**Question 8** **(25 marks)**

**(a)** The graph below shows the relationship between $C$, the temperature in °C (Celsius) and $F$, the temperature in °F (Fahrenheit).



**(i)** Use the graph to find the value of 60°C in °F.
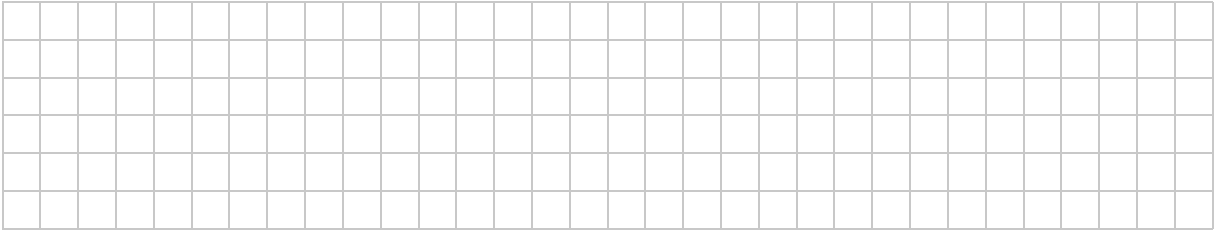
**(ii)** Use the graph to find the value of 50°F in °C.

**(iii)** The formula below shows the relationship between $C$ and $F$:

$$C = \frac{5(F - 32)}{9}.$$

Use the formula to show that 212°F is equivalent to 100°C.

**(b)** The map below shows 2 villages, **A** and **B**, in a part of a country in Africa. An Irish aid organisation wants to build a warehouse from which to serve the two villages.
The warehouse should be less than 60 km from **A** and less than 80 km from **B**.
Using your compass, draw **and** shade in the region on the map where the warehouse could be built.
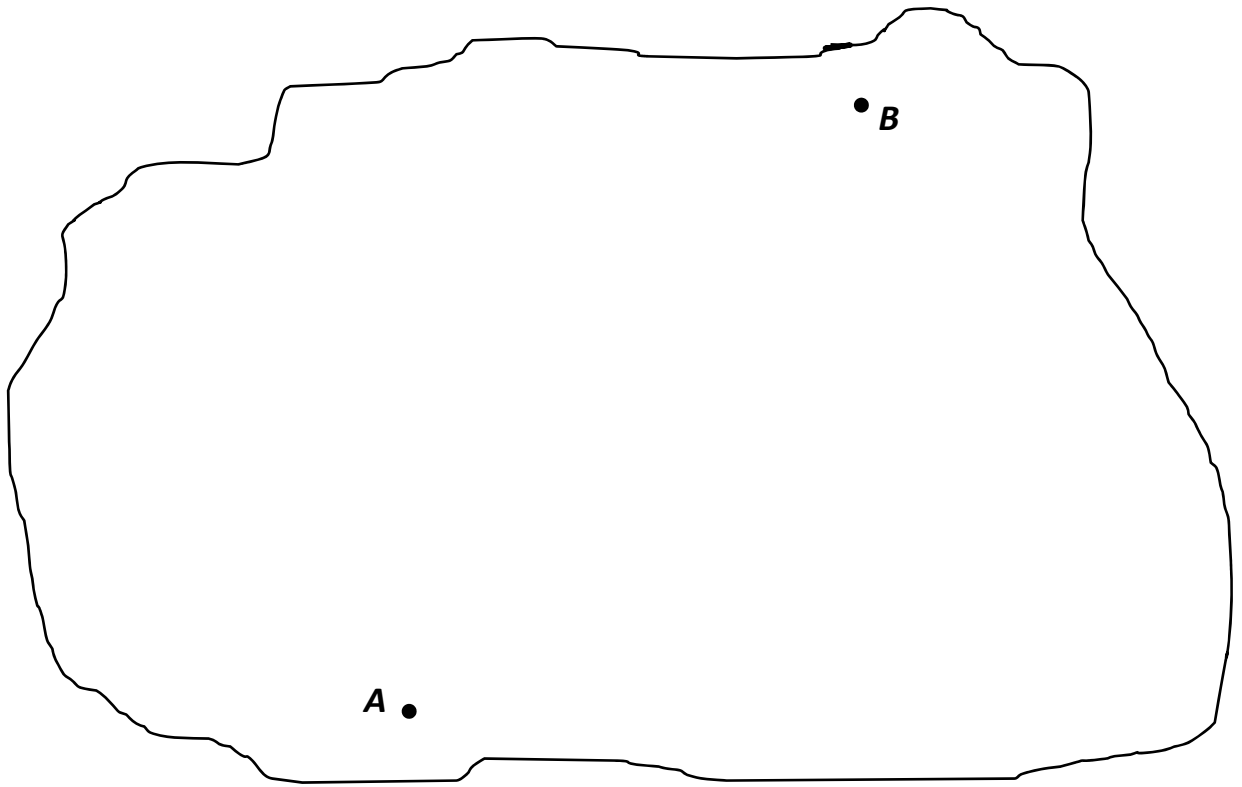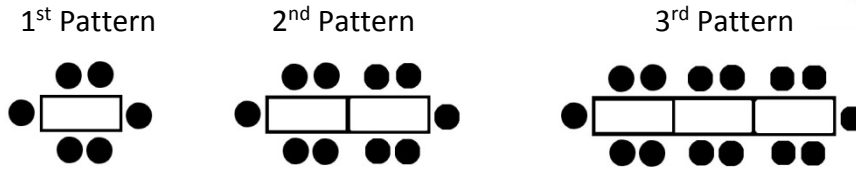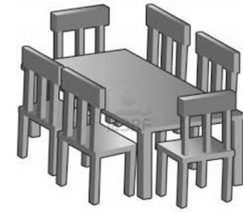


