

Sticky Numbers

Look at the following row of numbers:

$$10 \quad 15 \quad 21 \quad 4 \quad 5$$

They are arranged so that each pair of adjacent numbers adds up to a square number:

$$10 + 15 = 25 \quad 15 + 21 = 36 \quad 21 + 4 = 25 \quad 4 + 5 = 9$$

Can you arrange the numbers 1 to 17 in a row in the same way, so that each adjacent pair adds up to a square number?

Can you arrange them in more than one way? If not, can you justify that your solution is unique?

$$\begin{array}{cccccccccccccccc} 17 & + & 8 & + & 1 & + & 15 & + & 10 & + & 6 & + & 3 & + & 13 & + & 12 & + & 4 & + & 5 & + & 11 & + & 14 & + & 2 & + & 7 & + & 9 & + & 16 \\ \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark & & \checkmark \\ 25 & & 9 & & 16 & & 25 & & 16 & & 9 & & 16 & & 25 & & 16 & & 9 & & 16 & & 25 & & 16 & & 9 & & 16 & & 25 \end{array}$$

We can arrange those numbers in that form because if we try to change their order, the results change too.