

6. The following recurrence relation describes the Fibonacci sequence,

$$u_{n+2} = u_{n+1} + u_n \quad u_1 = 1, u_2 = 1$$

The ratio of consecutive terms converges to a limit ϕ , known as the Golden Ratio.

Show, by using the recurrence relation, that $\phi = \frac{1}{2}(1 + \sqrt{5})$.