $a + c > b + c$
- * If $a > b$ then $ac > bc$ for $c > 0$
 $ac < bc$ for $c < 0$
- * If $a \neq 0$, then $a^2 > 0$
- * If $a > b > 0$, then $\frac{1}{a} < \frac{1}{b}$
- * If $a < b < 0$, then $\frac{1}{a} > \frac{1}{b}$

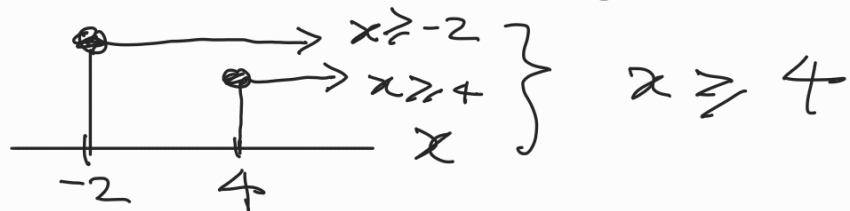
Representations:



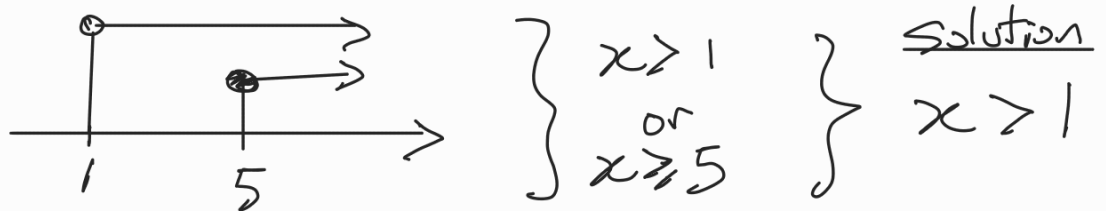
Compound Linear Inequalities in one Unknown



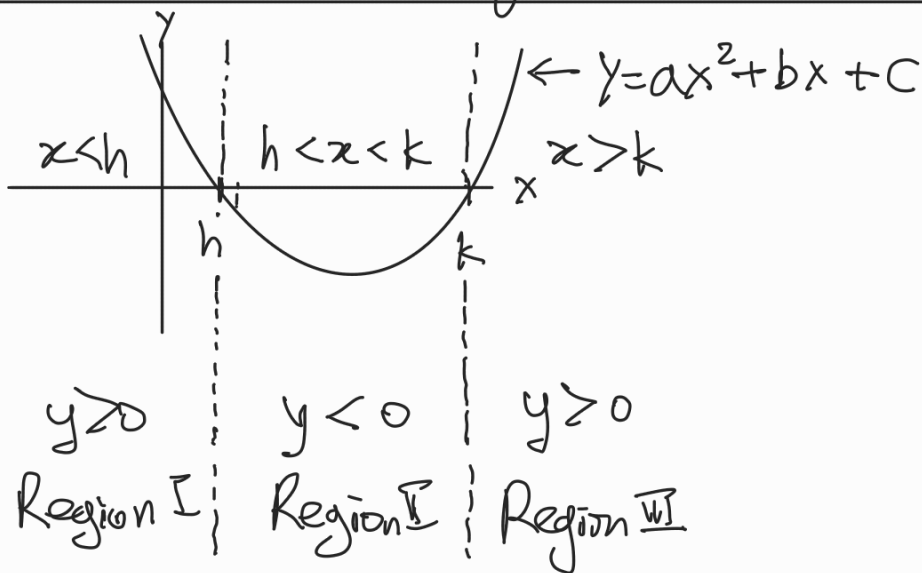
↑
overlapping



'OR'
↑
at least one



Quadratic Inequalities in one Unknown



For $ax^2 + bx + c > 0$, the solution (y) is above x axis.
For $ax^2 + bx + c < 0$, the solution is below x axis.

Solving QE Inequalities by Algebraic Method

1. If $ab > 0$, then $\begin{cases} a > 0 \\ b > 0 \end{cases}$ or $\begin{cases} a < 0 \\ b < 0 \end{cases}$
2. If $ab < 0$, then $\begin{cases} a > 0 \\ b < 0 \end{cases}$ or $\begin{cases} a < 0 \\ b > 0 \end{cases}$

Example: $x^2 + x - 6 = \underbrace{(x+3)}_a \underbrace{(x-2)}_b > 0$

This case $ab > 0$

$$\begin{aligned} & \{a > 0 \text{ and } b > 0\} \quad \text{or} \quad \{a < 0 \text{ and } b < 0\} \\ & (x+3 > 0 \text{ and } x-2 > 0) \quad \text{or} \quad (x+3 < 0 \text{ and } x-2 < 0) \\ & \underbrace{x > -3 \text{ and } x > 2}_{x > 2} \quad \text{or} \quad \underbrace{x < -3 \text{ and } x < 2}_{x < -3} \end{aligned}$$

$\therefore$ The solution is $x < -3$ or $x > 2$ 1/2