

Mathematics

The Happy Caterpillar problem

Mr Millar



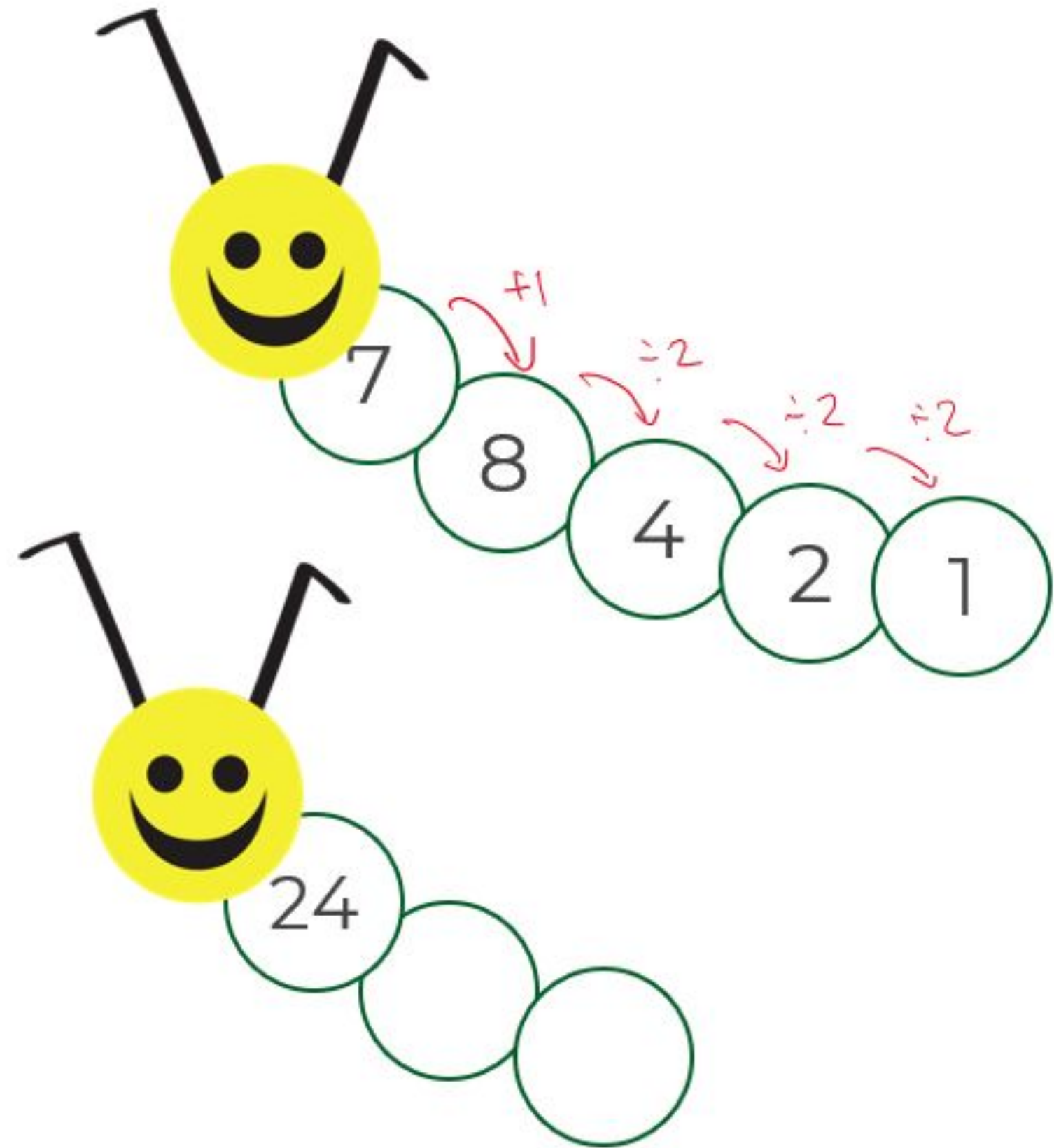
Try this

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.

