Exercise 1   Calc. : ✓

Professor Fry, a famous biologist, conducted a study on the population of viper snakes on an island of the coast of Brazil known as Snake Island.
When the study began, the population of this endangered species was 4 000 individuals. The study indicated that the population was **decreasing** by 5% each year due to competition for resources.

1. Write a formula for the population in year n (u_n). Justify.   3 marks

2. **Copy and complete** the table: 1.5 marks

Beginning of year	1	2	3	4
Population	4000			

3. What will the population be at the beginning of year 10?   1.5 marks

4. When was the initial population halved?   2 marks

After 15 years the trend was reversed and the population started increasing following the formula
$$P(n) = 500 + \frac{4\ 000}{2 + (0.7)^n} \quad (n \text{ is the number of years from year 15 onwards})$$

5. Due to the limited amount of resources, the island can only sustain the life of 2 800 individuals. Is this population growth sustainable? **Justify your answer**.   2 marks