5. A barrel contained 42 L of water. The water was leaking out.
   The table shows how the volume of water in the barrel
   changed every hour.
   a) Determine the first differences.
      What do the first differences represent?
   b) Is the relationship linear or non-linear? Explain.
   c) Graph the relation. Does the graph support your answer to
      part b? Explain.
   d) How much water would be in the barrel after 6 h?
      What assumptions did you make?
   e) Write a question you could answer using the data. Answer the question.

Time (h)	Volume (L)
0	42
1	38
2	34
3	30
4	26

6. **Assessment Focus**   The table shows the areas of rectangles
   for which the length is 3 times the width.
   a) Sketch the rectangles.
   b) Determine the first differences.
   c) Is the relationship linear or non-linear? Explain.
   d) Graph the relationship. Describe the graph.
   e) Predict the area of the next rectangle in the pattern.
      Sketch the rectangle. Calculate its area to check your prediction.

Width (cm)	Area (cm²)
1	3
2	12
3	27
4	48

7. Laura is swimming lengths to prepare for a triathlon.
   The table shows the distances she swims in metres.
   a) By how much are the numbers in the first column
      increasing?
   b) Determine the first differences.
      What do the first differences represent?
   c) Is the relationship linear or non-linear? Explain.
   d) Graph the relationship. Does the graph support your answer to part c? Explain.
   e) What is the length of the pool? How did you find out?

Number of lengths	Distance (m)
0	0
5	125
10	250
15	375
20	500

8. **Take It Further** Make your own pattern using square tiles, grid paper,
   or square dot paper. Choose 2 properties of the figures in your pattern;
   such as frame number, height, side length, perimeter, area,
   or number of squares. Investigate whether the number pattern
   that relates the properties is linear or non-linear. Show your work.

In Your Own Words

Describe two ways to identify whether a relationship is linear or non-linear.
Give an example of each way.