Question 2 (25 marks)
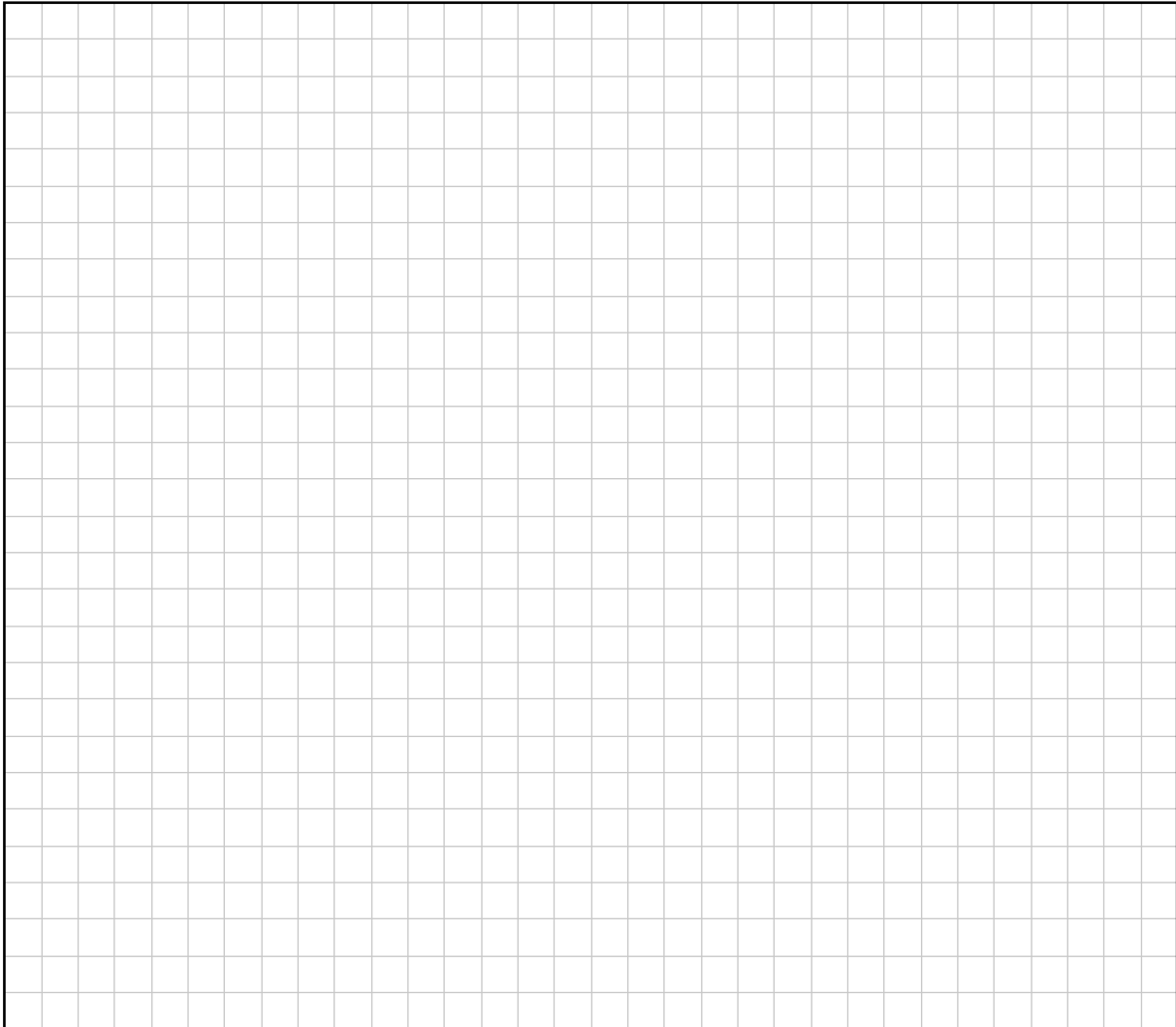
(a) Find the two complex numbers z_1 and z_2 that satisfy the following simultaneous equations, where $i^2 = -1$:

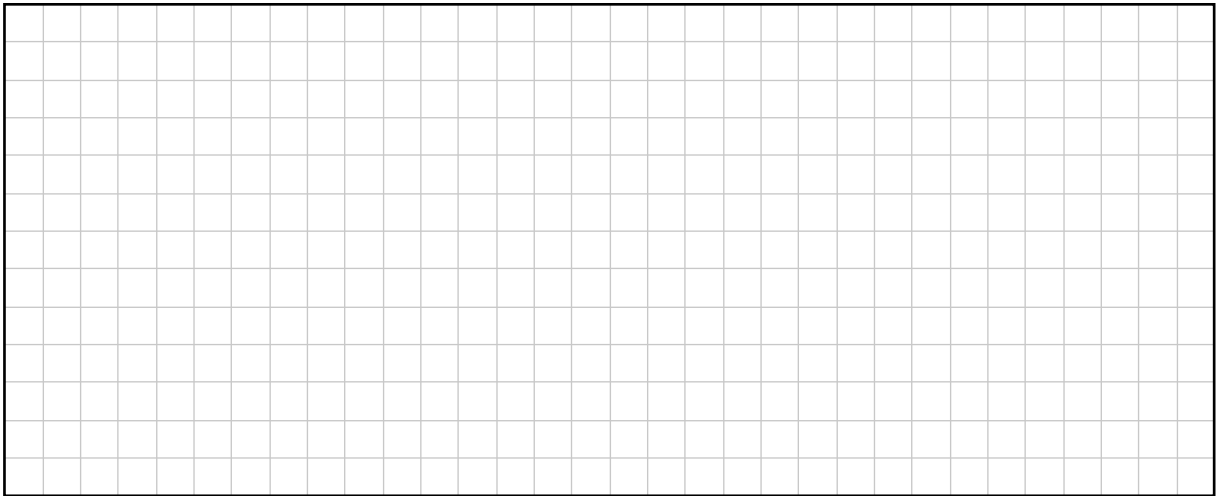$$iz_1 = -4 + 3i$$
$$3z_1 - z_2 = 11 + 17i.$$

Write your answers in the form $a + bi$ where $a, b \in \mathbb{Z}$.

(b) The complex numbers $3 + 2i$ and $5 - i$ are the first two terms of a **geometric** sequence.

(i) Find r, the common ratio of the sequence.
Write your answer in the form $a + bi$ where $a, b \in \mathbb{Z}$.

(ii) Use de Moivre's Theorem to find T_9, the ninth term of the sequence.
Write your answer in the form $a + bi$, where $a, b \in \mathbb{Z}$.