Question 15 **(12 marks)**

Paris, a retired hairdresser, has a superannuation balance of $775 320.

(a) She intends to set up an annual scholarship of $5000 to be awarded to a worthy apprentice. Paris is able to negotiate a fixed annual interest rate of 7.2% through a share trading company. Show that $69 444.44 (to the nearest cent) of Paris's superannuation is needed to be invested in this company to meet the requirements of the annual scholarship. (1 mark)

After the scholarship is in place, Paris considers her future investment plans with the remaining balance. Assume a financial advisor has indicated an interest rate of 6.1% per annum, added monthly, can be locked in.

(b) Paris decides on receiving a monthly annuity of $7000, with the interest added before the annuity is paid, at the end of each month.

(i) The annuity can be modelled by the recurrence relation
$T_{n+1} = (1 + 0.00508)T_n - 7000$, $T_0 = a$.
Using the information given in the question, show how to obtain the value 0.00508 and state the value of a. (2 marks)

(ii) For how many months will Paris be able to receive the annuity of $7000? (1 mark)

(iii) Determine the amount of the final payment. (2 marks)

(iv) Determine the total interest received on the annuity. (3 marks)

(c) Paris also considers receiving a perpetuity after the scholarship is in place. Determine the monthly amount she would receive. (3 marks)