

- 7 On the first day of each month, Kate pays £50 into a savings account.
Interest is paid on the total amount in the account on the last day of each month.
The interest rate is 0.2%
At the end of the n th month, the total amount of money in Kate's savings account is $\pounds T_n$

Kate correctly calculates T_1 and T_2 as shown below:

$$T_1 = 50 \times 1.002 = 50.10$$

$$\begin{aligned} T_2 &= (T_1 + 50) \times 1.002 \\ &= ((50 \times 1.002) + 50) \times 1.002 \\ &= 50 \times 1.002^2 + 50 \times 1.002 \\ &\approx 100.30 \end{aligned}$$

- 7 (a) Show that T_3 is given by

$$T_3 = 50 \times 1.002^3 + 50 \times 1.002^2 + 50 \times 1.002 \quad [1 \text{ mark}]$$

- 7 (b) Kate uses her method to correctly calculate how much money she can expect to have in her savings account at the end of 10 years.

- 7 (b) (i) Find the amount of money Kate expects to have in her savings account at the end of 10 years. [3 marks]

- 7 (b) (ii) The amount of money in Kate's savings account at the end of 10 years may not be the amount she has correctly calculated.

Explain why.

[1 mark]