

1.

$$f(z) = z^4 + az^3 + bz^2 + cz + d$$

where a , b , c and d are real constants.

Given that $-1 + 2i$ and $3 - i$ are two roots of the equation $f(z) = 0$

(a) show all the roots of $f(z) = 0$ on a single Argand diagram,

(4)

(b) find the values of a , b , c and d .

(5)