Question 16 **(8 marks)**

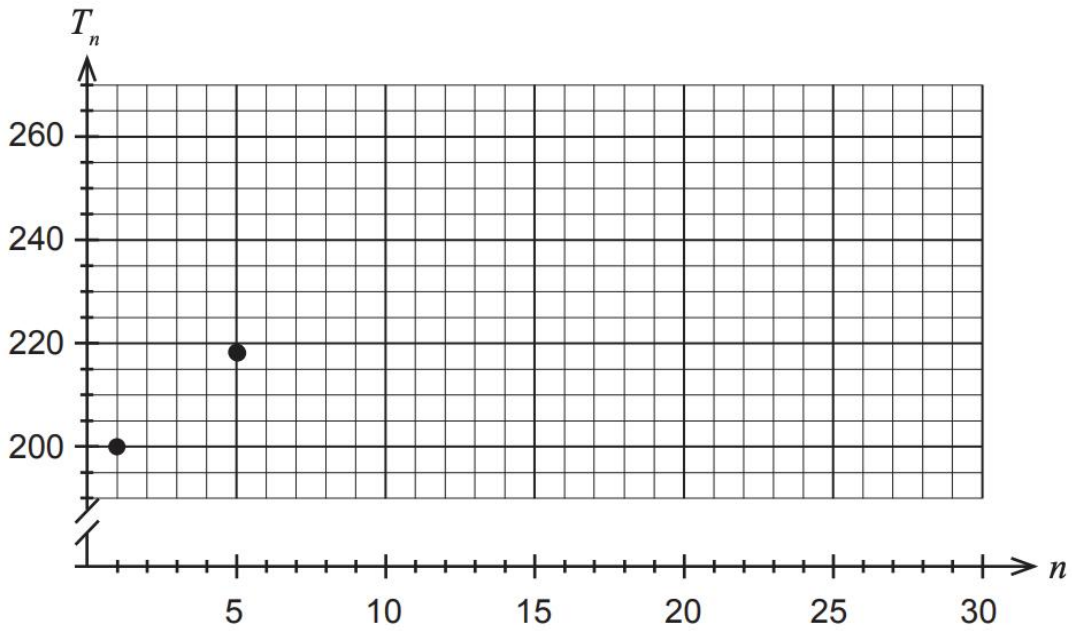
In a Northern Territory river, the crocodile population is dropping by 7.5% each year. The current population is 200. A scheme is being trialled under which 20 crocodiles are introduced to the river each year.

The population of crocodiles in the river can be modelled by the first-order linear recurrence relation $T_{n+1} = 0.925T_n + b$, $T_1 = 200$, where T_n is the number of crocodiles in the river at the beginning of the n^{th} year.

(a) (i) Interpret the coefficient 0.925 in the context of the question. (1 mark)

(ii) State the value of b. (1 mark)

(b) Graph the number of crocodiles in the river for every five year period (commencing at $n = 5$), up to the 30th year on the axes below. (2 marks)



(c) Using your graph, comment on how the population of crocodiles is changing over time. (2 marks)

(d) To the nearest whole number, what is the long-term effect on the crocodile population? (2 marks)