

## Polynomials – Q2 (26/6/23)

If the roots of the equation  $x^3 - 14x^2 + 56x - 64 = 0$  are

$\alpha$ ,  $\beta$  &  $\gamma$ , find the equation with roots  $\frac{1}{\alpha}$ ,  $\frac{1}{\beta}$  &  $\frac{1}{\gamma}$

**Solution**

Substitution method: Let  $u = \frac{1}{x}$ , so that  $x = \frac{1}{u}$

$$\text{Then } \left(\frac{1}{u}\right)^3 - 14\left(\frac{1}{u}\right)^2 + 56\left(\frac{1}{u}\right) - 64 = 0$$

$$\text{and } 1 - 14u + 56u^2 - 64u^3 = 0$$

$$\text{or } 64u^3 - 56u^2 + 14u - 1 = 0 \text{ (coefficients are reversed)}$$