Scale: 1 cm represents 10 km
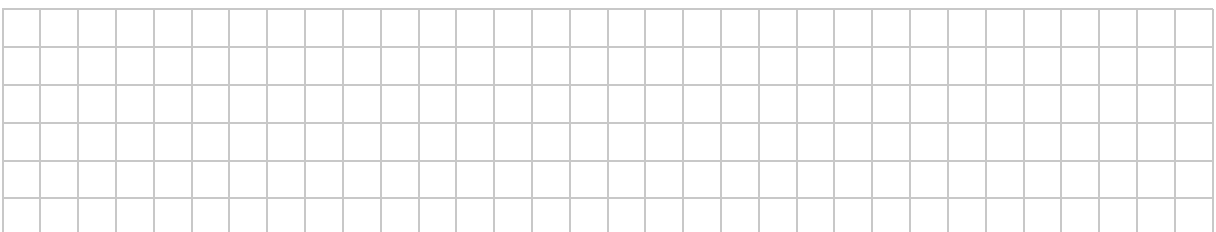
**Question 10**                                                        **(50 marks)**

The following diagram shows an arrangement of tables and chairs in a sequence of patterns.

Note: ☐ = table, and ● = chair

1ˢᵗ Pattern          2ⁿᵈ Pattern                  3ʳᵈ Pattern

**(a)** Draw the 4ᵗʰ pattern in the sequence.

**(b)** Complete the table below to show the number of chairs in each of the first 6 patterns.

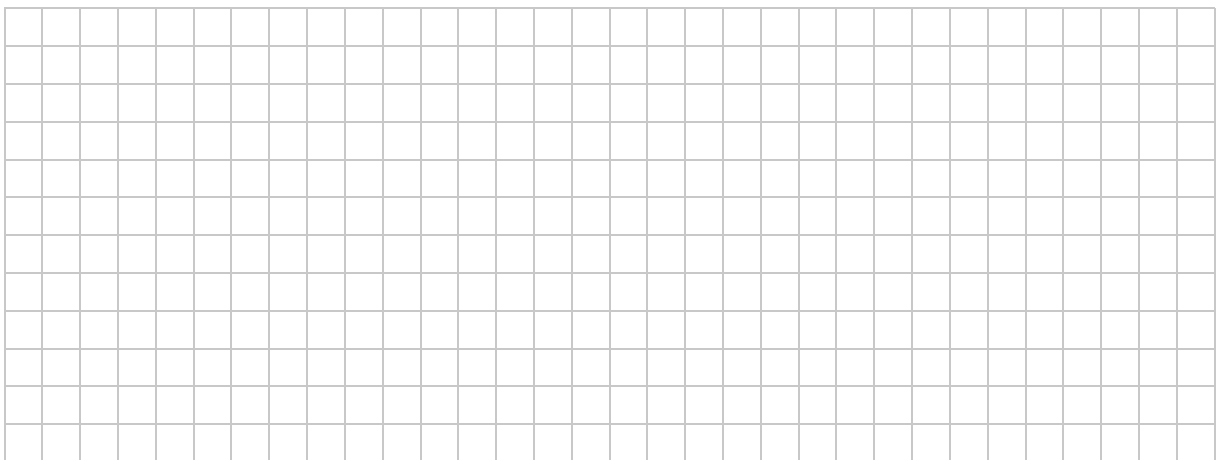| Number of Tables | Number of Chairs |
|:---:|:---:|
| 1 | 6 |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |

