AQA – Polar coordinates – AS Further Mathematics P1
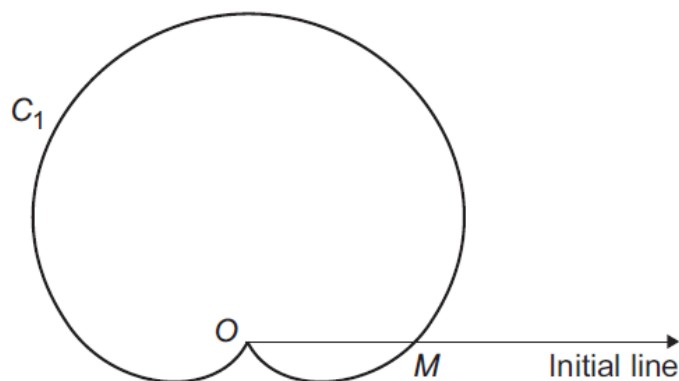
1.

The curve C_1 has polar equation $r = 2a(1 + \sin\theta)$ for $-\pi < \theta \le \pi$ where a is a positive constant.

The point M lies on C_1 and the initial line.

(a)   Write down, in terms of a, the polar coordinates of M

[1 mark]

(b) N is the point on C_1 that is furthest from the pole O

Find, in terms of a, the polar coordinates of N

[2 marks]

(c)   The curve C_2 has polar equation $r = 3a$ for $-\pi < \theta \le \pi$

C_2 intersects C_1 at points P and Q

Show that the area of triangle NPQ can be written in the form

$$m\sqrt{3}a^2$$

where m is a rational number to be determined.

[5 marks]

(d)   On the initial line below, sketch the graph of $r = 2a(1 + \cos\theta)$ for $-\pi < \theta \leq \pi$

Include the polar coordinates, in terms of a, of any intersection points with the initial line.

[2 marks]

O ——————————————————————▶
                                    Initial line