

Challenge

Look at this sequence of numbers:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

Describe how the sequence is created.

What is the name given to this special number sequence?

What is 'special' about this number sequence?

Write the next 10 numbers in the sequence.



1. The sequence is created by adding the two previous numbers together to find the next number.
2. The name of this special number sequence is 'The Fibonacci Sequence'.
3. This sequence is special because it can be found in nature – for example, how the spiral of a snail's shell is formed.
4. The next ten numbers in the sequence are:

89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

What if?

Add together the first 5 numbers in the sequence. Write down the answer.

Then add the first 6 numbers and write down the answer.

Next, add the first 7 numbers and write down the answer.

Finally, add the first 8 numbers and write down the answer.

Look at the four answers you have just written down.

Compare these with the numbers of the sequence above.

What do you notice?

Can you predict what the sum of the first 9, 10, 11, ... numbers are?

When you've finished, turn to page 80.



$$1 + 1 + 2 + 3 + 5 = 12$$

$$1 + 1 + 2 + 3 + 5 + 8 = 20$$

$$1 + 1 + 2 + 3 + 5 + 8 + 13 = 33$$

$$1 + 1 + 2 + 3 + 5 + 8 + 13 + 21 = 54$$

Reasoning Sentence

I've noticed that the total of the numbers is always one less than the number which is in the sequence in two numbers time.

Therefore, I predict the sum of the first 9 numbers will be 88 because this is one less than the 11th number: 89.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

Challenge

Look at the ten numbers in the number sequence on page 56.

Choose four consecutive numbers in the sequence.

Find the products of the first and last numbers, and the second and third numbers.

Now work out the difference between the two products.

Choose four more consecutive numbers in the sequence and repeat the above.

What do you notice?

3, 5, 8, 13

$$3 \times 13 = 39$$

$$5 \times 8 = 40$$

$$40 - 39 = 1$$

You may have chosen different numbers but the difference should still be one.

13, 21, 34, 55

$$13 \times 55 = 715$$

$$21 \times 34 = 714$$

$$715 - 714 = 1$$

Reasoning Sentence

I've noticed that every time I complete this, the difference between the two products is always one.

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...

What if?

Choose three consecutive numbers from the sequence.

Multiply the first and last numbers together, and square the second number.

Now work out the difference between the two products.

Choose three more consecutive numbers from the sequence and repeat the above.

What do you notice?

3, 5, 8

$$3 \times 8 = 24$$

$$5 \times 5 = 25$$

$$25 - 24 = 1$$

When you've finished, turn to page 80.



21, 34, 55

$$21 \times 55 = 1155$$

$$34 \times 34 = 1156$$

$$1156 - 1155 = 1$$

You may have chosen different numbers but the difference should still be one.

Reasoning Sentence

I've noticed that every time I complete this, the difference between the two numbers is always one.