

$$r = \cos 2\theta \Rightarrow x = r \cos \theta = \cos 2\theta \cos \theta, y = r \sin \theta = \cos 2\theta \sin \theta \Rightarrow$$
$$\frac{dy}{dx} = \frac{dy/d\theta}{dx/d\theta} = \frac{\cos 2\theta \cos \theta + \sin \theta (-2 \sin 2\theta)}{\cos 2\theta (-\sin \theta) + \cos \theta (-2 \sin 2\theta)}$$

$$\text{When } \theta = \frac{\pi}{4}, \frac{dy}{dx} = \frac{0(\sqrt{2}/2) + (\sqrt{2}/2)(-2 \cdot 1)}{0(-\sqrt{2}/2) + (\sqrt{2}/2)(-2 \cdot 1)} = 1.$$