Answer on Question #53938 – Math – Calculus

Determine if the graph is symmetric about the x-axis, the y-axis, or the origin.

$$r = 3 - 4 \sin \theta$$

Solution

$$\boldsymbol{r = \sqrt{x^2 + y^2},\ \ \theta = arctan\left(\frac{y}{x}\right)}$$

Thus, in Cartesian coordinates we have:

$$\boldsymbol{\sqrt{x^2 + y^2} = 3 - 4\frac{\frac{y}{x}}{\sqrt{1+\frac{y^2}{x^2}}}} \rightarrow$$

$$\boldsymbol{\rightarrow \quad F(x, y) = \sqrt{x^2 + y^2} - 3 + \frac{4y}{\sqrt{x^2+y^2}} = 0}$$

$$\boldsymbol{F(-x, y) = F(x, y)},$$

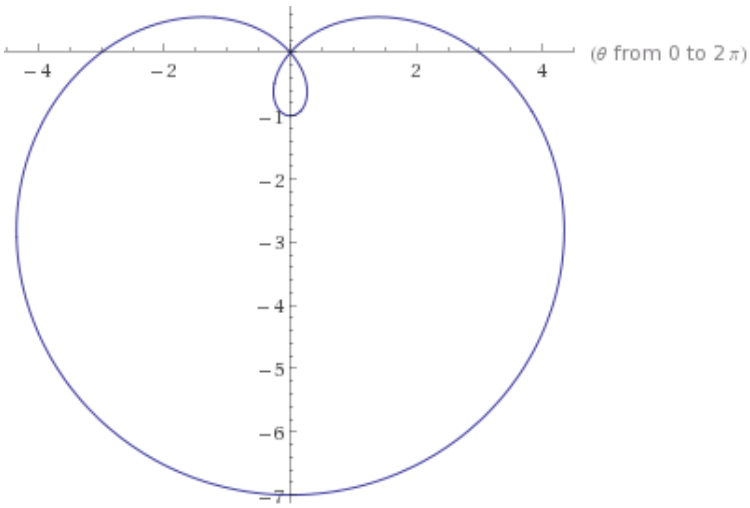
Thus, the graph is symmetric about y-axis.

$$\boldsymbol{F(x, -y) \neq F(x, y)},$$

Thus, the graph is not symmetric about x-axis.

$$\boldsymbol{F(-x, -y) \neq F(x, y)}.$$

Thus the graph is not symmetric about the origin.


−4
−2
2
4
−1
−2
−3
−4
−5
−6
−7
(θ from 0 to 2π)