

# Number Sequences

1. Complete the table for the pattern below. For example, the first triangle uses 3 sticks, the second 9 sticks, and so on.

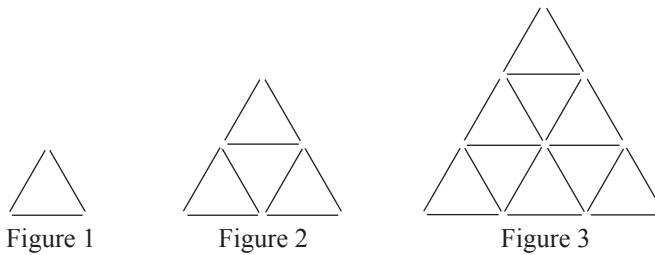


Figure	1	2	3	4	5	6
Number of sticks	3	9	18			

2. What is the 1000th term in

$$\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{1}{5}, \frac{2}{5}, \frac{3}{5}, \frac{4}{5}, \dots ?$$

# Number Sequences

1. The observation:

$$3 = 1 \times 3$$

$$9 = (1 + 2) \times 3$$

$$18 = (1 + 2 + 3) \times 3$$

$$\begin{aligned} 4\text{th} &= (1 + 2 + 3 + 4) \times 3 \\ &= 30 \end{aligned}$$

$$\begin{aligned} 5\text{th} &= (1 + 2 + 3 + 4 + 5) \times 3 \\ &= 45 \end{aligned}$$

$$\begin{aligned} 6\text{th} &= (1 + 2 + 3 + 4 + 5 + 6) \times 3 \\ &= 63 \end{aligned}$$

Figure	1	2	3	4	5	6
No. of sticks	3	9	18	30	45	63

2. Analysis: Denominator 2 has 1 term, denominator 3 has 2 terms, ...

Solution:  $1 + 2 + 3 + 4 + \dots + 44$

$$\begin{aligned} &= \frac{(1 + 44) \times 44}{2} \\ &= 990 \end{aligned}$$

The 990th term is  $\frac{44}{45}$ .

The 1000th term is  $\frac{10}{46}$ .