

Mathematics

# The Happy Caterpillar problem

Mr Millar



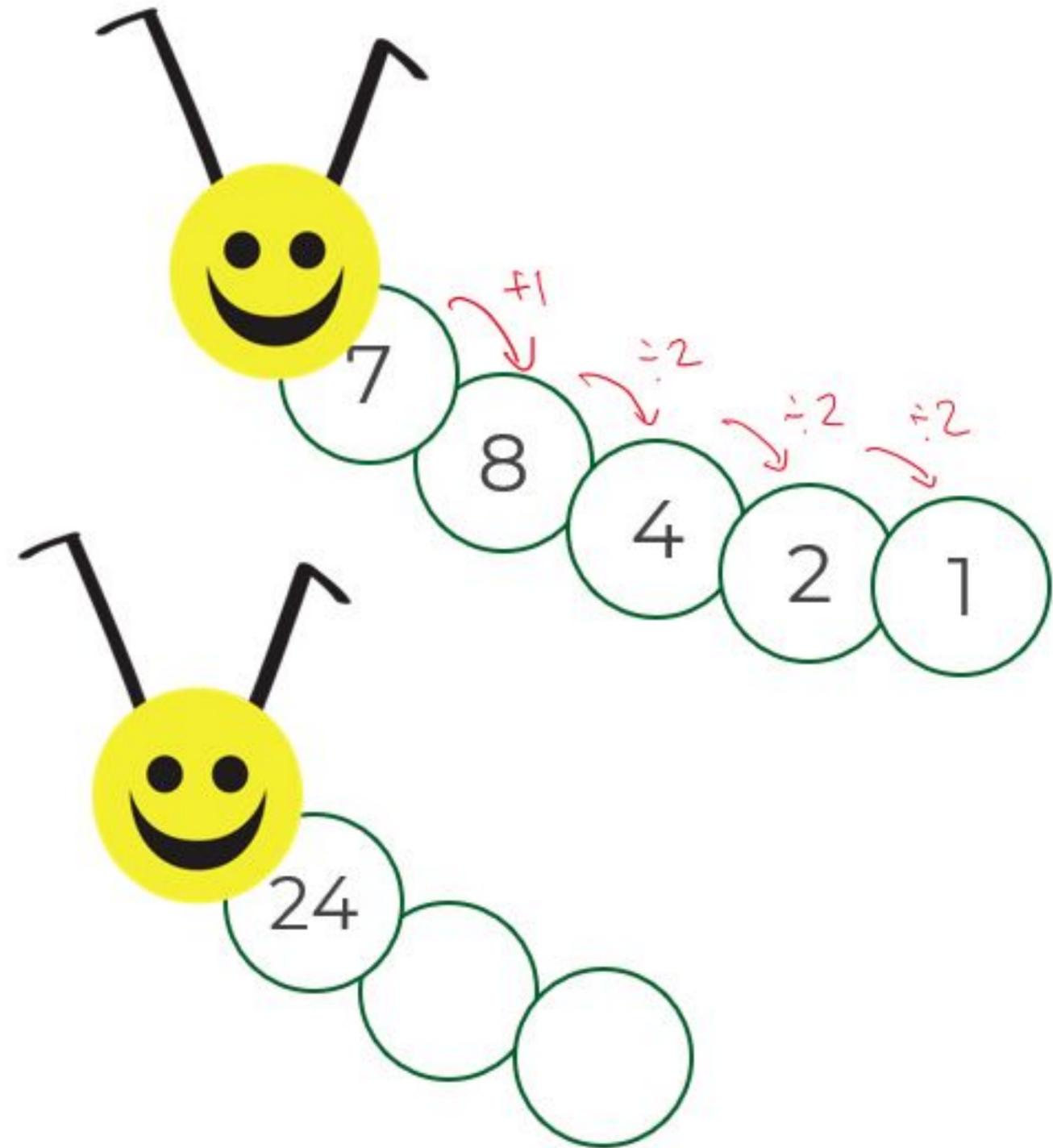
# Try this

A caterpillar starts with a number between 1 and 100.

If that number is **odd**, the caterpillar will **+1**. If it is **even**, the caterpillar will **÷ 2**. It will keep doing this until it gets to 1.