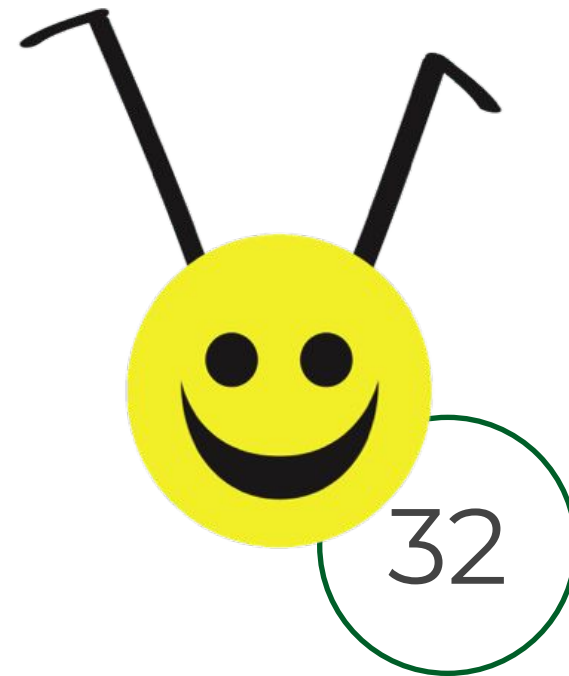
A 7 caterpillar is **length 5**.

What length is a 24 caterpillar?



Connect

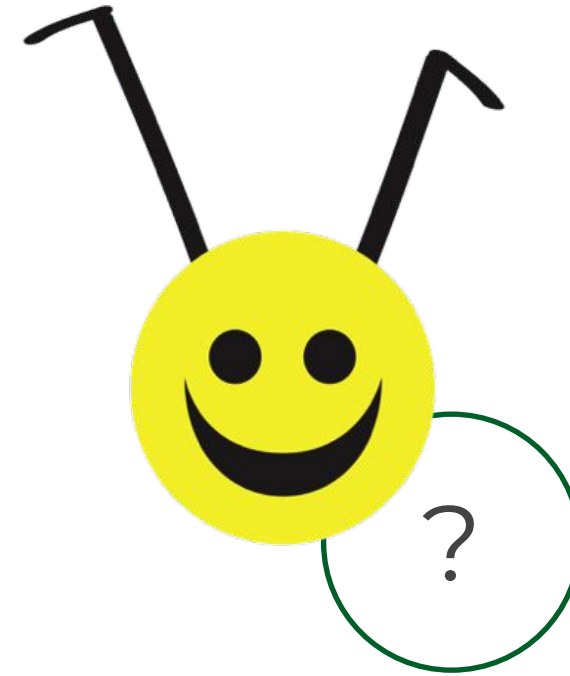
Order these caterpillars in length from longest to shortest.



Independent task

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

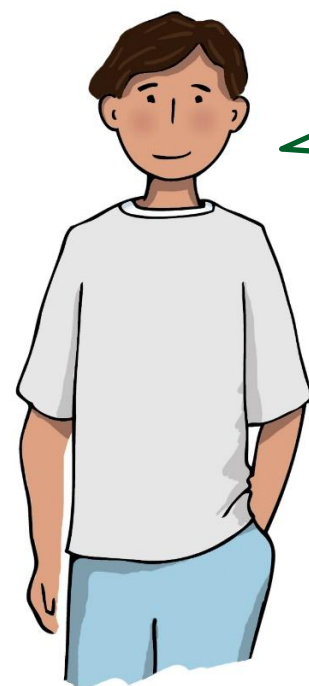
Explain why this number gives the shortest?



