

PATTERNS AND SEQUENCES

Sequence questions are all linked to identifying patterns and repeating them.

To find the pattern, you need to find the rule.

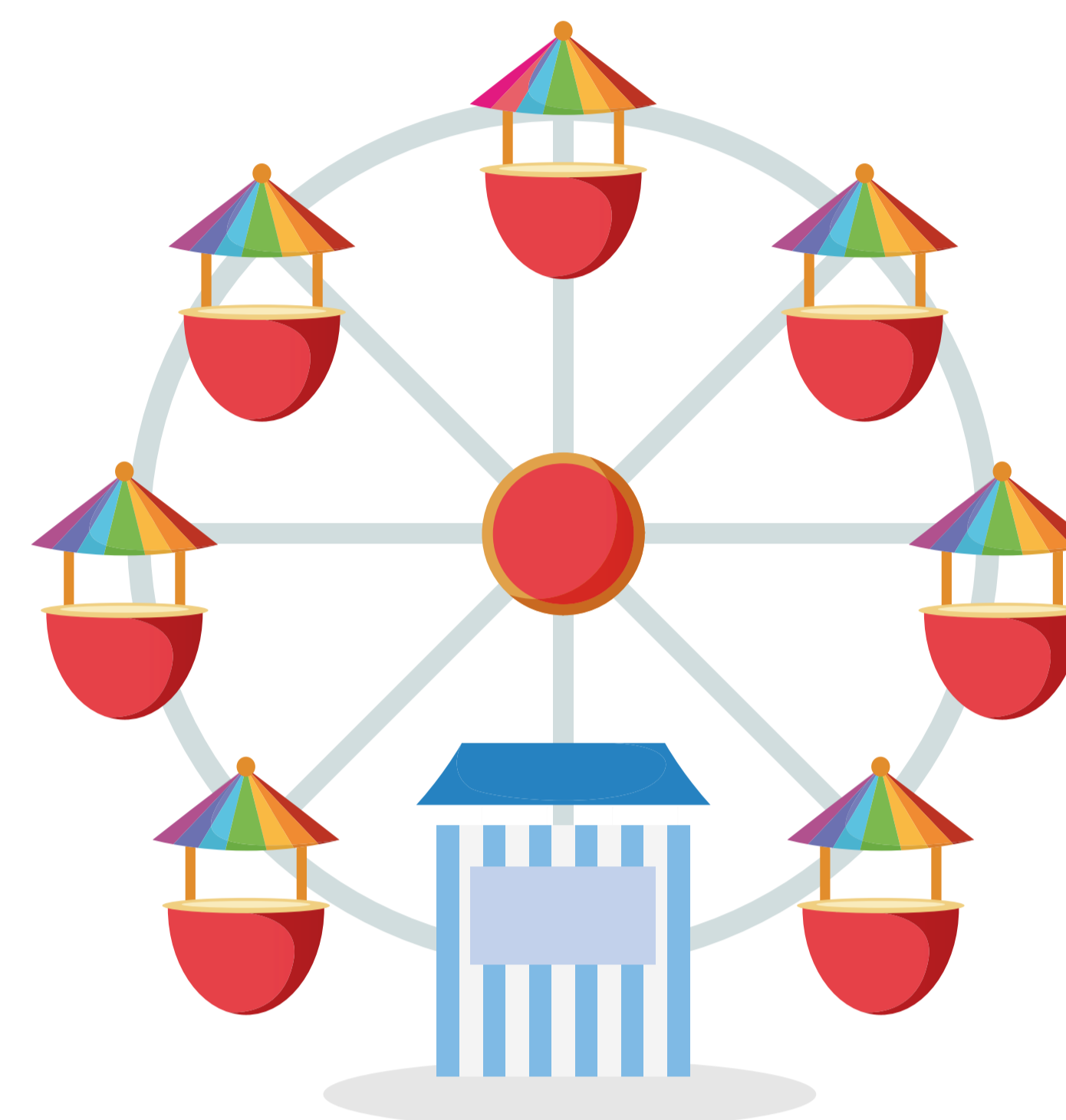
In some sequences the rule remains the same, e.g.



