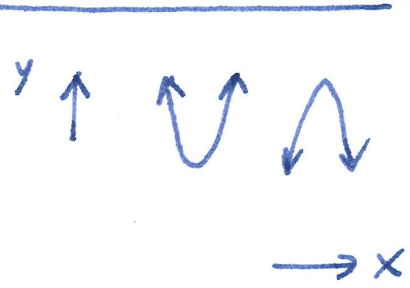
QUADRATIC EQUATIONS

$y = ax^2 + bx + c$

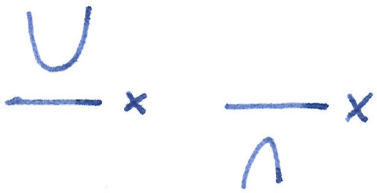


Sign of a +

Sign of a −

$y = 0$

$ax^2 + bx + c = 0$



no real x solution ← $b^2 - 4ac < 0$

$$x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

WORTH TO REMEMBER

← $b^2 - 4ac > 0$

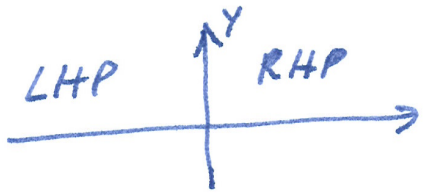
$x_{1,2} = -\frac{b}{2a}$ ← $b^2 - 4ac = 0$

$$a \cdot s^2 + b \cdot s + c = 0 \leftarrow$$

$$T(s) = H(s) = \frac{N(s)}{D(s)}$$

$$s_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

a	b	c	roots	
+	any	−	RHP and LHP	real roots
−	any	+	RHP and LHP	real roots
+	+	+	LHP	real or complex roots
+	+	+	LHP	real or complex roots
−	−	−	LHP	real or complex roots
−	−	−	LHP	real or complex roots
−	+	−	RHP	real or complex roots
−	+	−	RHP	real or complex roots
+	−	+	RHP	real or complex roots
+	−	+	RHP	real or complex roots



one root in RHP and one root in LHP

both roots in LHP

both roots in RHP