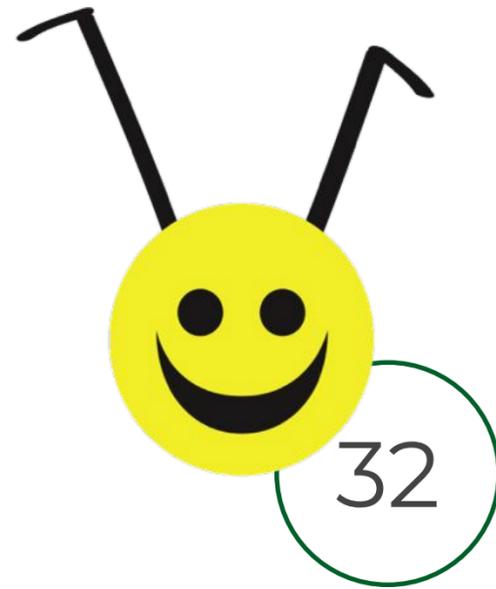
A 7 caterpillar is **length 5**.

What length is a 24 caterpillar?



# Connect

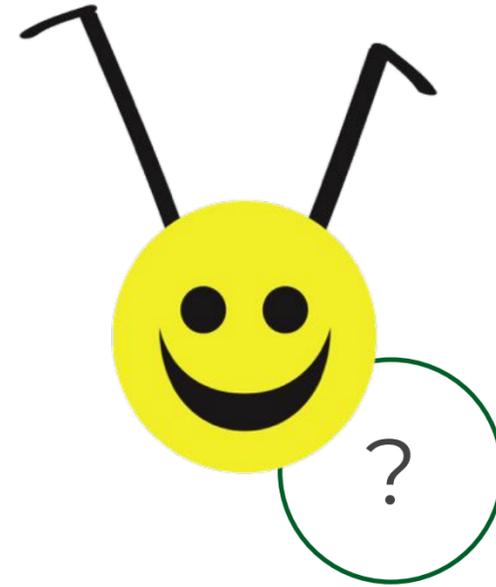
Order these caterpillars in length from longest to shortest.



# Independent task

Work out the shortest caterpillar which starts with length 10-20.

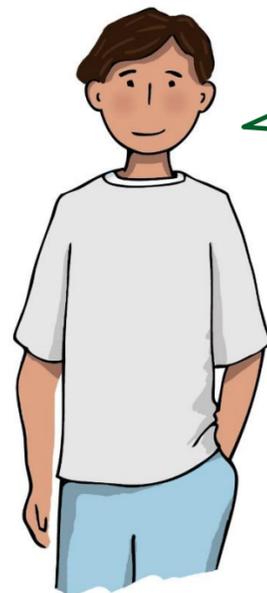
Explain why this number gives the shortest?



