Question 10 **(7 marks)**
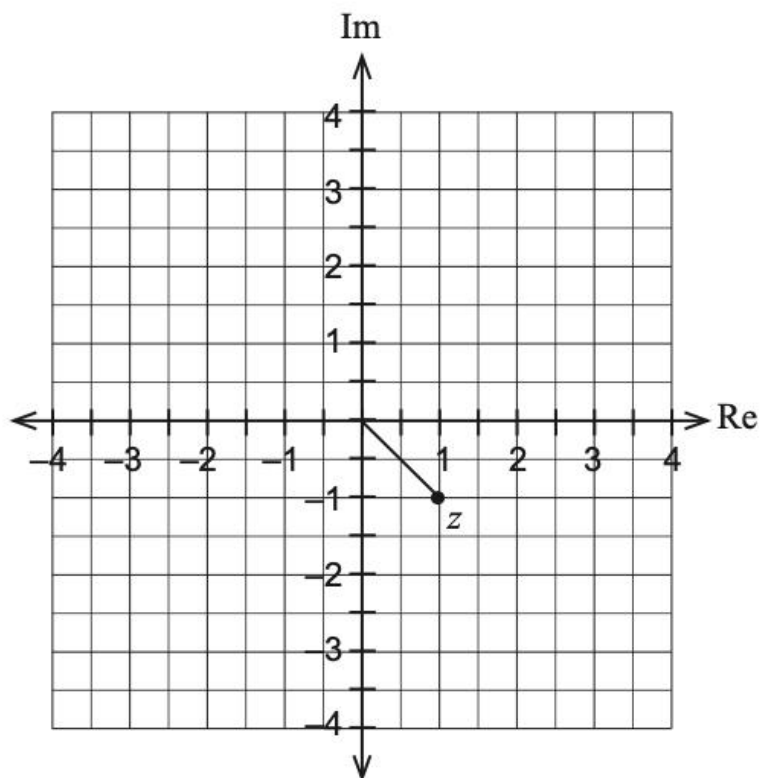
Consider $z = 1 - i$ shown in the complex plane below.

(a)   Express z in polar form. (1 mark)

(b)   Hence express z^2, z^3 and z^4 in exact polar form. (2 marks)

(c)   Sketch the complex numbers z^2, z^3, z^4 as vectors in the given Argand diagram. (2 marks)

Consider the geometric transformation(s) applied to transform $z \rightarrow z^2 \rightarrow z^3 \rightarrow z^4$ etc.

(d)   Describe the geometric transformation(s) performed by successive multiplication
        by z.   (2 marks)