

## Solution to Problem $\diamond$ -11

**Problem:** *Mr Snail walks straightforward North for 2019 meters, then he turns right and walks straightforward East for 2018 meters. Then again he turns right and walks straightforward South for 2017 meters, to turn right and walk straightforward Westward for 2016 meters. Then he turns right and walks 2015 meters North etc etc etc until he walks just one meter South. How far from the starting point is he then?*

*Solution.* In the North–South direction Mr Snail will walk the distance of

$$\begin{aligned} & 2019 - 2017 + 2015 - 2013 + \dots + 7 - 5 + 3 - 1 \\ &= \sum_{i=0}^{504} (3 + 4i) - \sum_{i=0}^{504} (1 + 4i) = \frac{505 \cdot 2022}{2} - \frac{505 \cdot 2018}{2} = 1010. \end{aligned}$$

In the East–West direction he will walk the distance of

$$\begin{aligned} & 2018 - 2016 + 2014 - 2012 + \dots - 8 + 6 - 4 + 2 \\ &= \sum_{i=0}^{504} (2 + 4i) - \sum_{i=1}^{504} 4i = \frac{505 \cdot 2020}{2} - \frac{504 \cdot 2020}{2} = 1010 \end{aligned}$$

Consequently, when Mr Snail finishes his walk he will be  $1010\sqrt{2}$  meters from the starting point, in the NE direction.  $\square$

CORRECT SOLUTION WAS RECEIVED FROM :

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