

Polar Curves Exercises (1 page; 3/2/26)

(1)(i) Sketch the curve $r = 5 + 4\cos\theta$, explaining how you obtained your sketch. [Do not obtain your curve entirely by plotting points.]

(ii) Without converting the curve to cartesian form, find the greatest negative x -coordinate of a point on the curve.

(iii) Determine the area enclosed by the curve.

(2) Convert the curve $(x - 1)^2 + y^2 = 1$ to polar form.

(3) Convert the curve $r = \frac{2}{1+\cos\theta}$ to cartesian form, and sketch the curve, based on its cartesian form.

(4)(i) Sketch the curve $r^2 = \sin 2\theta$.

(ii) Show how to sketch the curve $r^2 = \cos 2\theta$ by applying a transformation to $r^2 = \sin 2\theta$.

(iii) Find the largest y -coordinate of the curve $r^2 = \sin 2\theta$.

(5) A curve has polar equation $r = 3(\cos\theta + 2\sin\theta)$,

for $0 \leq \theta \leq \pi$.

(i) Show that the curve is a circle.

(ii) Determine the polar coordinates of the point on the curve which is furthest from the pole.