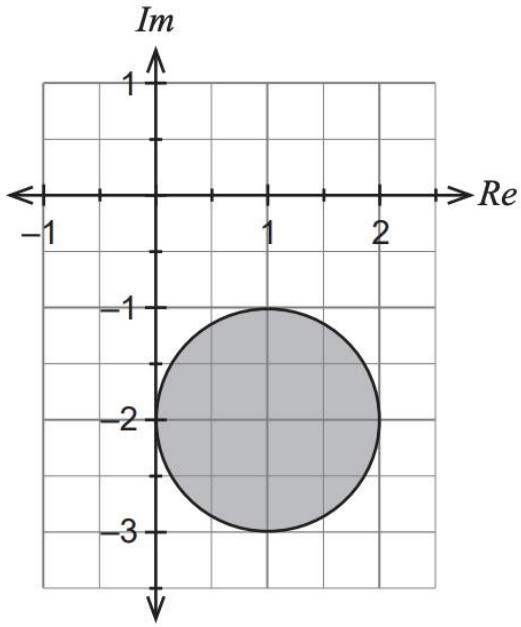
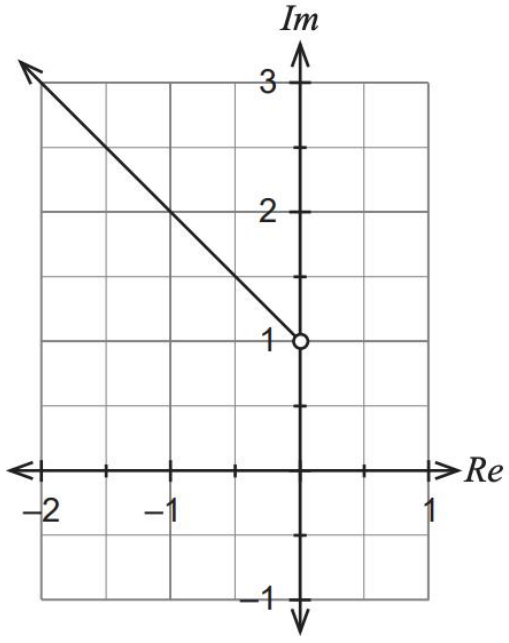
Question 11 **(8 marks)**

A sketch of the locus of a complex number z is shown below. Write equations or inequalities in terms of z (without using $x = \text{Re}(z)$ or $y = \text{Im}(z)$) for each of the following:

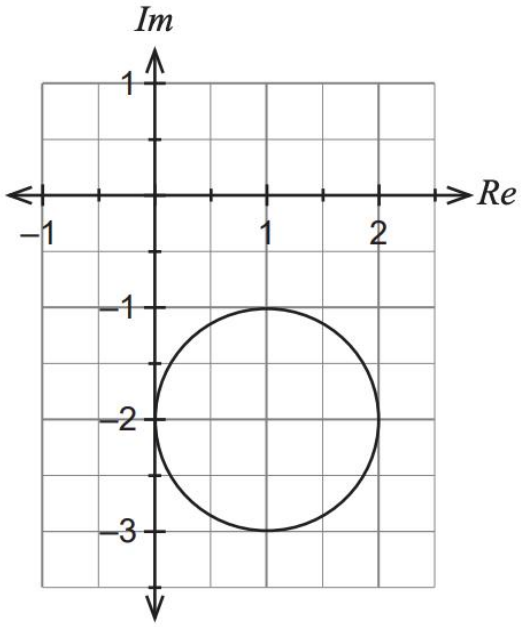
(a) (3 marks)



(b) (2 marks)



The sketch in Question 11 part (a) is repeated below, with only the circle indicated.



(c) For the locus from part (a), determine the maximum value for $arg\,(z)$ correct to 0.01, where $0 \leq arg\,(z) < 2\pi$. (3 marks)