Answer on Question #76410 – Math –Algebra

Question

Is the curve $r = 2\sin 3\theta$ symmetric about the line $\theta = \frac{\pi}{2}$? Justify your answer.

Solution

Symmetry tests for polar coordinates: Replace θ with $-\theta$ and r with $-r$. If an equivalent equation results, the graph is symmetric with respect to $\theta = \frac{\pi}{2}$: [1]

$$-r = 2\sin(-3\theta),$$
$$-r = -2\sin(3\theta),$$
$$r = 2\sin(3\theta).$$

Answer: the graph of the curve $r = 2\sin 3\theta$ is symmetric with respect to $\theta = \frac{\pi}{2}$.

References:

1. https://faculty.math.illinois.edu/~rasekh2/math231(s2016)/PolarEquations.pdf