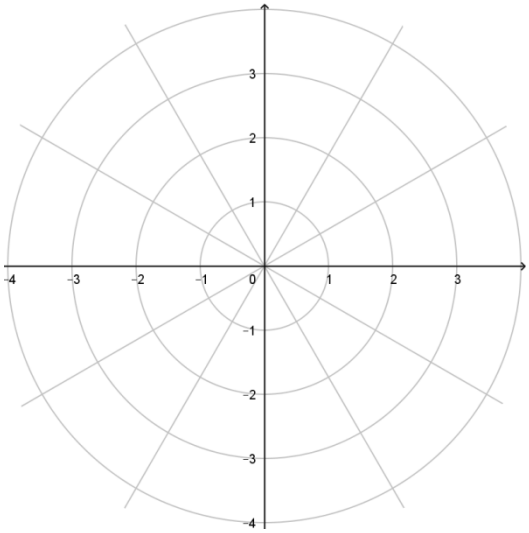
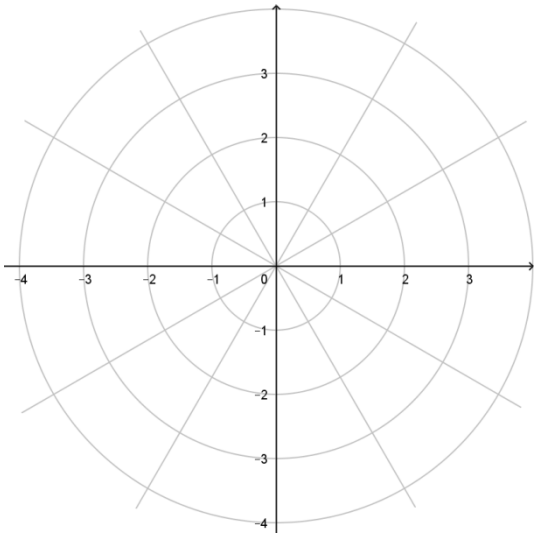
Plot the point whose polar coordinates are given. Then find two other pairs of polar coordinates of this point, one with $r > 0$ and one with $r < 0$.

1) (a) $(1, \pi/2)$ (b) $(-2, \pi/4)$ (c) $(3, 2)$



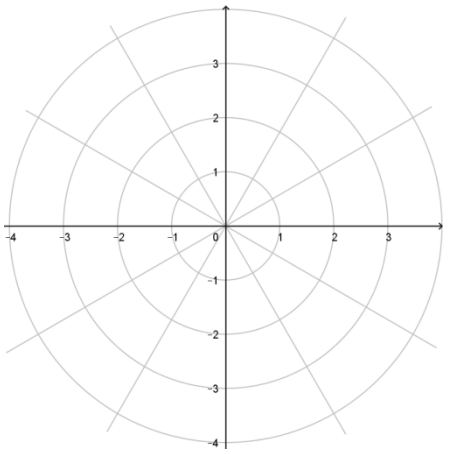

Plot the point whose polar coordinates are given. Then find the Cartesian coordinates of the point.

2) (a) $(3, \pi/2)$ (b) $\left(2\sqrt{2}, 3\pi/4\right)$ (c) $(-1, \pi/3)$

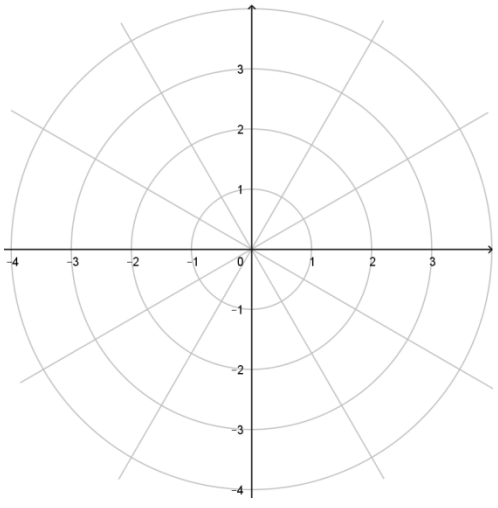


Sketch the region in the plane consisting of points whose polar coordinates satisfy the given conditions.

