

Problem 25

Let

$$\begin{aligned}u &= 1 + \frac{x^3}{3!} + \frac{x^6}{6!} + \frac{x^9}{9!} + \cdots \\v &= x + \frac{x^4}{4!} + \frac{x^7}{7!} + \frac{x^{10}}{10!} + \cdots \\w &= \frac{x^2}{2!} + \frac{x^5}{5!} + \frac{x^8}{8!} + \cdots\end{aligned}$$

Show that $u^3 + v^3 + w^3 - 3uvw = 1$.