Q.1 Consider the polar equation \( r = 2 \cos \left( \frac{\theta}{2} \right) \), \( 0 \leq \theta \leq 2\pi \).

i) Sketch the curve of the given polar equation. (3 points)

ii) Find the equation of the tangent line to the polar curve at \( \theta = \frac{\pi}{2} \). (3 points)

Q.2 Find the area inside the curve \( r = \frac{1}{2} \) and outside the curve \( r = \sin 2\theta \). (6 points)