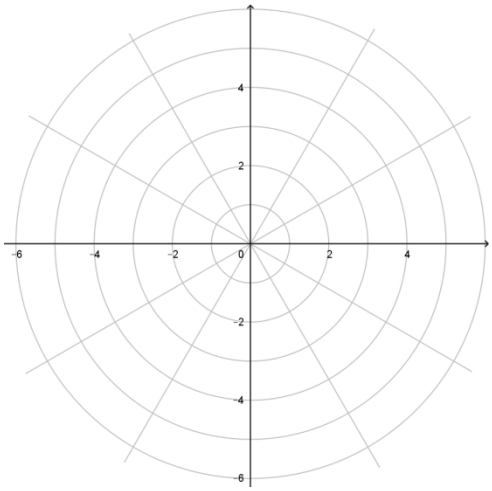
3) $1 \le r \le 2$



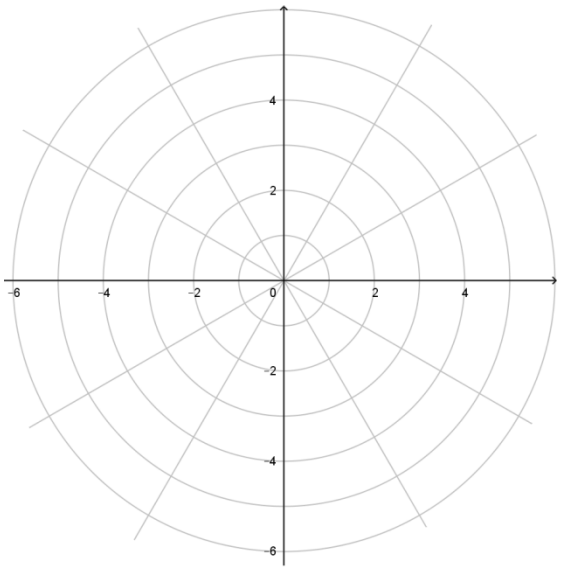
4) $r \ge 0, \quad \frac{\pi}{3} \le \theta \le \frac{2\pi}{3}$



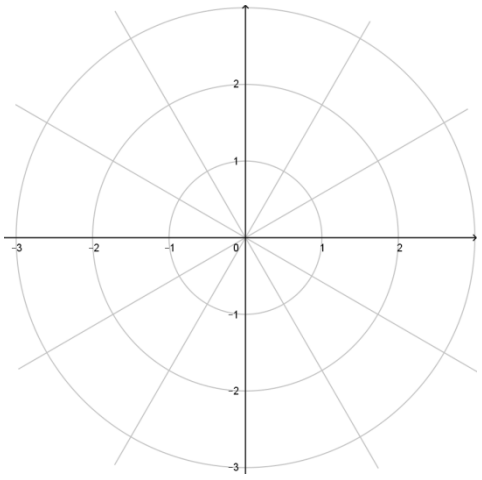
5) $0 \le r < 4, \quad -\frac{\pi}{2} \le \theta \le \frac{\pi}{6}$



6) $2 < r \le 5, \quad \frac{3\pi}{4} < \theta < \frac{5\pi}{4}$



7) $-1 \le r \le 1, \quad \frac{\pi}{4} < \theta < \frac{3\pi}{4}$




Identify the curve by finding a Cartesian equation for the curve.

8) $r = 2$

9) $r\cos\theta = 1$

10) $r = 2\sin\theta + 2\cos\theta$

11) $r = \tan\theta\sec\theta$

Find a polar equation for the curve represented by the given Cartesian equation.

12) $x = 3$

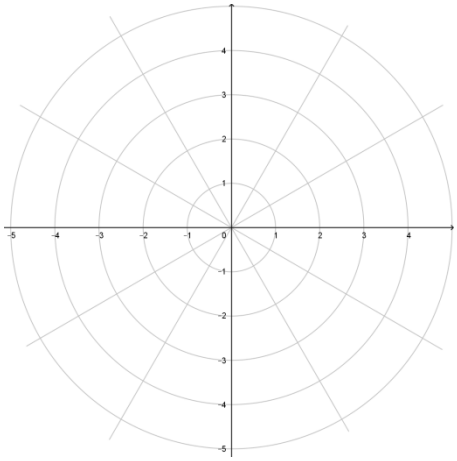
13) $x^2 + y^2 = 9$

14) $x = -y^2$

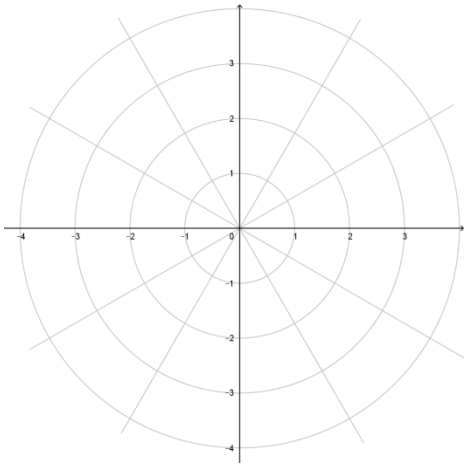
15) $x^2 - y^2 = 1$

Sketch the curve with the given polar equation.