**(c)**  Use your data from **part (b)** to graph the relationship between the number of tables and the number of chairs.

**Number of Chairs** (y-axis, marked at 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30)

**Number of Tables** (x-axis, marked at 1, 2, 3, 4, 5, 6, 7)

**(d)**  How many chairs are there in the 10th pattern?

| previous | page | running |
|----------|------|---------|
|          |      |         |

**(e)** There are exactly 54 chairs in one of the patterns.  How many tables are in that pattern?
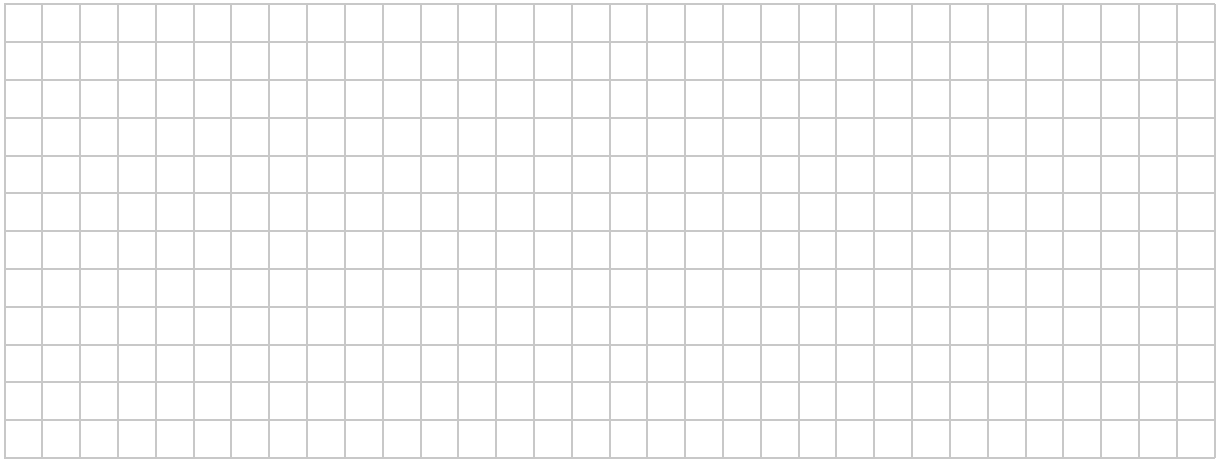
**(f)** How many chairs, in total, are there in the first 7 patterns?

**(g)** Write a formula (in words) that shows the relationship between the number of chairs and the number of tables in any given pattern.