

**Problem statement** The position of particle  $P$  at time  $t$  is given by  $\begin{cases} x = t \\ y = 2t - 1 \end{cases}$  and the position of particle  $Q$  at time  $t$  is given by  $\begin{cases} x = 3t - t^2 \\ y = t + 1 \end{cases}$ .

- a) Sketch both paths as well as possible. Be sure to label the paths with the particles ( $P$  and  $Q$ ) traveling on each of them.
- b) Find the two points of intersection of the paths exactly using algebra.
- c) Do the particles ever collide? You should support your answer (one of {**Yes**|**No**}) with some reason.