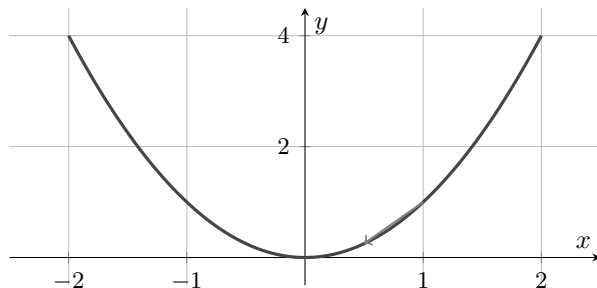


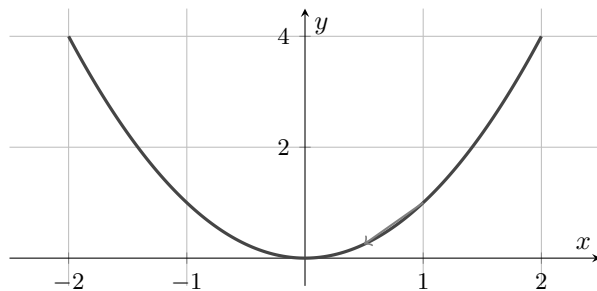
Question 9

Problem

Can the parabola $y = x^2$ be traced from right to left while the parameter increases? Give a parametrization on $-2 \leq t \leq 2$ that does so.



Question 9 – Solution



Solution

1. To trace the parabola from right to left, choose the x -coordinate so that it decreases as t increases. A simple choice is

$$x = -t.$$

2. The curve must satisfy $y = x^2$. Substituting $x = -t$ gives

$$y = (-t)^2 = t^2.$$

Hence one suitable parametrization is

$$\boxed{x = -t, \quad y = t^2, \quad -2 \leq t \leq 2}.$$

3. Verify that the curve is correct by eliminating the parameter:

$$t = -x \implies y = t^2 = (-x)^2 = x^2.$$

4. Verify the direction. At $t = -2$, the point is $(2, 4)$; at $t = 0$, it is $(0, 0)$; and at $t = 2$, it is $(-2, 4)$.
5. Also, $dx/dt = -1 < 0$, so x decreases continuously. Therefore, the parabola is traced from right to left as required.