5. $$f(z) = z^4 + pz^3 + qz^2 + rz - 52$$

where p, q and r are real constants.

The roots of the equation $f(z) = 0$ are $\pm \alpha$, β and γ where α is real and positive.

Given that $\beta = 3 + 2i$

(a) write down the root γ.

(1)

(b) Determine the value of α.

(3)

(c) Hence determine the values of p, q and r.

(3)