InkMaths

QUESTION WORKBOOK

Polar curves

Polar coordinates · Year FM

7 questions · 27 marks

PRINT EDITION

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SECTION A · Warm-up

A1 Convert the polar point $(4, 2\pi/3)$ to cartesian coordinates, exactly. [2]

A2 Find polar coordinates (r, θ) for the cartesian point $(1, -1)$, with $-\pi < \theta \leq \pi$. [3]

SECTION B · Standard

B1 Convert $r = 6 \sin\theta$ to cartesian form and identify the curve. [4]

B2 Convert $r = 2 \sec\theta$ to cartesian form and describe the curve. [3]

B3 For the cardioid $r = 3(1 + \cos\theta)$, find r at $\theta = 0$, $\pi/2$ and π, and sketch the curve, marking those three points. [4]

B4 The curve $r = 2\cos 3\theta$ is a rose. State how many petals it has, the maximum value of r, and the first positive θ at which the curve passes through the pole. [3]

SECTION C · Stretch

C1 The cardioid has equation $r = 3(1 + \cos\theta)$ for $0 \le \theta < 2\pi$. Find the polar coordinates of the points on the curve that are furthest from the initial line, giving exact values. [8]