

Consider the polynomial equation

$$z^4 - z^3 - 11z^2 + z - 12 = 0 \quad (1)$$

on the set  $\mathbb{C}$  of complex numbers.

1. Verify that 3 and  $-4$  are complex numbers;
2. Use the previous information to prove that

$$z^4 + z^3 - 11z^2 + z - 12 = (z - 3)(z + 4)Q(z)$$

where  $Q(z)$  is a degree-2 polynomial.

3. Find *all* solutions of (1)