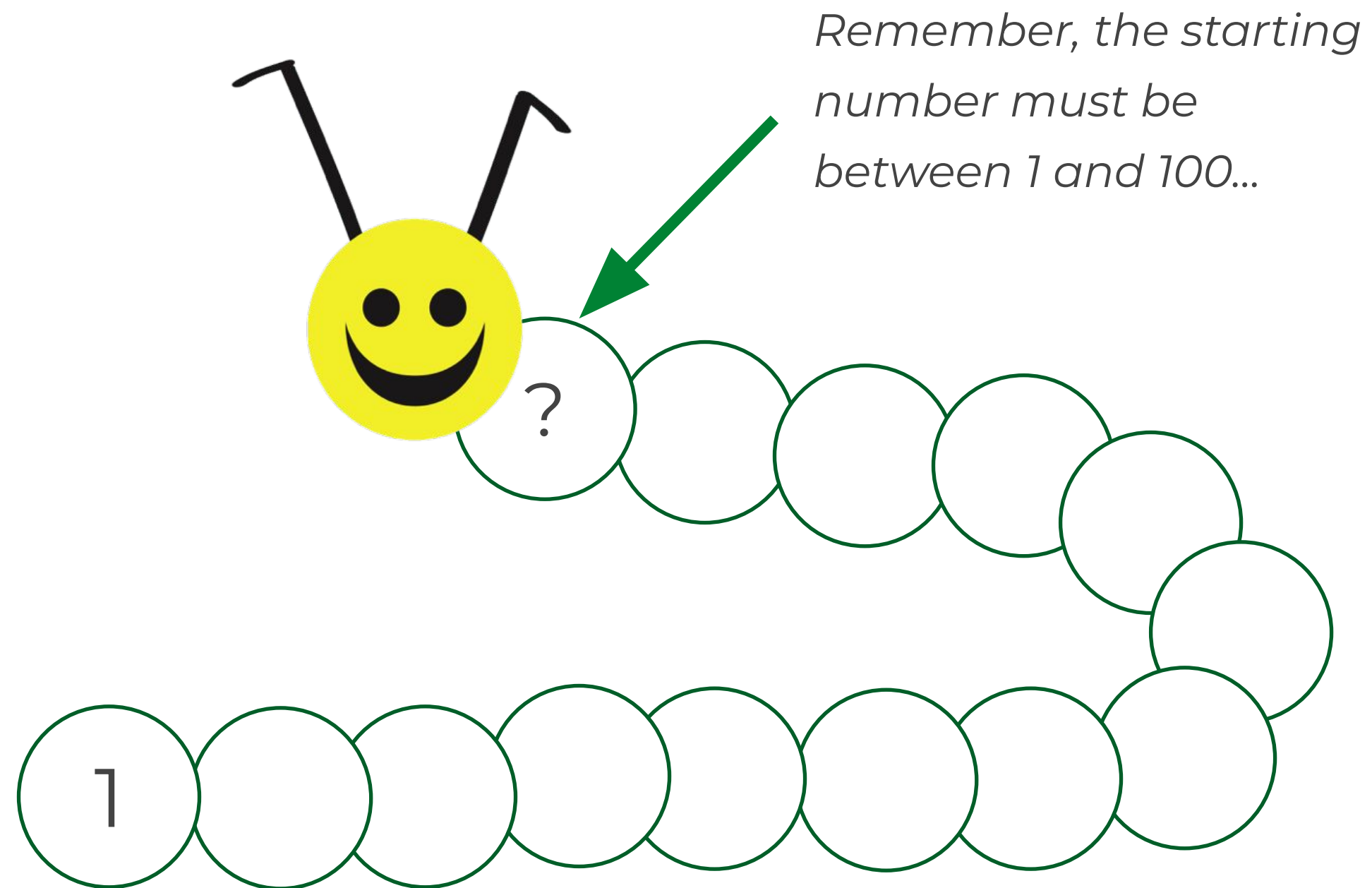
Explore

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

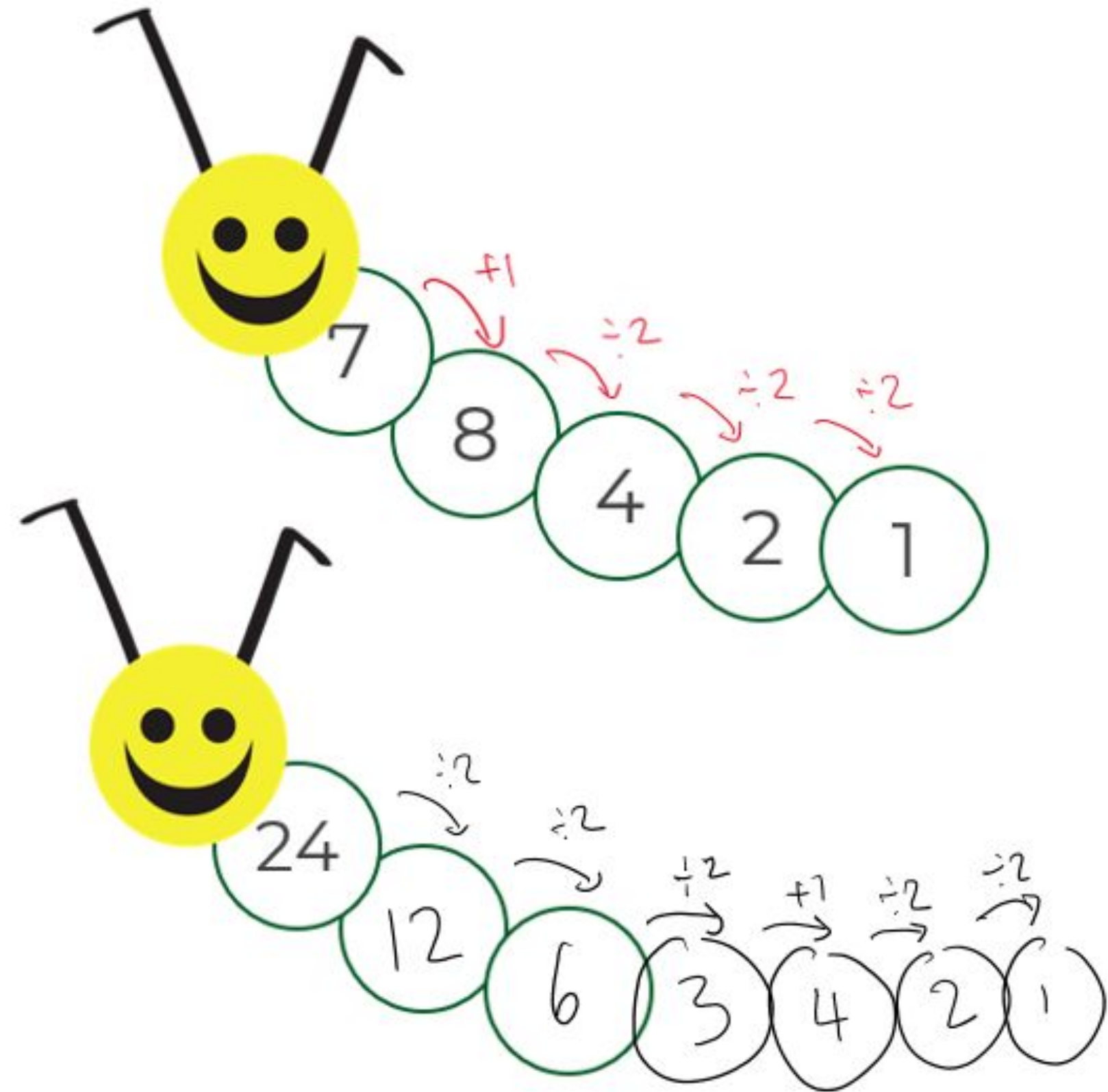
A caterpillar starts with a number between 1 and 100.

If that number is **odd**, the caterpillar will **+1**. If it is **even**, the caterpillar will $\div 2$. 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.



$50 \rightarrow 25 \rightarrow 26 \rightarrow 13 \rightarrow 14$
