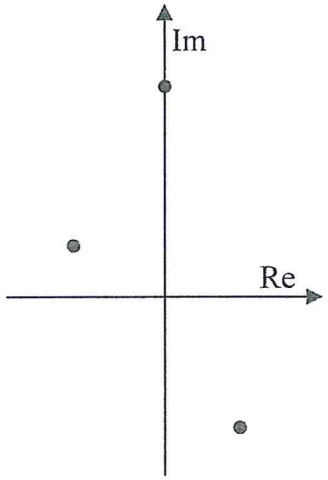
LCH - 2011 - Paper 1

Question 2 **(25 marks)**

(a) **(i)** Write the complex number $1-i$ in polar form.

(ii) Use De Moivre's theorem to evaluate $(1-i)^9$, giving your answer in rectangular form.

(b) A complex number z has modulus greater than 1.
The three numbers z, z^2, and z^3 are shown on the Argand diagram.
One of them lies on the imaginary axis, as shown.



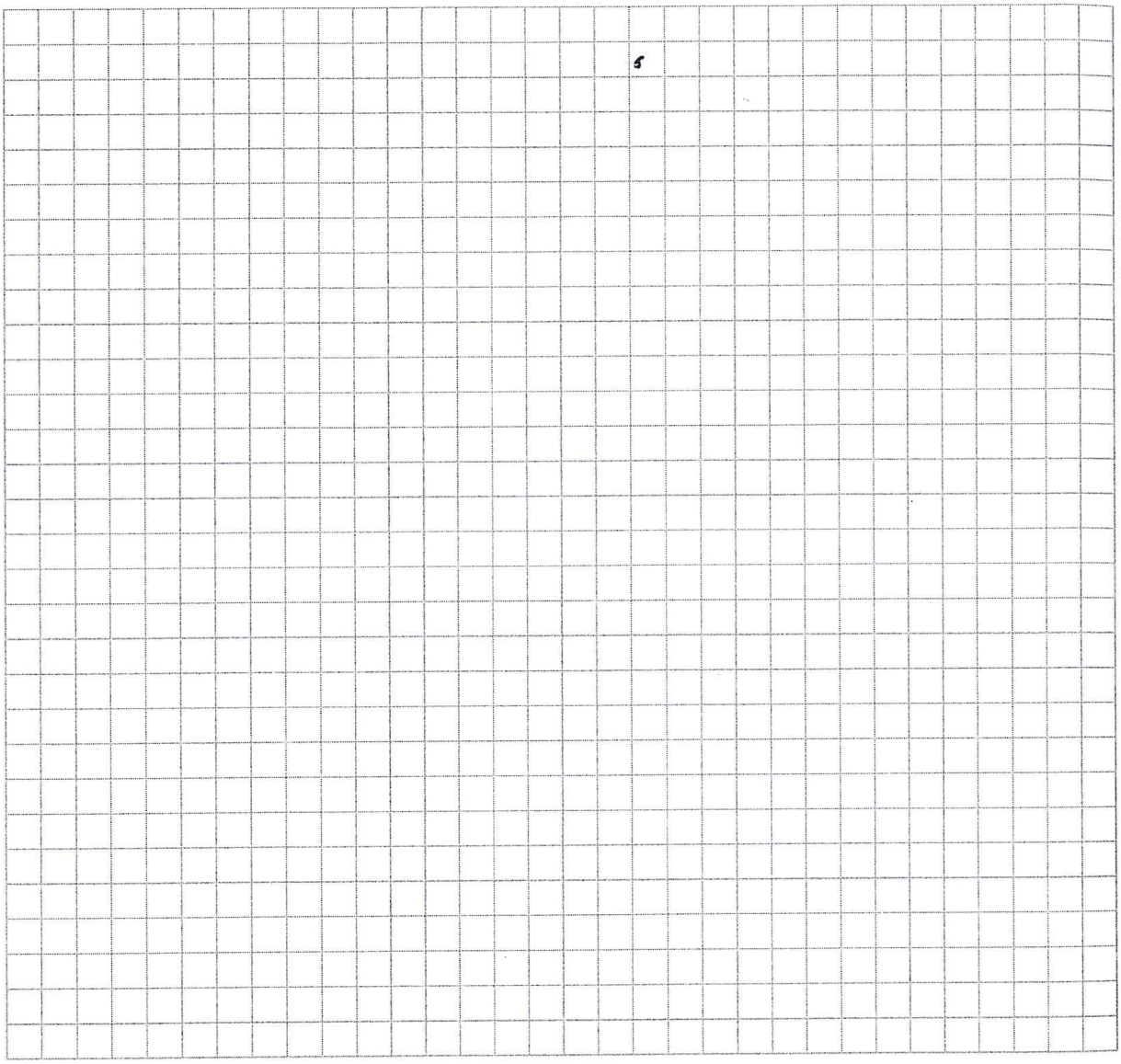
(i) Label the points on the diagram to show which point corresponds to which number.

(ii) Find θ, the argument of z.

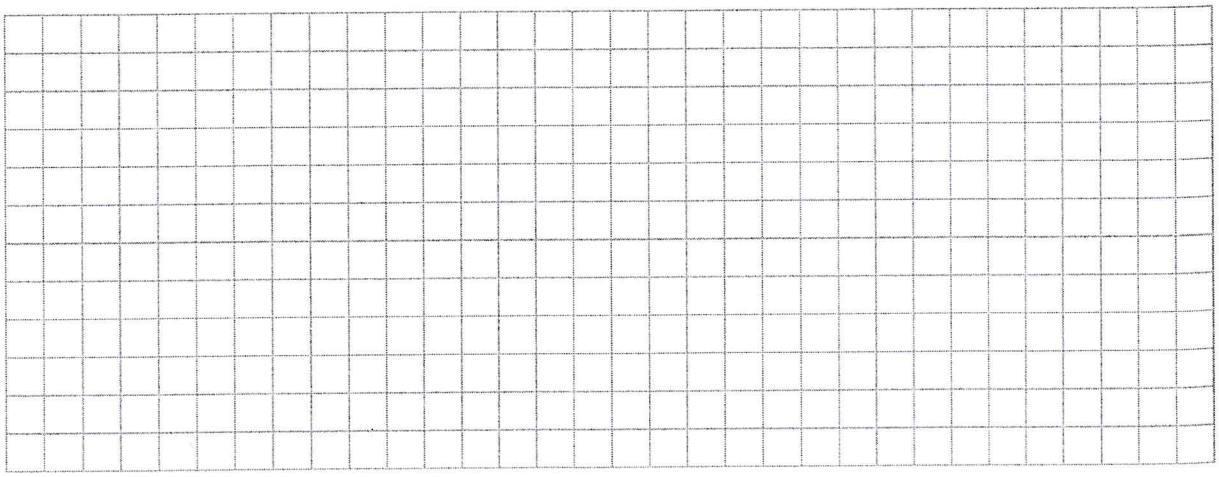
LCH - 2011 - Paper 1

Question 3 **(25 marks)**

(a) The cubic function $f : x \mapsto x^3 + 7x^2 + 17x + 15$ has one integer root and two complex roots. Find all three roots.



(b) Using part **(a)**, or otherwise, solve the equation $(x-2)^3 + 7(x-2)^2 + 17(x-2) + 15 = 0$.



page	running