r, θ (x, y)

$r^2 = x^2 + y^2$

$r = \sqrt{x^2 + y^2}$

$x = r\cos\theta$

$y = r\sin\theta$

Convert the polar equation to rectangular form and identify the graph.

A) $r(r) = (4\cos\theta)r$

$r^2 = 4r\cos\theta$

$x^2 + y^2 = 4x$

$x^2 - 4x + y^2 = 0$

Circle

B) $r = 4\sec\theta$ $(4)(\frac{1}{\cos\theta})$

$r = \frac{4}{\cos\theta}$

$r\cos\theta = 4$

$x = 4$

Vertical line

C) $r\cot\theta = 4$

$r\left(\frac{\cos\theta}{\sin\theta}\right) = 4$

$r\cos\theta = 4\sin\theta$

$x = 4\sin\theta$

$r \cdot x = 4r\sin\theta$

$r \cdot x = 4y$

$\sqrt{x^2+y^2} \cdot x = 4y$

$\left(\sqrt{x^2+y^2}\right)^2 = \left(\frac{4y}{x}\right)^2$

$x^2(x^2+y^2) = \left(\frac{16y^2}{\cancel{x^2}}\right)\cancel{x^2}$

$x^4 + x^2y^2 = 16y^2$

$x^4 + x^2y^2 - 16y^2 = 0$

D) $r(r) = (2\cos\theta - 6\sin\theta)r$

$r^2 = 2r\cos\theta - 6r\sin\theta$

$x^2 + y^2 = 2x - 6y$

$x^2 - 2x + y^2 + 6y = 0$