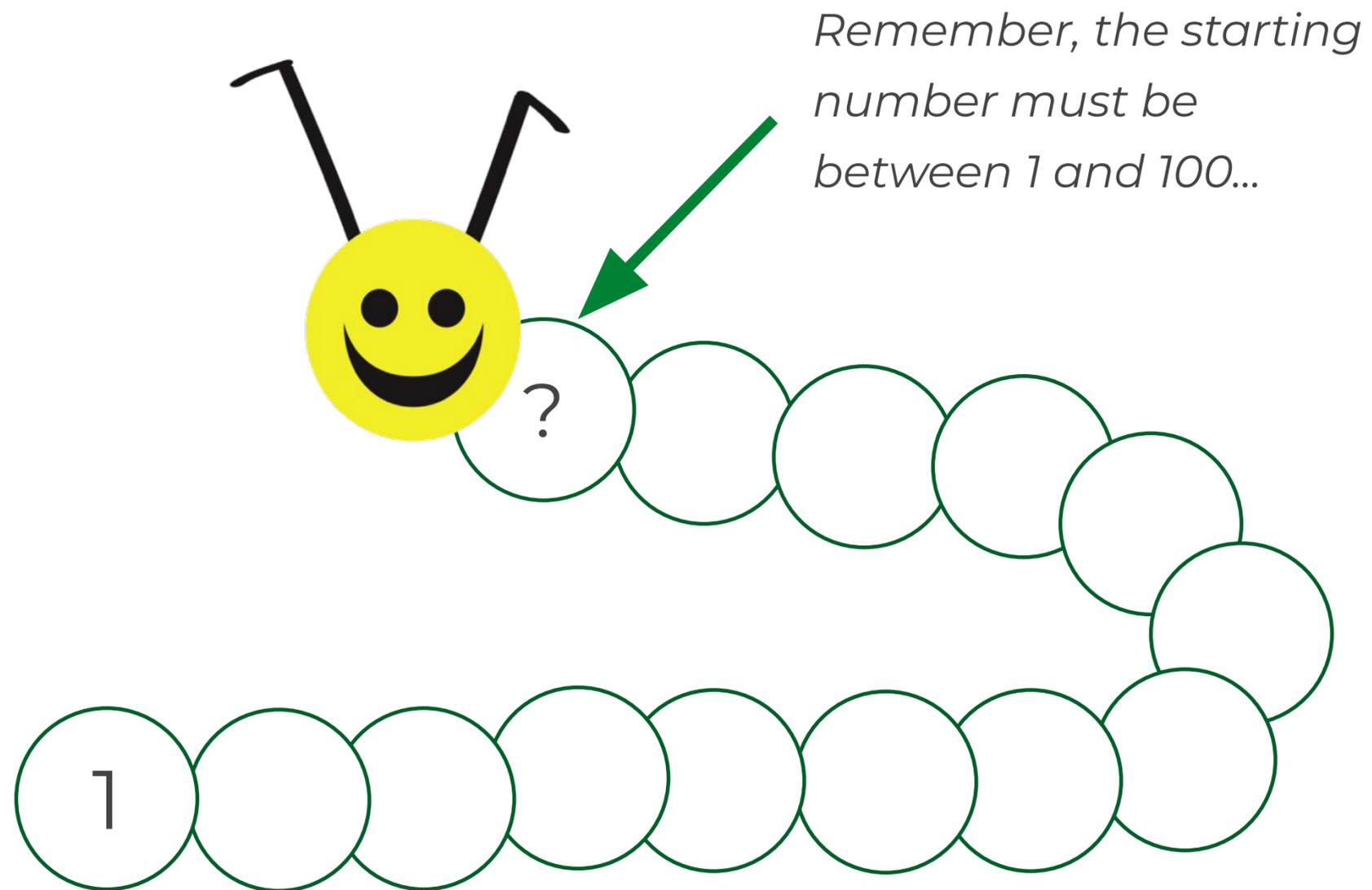
# Explore

There are rumours of a caterpillar with length 14!

What number could produce such a beast?



I can work backwards, thinking about how I can have the most steps...



*Extension: can you work out the 6 different numbers which give a caterpillar of length 13?*



