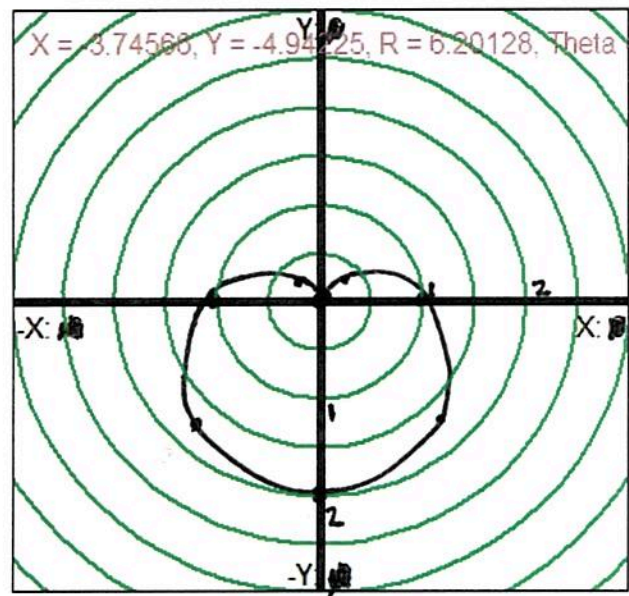


Instructions: Work the problems below as directed. Show all work. Clearly mark your final answers. Use exact values unless the problem specifically directs you to round. Simplify as much as possible. Partial credit is possible, but solutions without work will not receive full credit.

1. Sketch the graph of $r = 1 - \sin \theta$ on the graph below. You must plot at least 8 points with exact values.

θ	r
0	1
$\frac{\pi}{4}$	$1 - \frac{1}{\sqrt{2}} \approx 0.292893$
$\frac{\pi}{2}$	0
$\frac{3\pi}{4}$	$1 - \frac{1}{\sqrt{2}}$
π	1
$\frac{5\pi}{4}$	$1 + \frac{1}{\sqrt{2}} \approx 1.70711$
$\frac{3\pi}{2}$	2
$\frac{7\pi}{4}$	$1 + \frac{1}{\sqrt{2}}$
2π	1



2. Write the equation (do simplify, but do not integrate!) for the arclength of the graph $x = e^{-t}, y = e^{2t} - 1$ in parametric form on the interval $[2, 5]$.

$$S = \int_2^5 \sqrt{(-e^{-t})^2 + (2e^{2t})^2} dt = \int_2^5 \sqrt{e^{-2t} + 4e^{4t}} dt$$

$$\approx 21,971.9$$

3. Find parametric equations for the graph of a circle centered at $(-3, 1)$ and radius 3.

$$X = 3 \cos x - 3$$

$$Y = 3 \sin x + 1$$