Exercise 5

For the following exercises, eliminate the parameter and sketch the graphs.

$$x = 2t^2, \quad y = t^4 + 1$$

Solution

Since the first equation is simpler, solve it for t^2

$$\frac{x}{2} = t^2$$

and plug it into the second equation.

$$\begin{aligned} y &= t^4 + 1 \\ &= (t^2)^2 + 1 \\ &= \left(\frac{x}{2}\right)^2 + 1 \\ &= \frac{x^2}{4} + 1 \end{aligned}$$

The graph is of a parabola (the right half only because x and y are nonnegative for all t) opening upward.