# Answers



# Try this

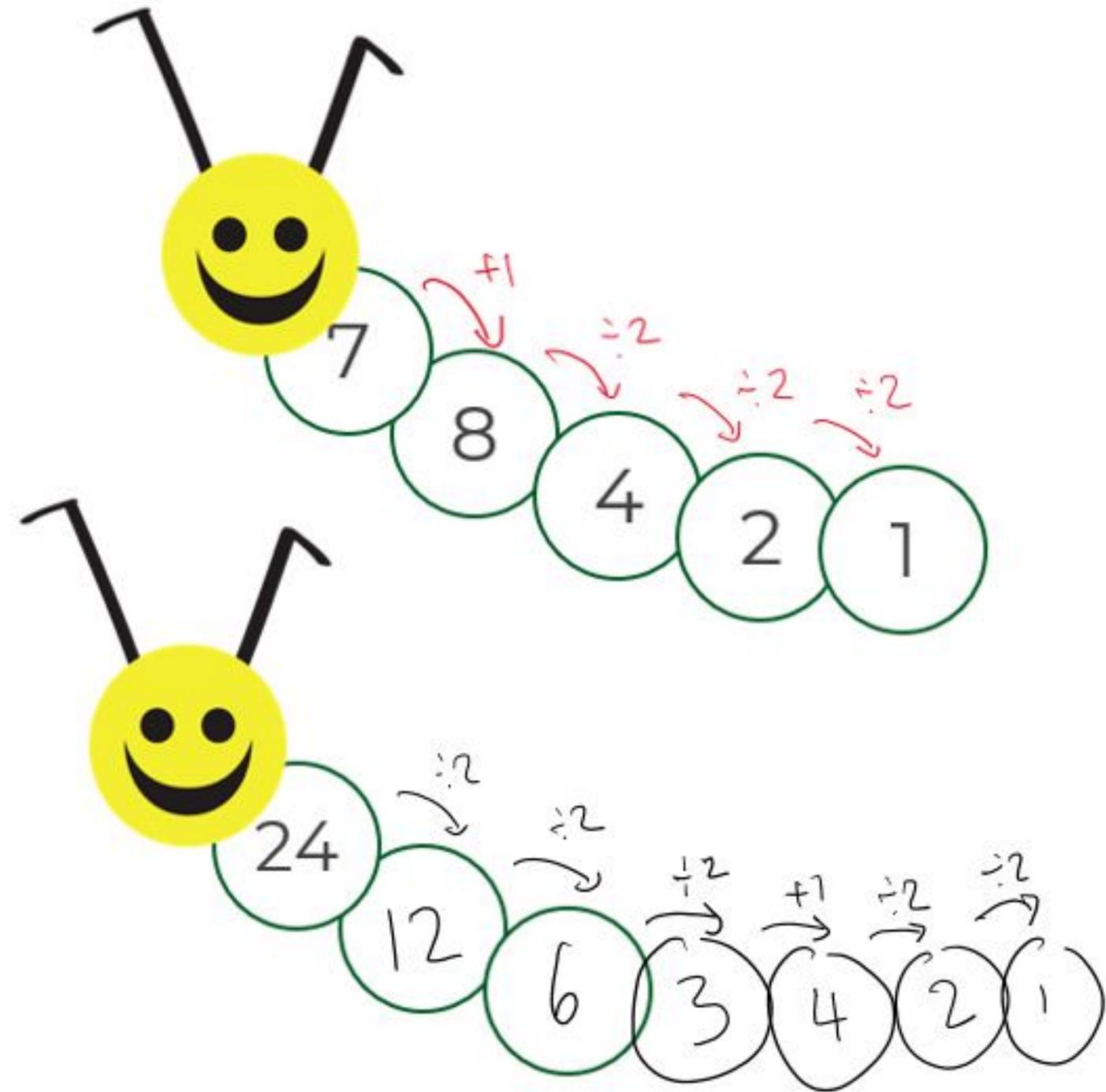
A caterpillar starts with a number between 1 and 100.

If that number is **odd**, the caterpillar will **+1**. If it is **even**, the caterpillar will **÷ 2**. It will keep doing this until it gets to 1.

A 7 caterpillar is **length 5**.

What length is a 24 caterpillar?

Length 7



# Connect

Order these caterpillars in length from longest to shortest.



50 → 25 → 26 → 13 → 14  
↓  
1 ← 2 ← 4 ← 8 ← 7



32 → 16 → 8 → 4 → 2 → 1



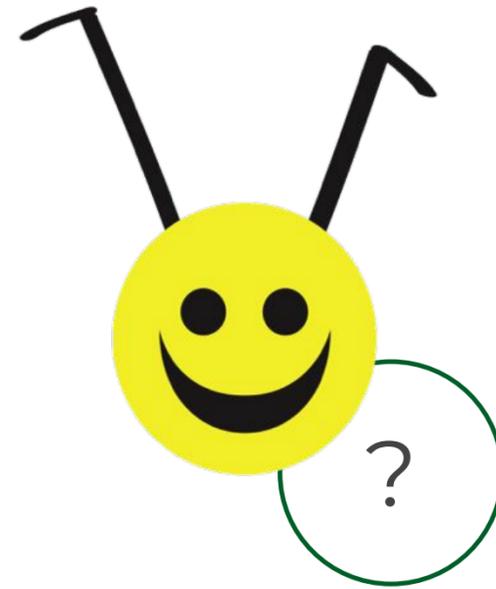
10 → 5 → 6 → 3 → 4 → 2 → 1



# Independent task

Work out the shortest caterpillar which starts with length 10-20.

Explain why this number gives the shortest?



