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 $P(n) = 500 + \dfrac{4\,000}{2 + (0.7)^n}$ (n 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