 \downarrow
 $1 \leftarrow 2 \leftarrow 4 \leftarrow 8 \leftarrow 7$



$32 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1$



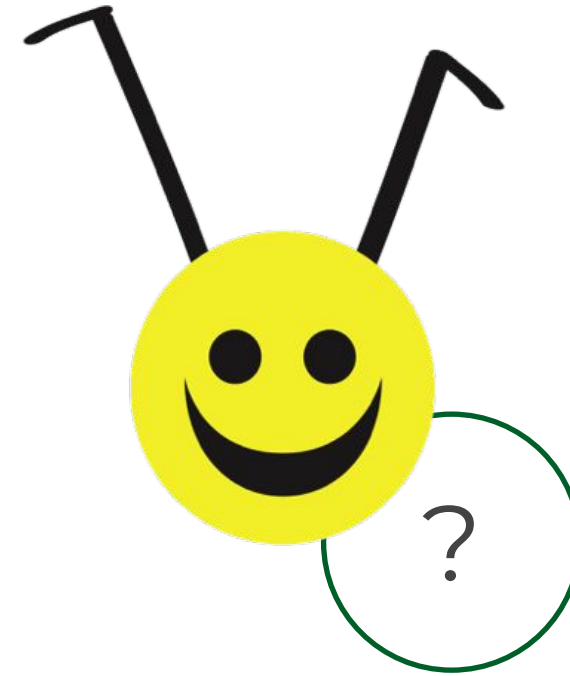
$10 \rightarrow 5 \rightarrow 6 \rightarrow 3 \rightarrow 4 \rightarrow 2 \rightarrow 1$



Independent task

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

Explain why this number gives the shortest?



