

Problem 1

Graph the curve $r = 1 + \cos(\theta)$. Then, give the equation of the tangent line (in the usual Cartesian coordinates) at the point $(r, \theta) = (\frac{3}{2}, \frac{\pi}{3})$. Graph the tangent line on the graph of the curve.

Problem 2

Graph the curves $r = 1 + 2 \cos(\theta)$ and $r = \sin(2\theta)$ (separately).

Problem 3

Find the area between the curves $r = 3 - \cos(\theta)$ and $r = 1 - \cos(\theta)$ from $0 \leq \theta \leq 2\pi$.

Problem 4

Find the length of the cardioid $r = 1 + \cos(\theta)$.

(Hint: $\frac{1 + \cos(2\theta)}{2} = \cos^2(\theta)$)

(Another Hint: By symmetry, you can get away with integrating from 0 to π and multiplying your answer by 2. This makes dealing with the absolute value easier.)