Precalculus, Section 9.1, #68
Polar Coordinates

The letters x and y represent rectangular coordinates. Write each equation using polar coordinates (r,θ).[1]

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

We know $x^2 + y^2 = r^2$ and $x = r\cos(\theta)$. Substituting,

$$\begin{aligned} x^2 + y^2 &= x \\ r^2 &= r\cos(\theta) \end{aligned}$$

if $r \neq 0$,

$$\begin{aligned} \frac{1}{r} \cdot r^2 &= \frac{1}{r} \cdot r\cos(\theta) \\ r &= \cos(\theta) \end{aligned}$$

[1]Sullivan, *Precalculus: Enhanced with Graphing Utilities*, p. 568, #68.