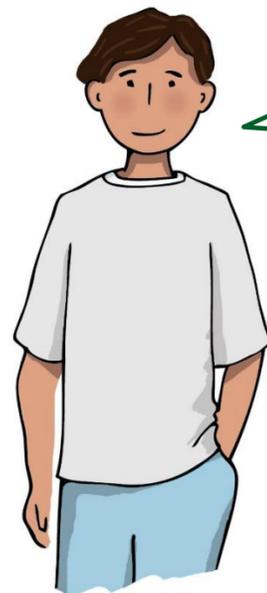
16 gives the shortest answer as dividing by 2 each times gets to one the quickest



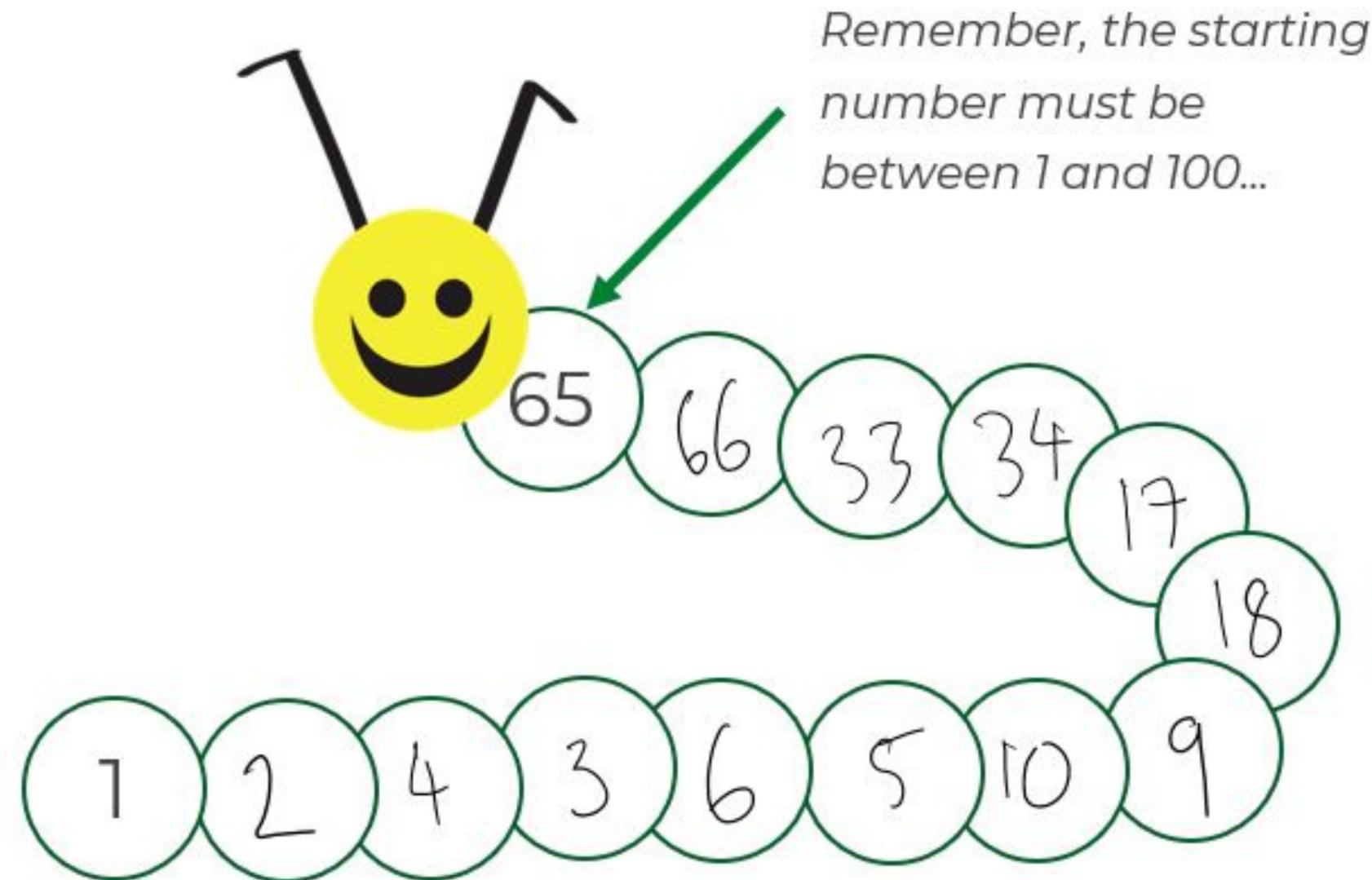
# Explore

There are rumours of a caterpillar with length 14!

What number could produce such a beast?



I can work backwards, thinking about how I can have the most steps...



Remember, the starting number must be between 1 and 100...

*Extension: can you work out the 6 different numbers which give a caterpillar of length 13?*

66, 67, 69, 70, 73, 81

