Question 6 **(10 marks)**

Jenny has organised a housing loan. She has modelled the balance owing (in dollars) at the end of each month by the recursive rule $T_{n+1} = 1.0055T_n - 3200, \quad T_0 = 430\,000.$

(a) State

(i) the amount borrowed. (1 mark)

(ii) the monthly repayment. (1 mark)

(b) Determine the annual interest rate. (1 mark)

(c) Assuming the interest rate remains unchanged,

(i) how long will it take to pay off the loan? (1 mark)

(ii) determine the final repayment. (1 mark)

At the beginning of the eighth year, Jenny makes an extra lump sum payment of $50 000 and increases her repayments by $100 per month.

(d) Calculate how much interest will be saved compared to the original loan arrangement. Assume that the interest rate remains unchanged. (5 marks)