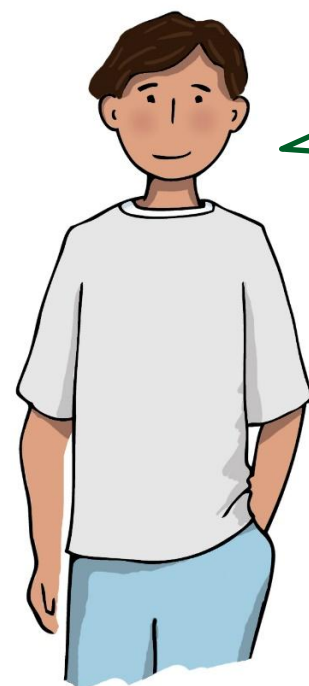
16 gives the shortest answer as dividing by 2 each times gets to one the quickest



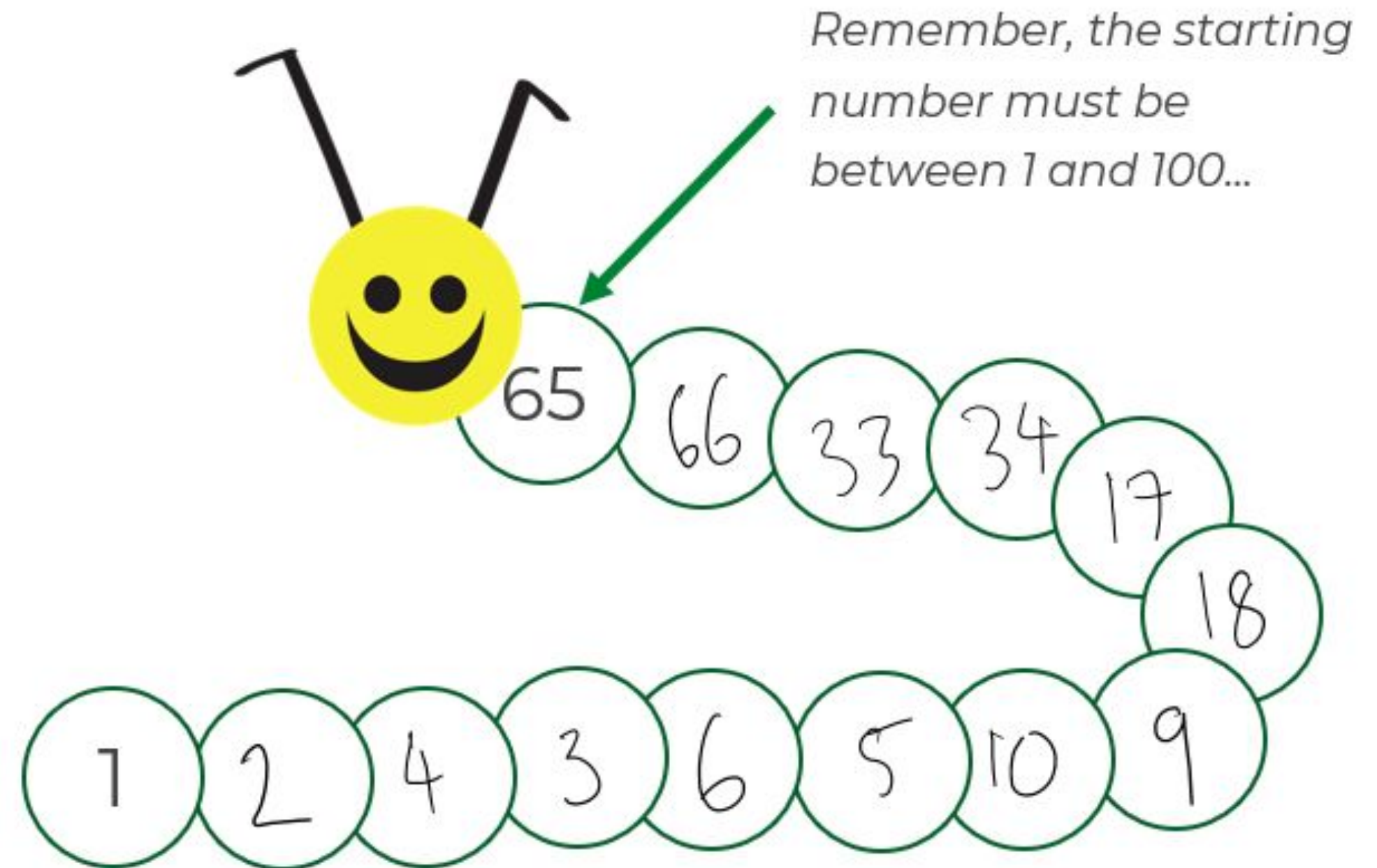
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Extension: can you work out the 6 different numbers which give a caterpillar of length 13?

66, 67, 69, 70, 73, 81

