

18.024 Homework 4 - Solutions

Problem 1.

The solutions of the two curves are $y^2 = 4x$ and $y^2 = 8 - 4x$.

Problem 2.

a) $\alpha(t) = \frac{\pi}{2} - 5t^2$

Note that $\alpha(t) = \frac{\pi}{2} + 5t^2$ is not a solution because the velocity never goes to the left of the y -axis.

b) $\mathbf{v}(t) = 5 \sin(5t^2)\hat{i} + 5 \cos(5t^2)\hat{j}$

Problem 3.

$$s = \sqrt{2}(1 - \exp(-2\pi M))$$

So as M becomes arbitrarily large, the length of the curve converges to $\sqrt{2}$.