

STEP II, 2010, Q3

- 3** The first four terms of a sequence are given by $F_0 = 0$, $F_1 = 1$, $F_2 = 1$ and $F_3 = 2$. The general term is given by

$$F_n = a\lambda^n + b\mu^n, \quad (*)$$

where a , b , λ and μ are independent of n , and a is positive.

(i) Show that $\lambda^2 + \lambda\mu + \mu^2 = 2$, and find the values of λ , μ , a and b .

(ii) Use (*) to evaluate F_6 .

(iii) Evaluate $\sum_{n=0}^{\infty} \frac{F_n}{2^{n+1}}$.



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