

$$\begin{aligned}xy = 11 &\Leftrightarrow (r \cos \theta)(r \sin \theta) = 11 &\Leftrightarrow r^2 \left(\frac{1}{2} \cdot 2 \sin \theta \cos \theta\right) = 11 &\Leftrightarrow \\r^2 \sin 2\theta = 22 &\Rightarrow r^2 = 22 \csc 2\theta\end{aligned}$$