(a) *Eliminate the parameter to find a Cartesian equation of the curve.*[1]

$$x = \tan^2(\theta), \quad y = \sec(\theta), \quad -\pi/2 < \theta < \pi/2$$

We know

$$1 + \tan^2(\theta) = \sec^2(\theta)$$

Substituting,

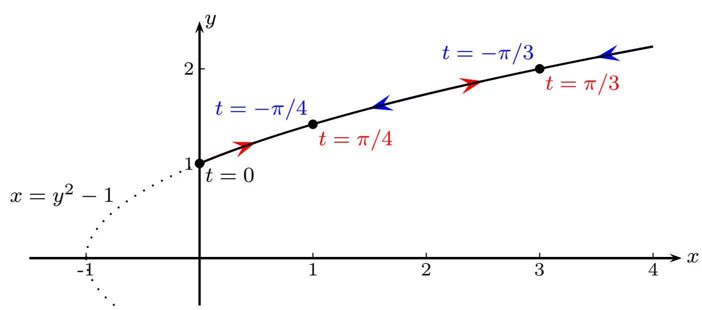
$$\begin{aligned} 1 + x &= y^2 \\ x &= y^2 - 1 \end{aligned}$$

If $-\pi/2 < \theta < \pi/2$, then $-\infty < \tan(\theta) < \infty$, so $-0 \leq \tan^2(\theta) < \infty$, and thus $0 \leq x$.

Also, if $-\pi/2 < \theta < \pi/2$, then $\sec(\theta) \geq 1$, so the graph of the parametric equations is in the first quadrant, with y-values always greater than or equal to one.

(b) *Sketch the curve by and indicate with an arrow the direction in which the curve is traced as the parameter increases.*

Here's the graph:



As t increases towards 0 from $-\frac{\pi}{2}$, the point moves to the left along the parabola towards (0,1); this is shown in blue. At $t = 0$, the direction changes and as t continues to increase, the point moves to the right along the parabola; this is shown in red.

[1] Stewart, *Calculus, Early Transcendentals*, p. 645, #18.