contents and sample pages

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Foreword

We are surrounded by patterns. Patterns come in various shapes and forms, such as the patterns found in music, simple patterns on clothing and the complicated number patterns found in mathematics. The number system we use is based on patterns. In fact, mathematics has been described as the 'science' of patterns.

The activities in ***Patterns in Mathematics – Upper*** offer students the opportunity to participate in pattern work that introduces and develops the relationship between numbers. The activities predominantly focus on number relationships in tables and become progressively more challenging throughout the book. Activities range from completing addition tables, to number sequences, to 'finding the rule'.

Whether the students work independently or collaboratively on the tasks in ***Patterns in Mathematics – Upper***, they will be developing their confidence to observe, describe, create and extend patterns.

Icons have been included on every activity page to show the materials required for the lesson.

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Barcodes

Most products are labelled with a barcode. The vertical bars and spaces are used to represent '0' and '1' in the binary number system. A check digit, the last digit in the code, is used to verify the barcode.

To check a barcode, follow these steps.

Step 1 *Write down the barcode number.*

Second last digit — Check digit

9 ③ 1 ① 6 ⑨ 7 ① 0 ① 5 ⑧ [3]

Step 2 *Draw a box around the last digit (the check digit).*

Step 3 *Draw a circle around the second last digit and then every second one from there on.*

Step 4 *Add all the numbers in circles. (3 + 1 + 9 + 1 + 1 + 8 = 23)*

Step 5 *Multiply the result by 3. (23 x 3 = 69)*

Step 6 *Add all the digits without a circle or box around them. (9 + 6 + 7 + 0 + 5 = 28)*

Step 7 *Add the results from steps 5 and 6. (69 + 28 = 97)*

Step 8 *Add the check digit (3) to the total (97) and you should get a multiple of ten. If not, you have either made a mistake, or the barcode is printed incorrectly.*

1 Check the following barcodes.

(a)

9 310055 149809

(b)

300657 015336

3 + 0 + 5 + ☐ = ☐

☐ x 3 = ☐

☐ + 9 = ☐

Is the answer a multiple of ten? (Y) (N)

3 + 0 + 5 + 0 + 5 + 3 = ☐

☐ x 3 = ☐

☐ + 6 = ☐

Is the answer a multiple of ten? (Y) (N)

2 Check the following barcodes. Use the back of this sheet for your calculations.

(a)

9 300657 304461

(b)

9 300652 010756

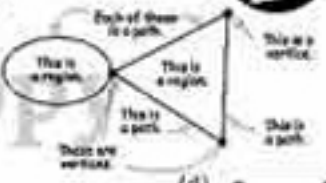
(c)

9 310060 006234

3 Find more barcodes and check them. Hint: Barcodes are found on most food products.

Paths and Patterns

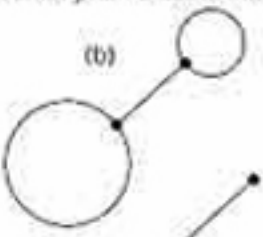
A network is made up of paths, vertices and regions. An example of a network is shown. This network has four paths, three vertices and three regions (two inside the network and the region around the network). Network: Regions (R) = 3, Vertices (V) = 3, Paths or Edges (E) = 4



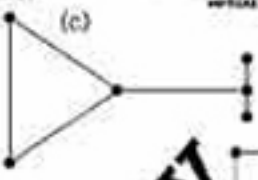
1 Count the number of paths, vertices and regions for each of the following networks and enter your results in the table.

(a)

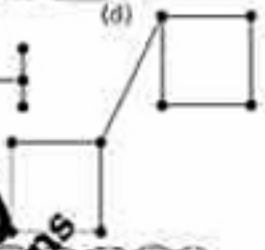
(b)



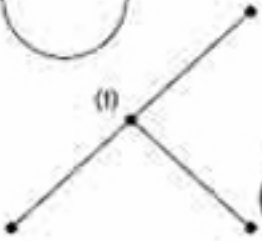
(c)



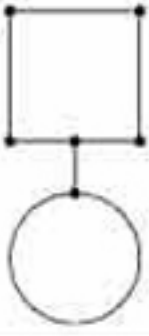
(d)



(f)



(e)



(g)

Shape	Regions (R)	Vertices (V)	Paths or Edges (E)	R + V − E
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				
(g)				
(h)				

2 Do you notice a pattern in the table? Explain below.

3 Complete the rule: $R + V - E =$ ☐