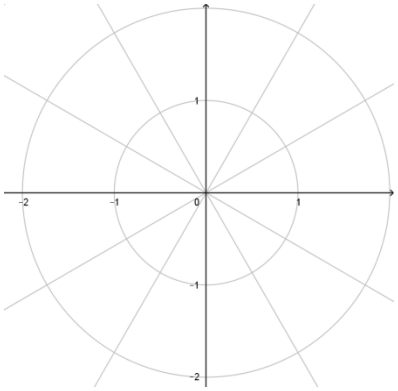
16) $r = 1 - 3\cos\theta$



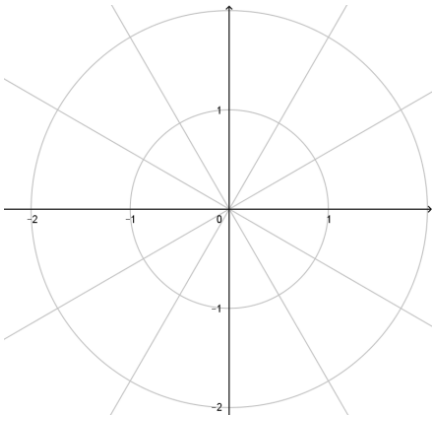
17) $r = \theta, \quad \theta \geq 0$



18) $r = \sin 2\theta$



19) $r^2 = \sin 2\theta$



20) Match the polar equations with the graphs labeled I-VI. Give reasons for your choices. (Don't use a graphing device.)

a) $r = \sin(\theta/2)$

b) $r = \sin(\theta/4)$

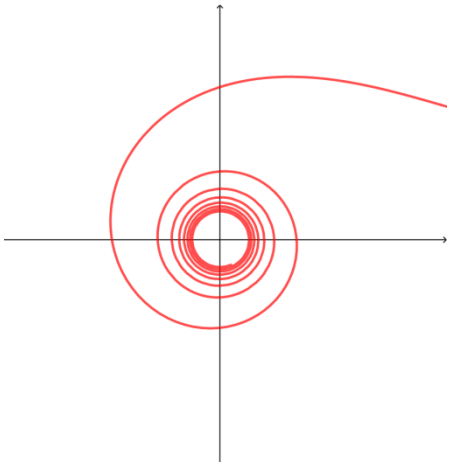
c) $r = \sec(3\theta)$

d) $r = \theta \sin\theta$

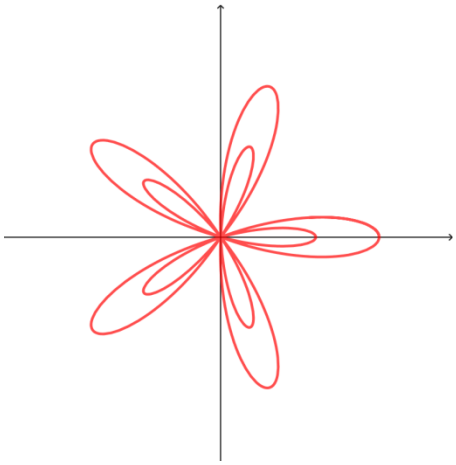
e) $r = 1 + 4\cos 5\theta$

f) $r = \dfrac{1}{\sqrt{\theta}}$

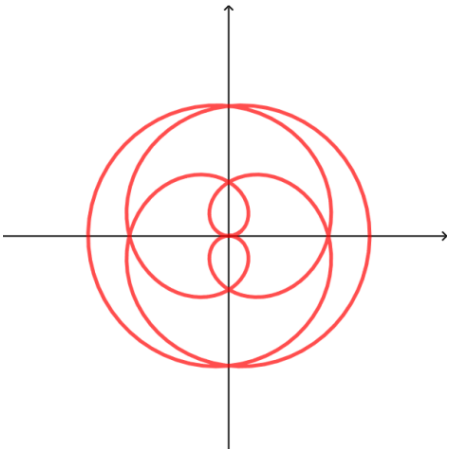
**I**



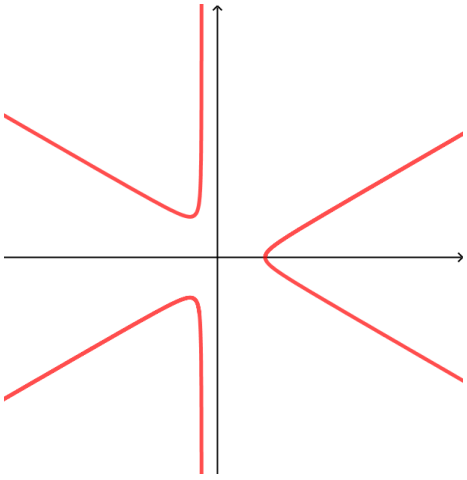
**II**



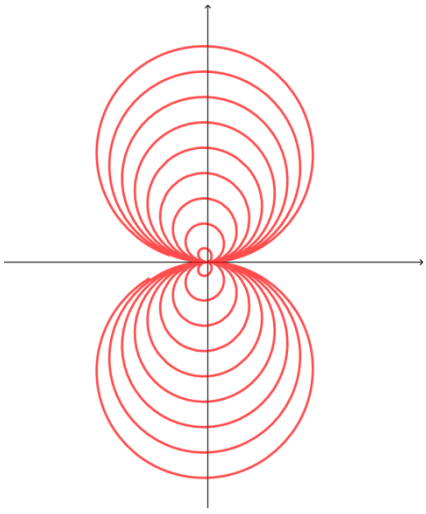
**III**



**IV**



**V**



**VI**