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

where a, b, c and d are integers.

The complex numbers $3 + i$ and $-1 - 2i$ are roots of the equation $f(z) = 0$

(a) Write down the other roots of this equation.

(2)

(b) Show all the roots of the equation $f(z) = 0$ on a single Argand diagram.

(2)

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

(5)

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