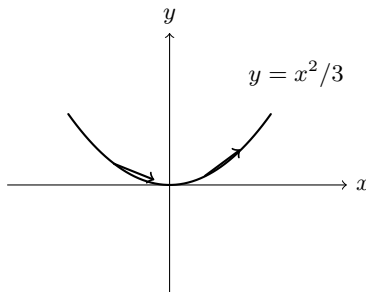


Question 2

For $\vec{r}(t) = \langle 3t, t^2, 2 - t \rangle$, eliminate the parameter to describe the curve as the intersection of two surfaces. State its orientation as t increases and locate the point corresponding to $t = -1$.

Question 2 – Solution

Strategy Solve the simplest component for t and substitute into the others.



Elimination Since $x = 3t$, $t = x/3$. Therefore

$$\boxed{y = x^2/9, \quad z = 2 - x/3}.$$

The curve is the intersection of a parabolic cylinder and a plane.

Orientation and point As t increases, x increases and z decreases. At $t = -1$, the point is $\boxed{(-3, 1, 3)}$.

Verification Substituting these coordinates into both surface equations confirms membership.