

Core Pure 1 Complex Numbers

$$f(z) = z^4 - z^3 - 16z^2 - 74z - 60$$

Write $f(z)$ in the form $(z^2 - 5z - 6)(z^2 + bz + c)$

Hence find all the solutions to $f(z) = 0$

Comparing constant terms $c = 10$

Comparing coefficient of z $-74 = -50 - 6b \Rightarrow b = 4$

$$f(z) = (z^2 - 5z - 6)(z^2 + 4z + 10)$$

$$(z^2 - 5z - 6)(z^2 + 4z + 10) = 0 \Rightarrow$$

$$(z - 6)(z + 1)(z^2 + 4z + 10) = 0 \Rightarrow$$

$$z = 6 \text{ or } z = -1 \text{ or } z = \frac{-4 \pm \sqrt{16 - 40}}{2} = -2 \pm \sqrt{6} i$$

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