

$$\begin{aligned}
 r = 4 - \sin \theta &\Rightarrow x = r \cos \theta = (4 - \sin \theta) \cos \theta, y = r \sin \theta = (4 - \sin \theta) \sin \theta \\
 \Rightarrow \frac{dy}{dx} = \frac{dy/d\theta}{dx/d\theta} &= \frac{(4 - \sin \theta) \cos \theta + \sin \theta(-\cos \theta)}{(4 - \sin \theta)(-\sin \theta) + \cos \theta(-\cos \theta)} = \frac{4 \cos \theta - 2 \sin \theta \cos \theta}{-4 \sin \theta + \sin^2 \theta - \cos^2 \theta} = \\
 &= \frac{4 \cos \theta - \sin 2\theta}{-4 \sin \theta - \cos 2\theta}
 \end{aligned}$$

$$\text{When } \theta = \frac{\pi}{3}, \frac{dy}{dx} = \frac{4(1/2) - (\sqrt{3}/2)}{-4(\sqrt{3}/2) - (-1/2)} = -\frac{4 - \sqrt{3}}{4\sqrt{3} - 1}.$$