**4E Linear Transformations of Roots**

1. The cubic equation

$$x^{3}-2x^{2}+3x-4=0$$

has roots $α$, $β$ and $γ$. Find the equations of the polynomials with roots:

1. $2α$, $2β$ and $2γ$

Alternative approach by considering graphical transformations & substitution (easier)

1. $\left(α+3\right)$, $\left(β+3\right)$ and $\left(γ+3\right)$
2. The quartic equation $x^{4}-3x^{3}+15x+1=0$ has roots $α$, $β$, $γ$ and $δ$.

Find the equation with roots $\left(2α+1\right)$, $\left(2β+1\right)$, $\left(2γ+1\right)$ and $\left(2δ+1\right)$.