1. Find the slope of the limaçon $r = 1 + 2\cos\theta$ at the pole (ie when $r = 0$)

2. Find the polar coordinates of the horizontal and vertical tangents to the cardioid $r = 1 + \cos\theta$

3. Find the area enclosed by one petal of the rose $r = \cos 3\theta$

4. Find the average value of r where $r = 2 - \cos 2\theta$