

Exercise 1

Calc. : ✓

A group of scientists decides to investigate a population of insects in a large field. It is found that the starting population 100 and that the population increases exponentially by 20% every week. Two students each write down a formula to model the population P at a time t , where t is the number of days since the start of the investigation:

Formula A: $P(t) = 100t + 1.2$

Formula B: $P(t) = 100 \cdot (1.2)^t$

1. Explain why formula B is the correct formula and why formula A is incorrect. 2 marks
2. Calculate the number of insects after 2 weeks, to the nearest whole number. 2 marks
3. Copy and complete the table of values below, giving your answers to the nearest whole number: 2 marks

Number of days	5	10	15	20
Population				

4. After how many days will the population exceed 4 600? 2 marks

Another group of scientists investigates a population of insects in a different large field. They record their results in the table below:

Number of days	0	5	10	15	20
Population	100	340	580	820	1 060

5. Explain why the results follow a **linear** model. 1 mark
6. Use the information in the table of values to write down a formula to model the population P at a time t , where t is the number of days since the start of the investigation. 2 marks