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QUESTION WORKBOOK

# Polar curves

Polar coordinates · Year FM

7 questions · 27 marks

NAVY SCREEN EDITION

**SECTION A** · Warm-up

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

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

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**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]

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- B3** For the cardioid  $r = 3(1 + \cos \theta)$ , find  $r$  at  $\theta = 0, \pi/2$  and  $\pi$ , 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  $\theta$  at which the curve passes through the pole. [3]

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### SECTION C · Stretch

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