READING · PART 5

The Number Sequence Hiding Everywhere

1 1 2 3
5 8 13
21 34 55

LEVEL	TASK	FOCUS
B1+ (CEFR)	7 questions	Multiple choice

Read the article below. Then, for questions 1–7, choose the answer (A, B, C or D) which you think fits best according to the text. Circle or highlight your choice.

Have you ever looked closely at a sunflower? If you count the spirals in the centre, you'll discover something strange. The number of spirals almost always matches a pattern that mathematicians have been fascinated by for over 800 years: the Fibonacci sequence.

The sequence is surprisingly simple. You start with 0 and 1, and then each new number is made by adding together the two numbers before it. So 0 plus 1 makes 1, then 1 plus 1 makes 2, then 1 plus 2 makes 3, and so on. This gives you 0, 1, 1, 2, 3, 5, 8, 13, 21, 34 — and the numbers keep growing forever. It sounds like nothing more than a bit of clever arithmetic, but that's where people are wrong.

The sequence is named after an Italian man called Leonardo of Pisa, who lived around the year 1200 and was later nicknamed *"Fibonacci"*. He didn't actually invent it — mathematicians in India had described the same pattern centuries earlier. What Fibonacci did was introduce it to Europe in a book he wrote in 1202, using an unusual example about how quickly a pair of rabbits could multiply. At the time, hardly anyone paid attention. He could never have imagined that, hundreds of years later, his name would be known to maths students all over the world.

What makes the sequence truly remarkable is how often it appears in the natural world. The petals on many flowers come in Fibonacci numbers: lilies have three, buttercups have five, and some daisies have thirty-four. Pine cones and pineapples show the same spirals as the sunflower. Scientists believe this isn't a coincidence. Growing in this particular way allows plants to pack their seeds together as tightly as possible, or to catch the maximum amount of sunlight. In other words, nature seems to *"use"* the sequence because it simply works better.

The pattern is also closely linked to something called the golden ratio, a proportion that artists and architects have admired for thousands of years. If you divide any Fibonacci number by the one before it, the answer gets closer and closer to roughly 1.618. Many people find shapes built on this ratio especially pleasing to look at, which is why it has been used in famous paintings and buildings — though not everyone agrees about how important it really is.

These days, the Fibonacci sequence pops up in the most unexpected places. Computer programmers use it when designing certain types of software. Some traders even claim it can help predict changes in the stock market, although there is little solid evidence for this. Whether or not such claims are true, one thing is certain: a simple list of numbers, first written down to count imaginary rabbits, has turned out to be one of the most surprising patterns ever discovered.

★ DID YOU KNOW?

Count the petals next time you see a flower. There's a very good chance the number — 3, 5, 8, 13, 21 or 34 — is hiding in the Fibonacci sequence!

? Questions 1–7

1 In the first paragraph, why does the writer mention the sunflower?

A To prove that sunflowers are the most common flower in nature.	**B** To give a surprising example that introduces the topic.
C To explain how mathematicians first discovered the sequence.	**D** To show that counting spirals is difficult to do.

2 What does the writer suggest with the phrase "that's where people are wrong" at the end of the second paragraph?

A People often make mistakes when adding the numbers.	**B** The sequence is harder to understand than it looks.
C The sequence is far more significant than it first appears.	**D** Most people have never heard of the sequence.

3 According to the third paragraph, what did Fibonacci actually do?

A He was the first person in the world to discover the pattern.	**B** He brought an existing pattern to the attention of Europe.
C He proved that the pattern came originally from India.	**D** He used the pattern to breed rabbits successfully.

4 What does the word "this" refer to in the fourth paragraph ("Scientists believe this isn't a coincidence")?

A The fact that scientists study flowers so carefully.	**B** The way daisies and lilies are related to each other.
C The appearance of Fibonacci numbers in plants.	**D** The difference between pine cones and pineapples.

5 **What does the writer say about the golden ratio in the fifth paragraph?**

A Everyone agrees it is the most important idea in art.	**B** It has no real connection to the Fibonacci sequence.
C Its true importance is a matter of some disagreement.	**D** Only modern architects have ever made use of it.

6 **What is the writer's attitude towards the claims made by some traders?**

A Convinced that the sequence definitely predicts the market.	**B** Doubtful, because there is little firm proof.
C Angry that people use mathematics dishonestly.	**D** Surprised that programmers do not use it too.

7 **What would be the best subtitle for the whole article?**

A A medieval mathematician and his pet rabbits.	**B** How to do difficult arithmetic in your head.
C Why flowers are more beautiful than buildings.	**D** One simple pattern, found in surprising places.