Question 1 **(9 marks)**

A fish farm is stocked with 5000 fish. The owners plan to sell 25% of the fish stock throughout the year and then to re-stock the farm with an extra 300 fish at the end of the year.

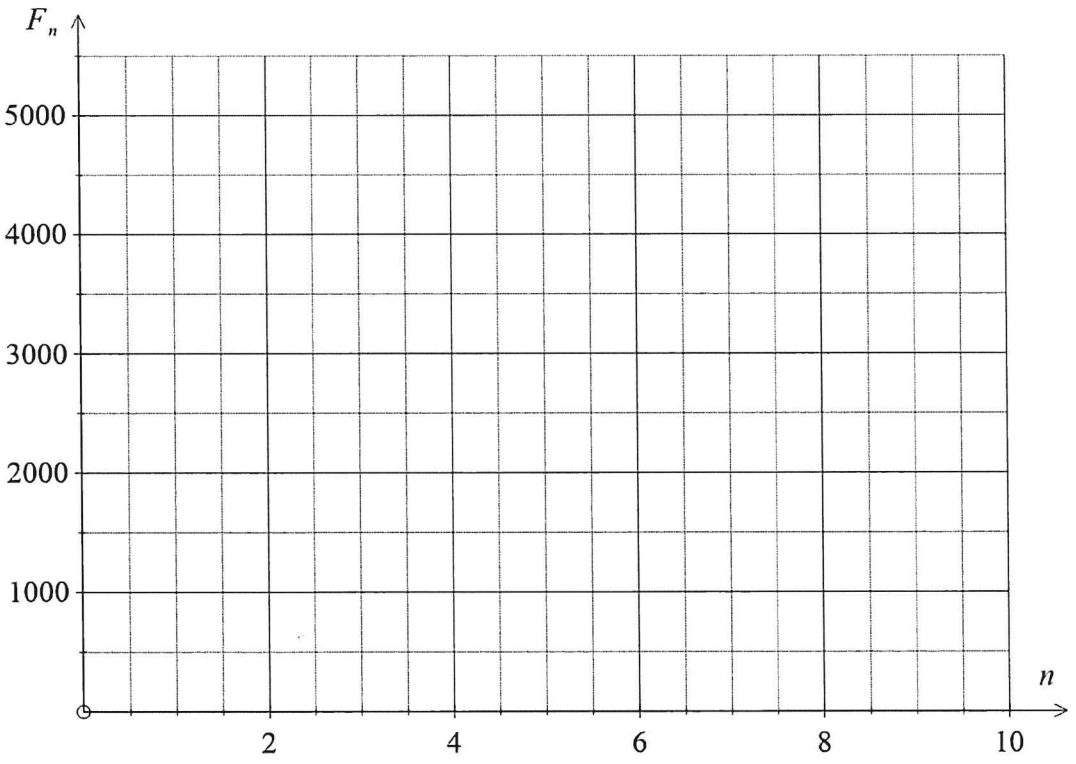
The fish stock, F_n, at the start of year n can be modelled by $F_{n+1} = 0.75F_n + 300$, $F_0 = 5000$.

(a) Explain the significance of the 0.75 in the model. (1 mark)

(b) Complete the table below for the first 8 years, rounding values to the nearest ten. (2 marks)

n	0	1	2	3	4	5	6	7	8
F_n	5000	4050	3340	2800	2400				

(c) Graph the fish stock at the start of the first 8 years on the axes below. (3 marks)



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(d) Comment on how the size of the fish stock is changing over the first 8 years. (1 mark)

(e) Calculate the expected fish stock after 20 years, and comment on the long-term size of the fish stock according to this model. (2 marks)

Question 2 **(8 marks)**

A company purchases equipment at a cost of $44 000 and expect the equipment to be used in the business for eight years. At the end of this time they expect to sell the equipment for $7 000.

(a) Calculate the total loss in value of the equipment. (1 mark)

Under the straight line depreciation method, the loss in value is spread equally over the eight years.

(b) Calculate the annual loss in value of the equipment. (1 mark)

(c) State a recursive rule for the value, V_n, of the equipment at the end of year n. (2 marks)

(d) Determine the value of the equipment at the end of the fourth year. (1 mark)

(e) After an accounting review, it was found that the equipment was actually to be used for ten years, after which time it could be sold for $5 000. Use this information to revise your answer to (d), assuming the straight line depreciation method is still used and showing all working. (3 marks)