

### Option 1: Large Group Activity

The table gives the population of a town starting in 1970. The total population  $P$  is given for the number of years  $n$  after 1970.

Number of years after 1970 $n$	0	5	12	17	24
Total population $P$	2350	2575	2866	3124	3359

a) Identify  $P(0)$ . Describe, in words, what this means in terms of the population. Make sure to include appropriate units.

b) Describe, in words, the changes in population per year for the values given in the table. Show any calculations to support your description.

c) For which interval was the population increasing most rapidly? Least rapidly? Make sure to include appropriate units for any mathematics.

d) Given an AROC of 33.6 people per year, what does that mean in terms of the population? Would you expect the population to increase by exactly 33.6 people each year?

e) Does the table make you think that the population has a limiting value? Support your answer. Describe what happens with AROC if there is a limiting value for a given set of values.

f) Estimate  $P(9)$  and  $P(19)$ . Can you find more than one way to estimate these values? Did you use the same method for each estimation? Explain. Make sure to include appropriate units.

g) Consider the following calculations. Describe what mathematics is being shown and what it is being calculated in practical terms.

$$\text{i) } 2575 + \frac{2866-2575}{12-5} (5)$$

$$\text{ii) } 2866 + \frac{2866-2575}{12-5} (-2)$$

h) Using the data given, how would estimate  $P(29)$ ? Show your calculations and explain this process.