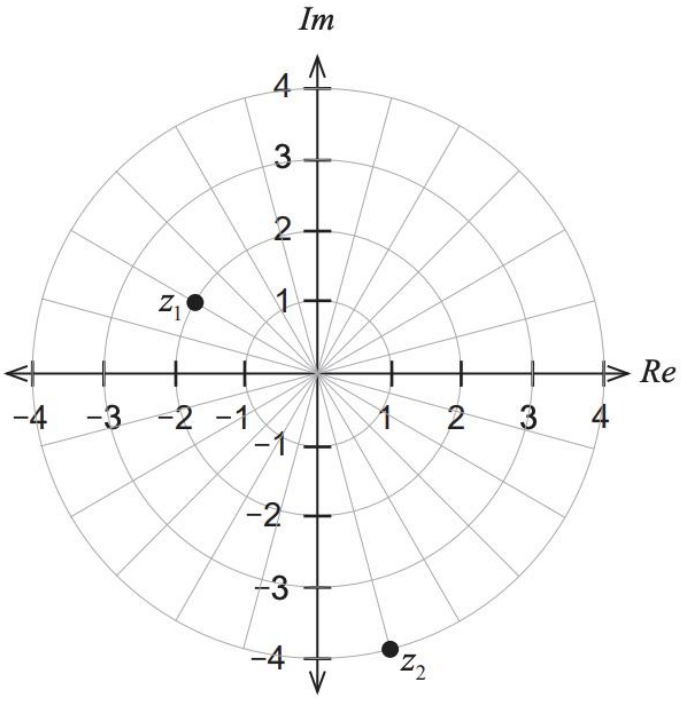
**Question 11** **(9 marks)**

Two complex numbers $z_1$ and $z_2$ are shown in the Argand plane below.




(a) Write the expression for $z_1$ in exact polar form. (2 marks)

(b) Write the expression for $z_1$ in exact Cartesian form. (1 mark)

(c) Plot the complex number $iz_2$ on the Argand diagram above. (2 marks)

(d) A sketch of the locus of a complex number $z$ is shown below. The upper boundary of the locus is part of a circle, centred at $z = i$. Write equations or inequalities in terms of $z$ (without using $x = Re(z)$ or $y = Im(z)$) for the indicated locus. (4 marks)