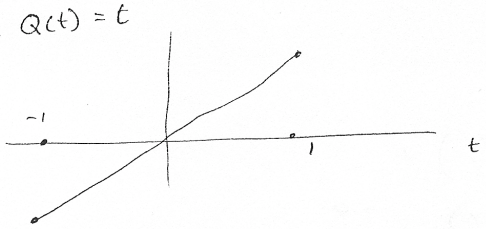
Examples:

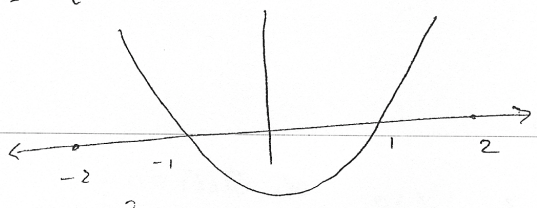
$Q(t) = t$



$Q(-1) = -1$; $Q(1) = 1$

$\Rightarrow$ must be a root $\in [-1, 1]$

$Q(t) = t^2 - 1$



$Q(-2) = 3$
$Q(2) = 3$

$\Rightarrow$ is there a root?

look at $\frac{dQ}{dt} = 2t$

$\frac{dQ}{dt}(-2) = -4$ $\therefore$ falling

$\frac{dQ}{dt}(2) = 4$ $\therefore$ rising

Q: does it pass through 0 ?

A: $\frac{d^2Q}{dt^2}$ could tell us.