MATH 212 Quiz 4 NAME:

1. Sketch the curve $r = 1 - \sin\theta$.
   - It is a cardioid. Consult the textbook.
2. Find the area of the region enclosed by the polar curve given in exercise #1.
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$$\begin{aligned} Area &= \frac{1}{2}\int (1-\sin\theta)^2 d\theta \\ &= \frac{2}{3}\theta + 2\cos\theta - \frac{\sin 2\theta}{4}|_0^{2\pi} \\ &= \frac{3}{2}\pi. \end{aligned}$$

3. Find all points of intersection of $r = \sin\theta$ and $r = \cos\theta$. Sketch both graphs.
   - The points of intersections are $(r,\theta) = (0,0)$ and $(\frac{1}{\sqrt{2}}, \frac{\pi}{4})$.