In others, the rule may increase or decrease from the previous step, e.g.



In some patterns, the rules work in pairs and so can be harder to spot, e.g.



1 Challenge one

Complete the number sequences by continuing the patterns below.

1. 15, 17, 20, 24, 29, _____

6. 1, 4, 9, 16, 25, _____

2. 25, 19, 22, 23, 19, 27, _____

7. 3, 12, 10, 40, 38, _____

3. 3, 6, 12, 24, _____

8. 512, 256, 128, 64, _____

4. 4, 9, 13, 18, 22, 27, _____

9. 5, 6, 12, 13, 26, _____

5. 4, 8, 10, 20, 22, _____

10. 50, 47, 41, 32, _____

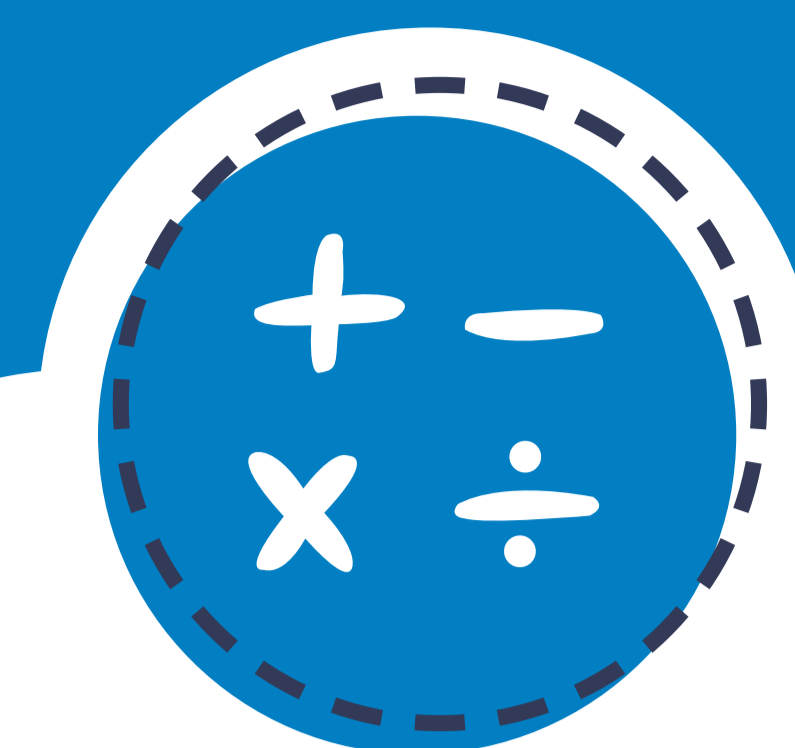
2 Challenge two

Linear Sequences: If the numbers increase or decrease by the same amount each time, the sequence is linear.

5, 8, 11, 14, 17, 20... (+3 every time)

Geometric Sequences: If the rule for a number sequence is to divide or multiply by the same number each time, then it is geometric. They have a 'common ratio'.

2, 4, 8, 16, 32... (x2 every time)



PATTERNS AND SEQUENCES

What is the next number in each sequence? What is happening in the sequence? Are they linear or geometric?

Sequence	Next Number	What is Happening	Linear or Geometric?
12,16,20,24,28...			
1,3,9,27,81...			
63,66,69,72,75...			
2,5,8,11,14,17...			
1,25,625, 15,625...			
2, 0.4, 0.08, 0.016...			

If you would like an additional challenge, find the nth term for one of the linear sequences above.

Example:



The common difference is 2, so it is linked to the 2 times tables or '2n'.

Every term in this sequence is 6 more than the 2 times table e.g. 2,4,6,8.

Therefore, the nth term is $2n + 6$.