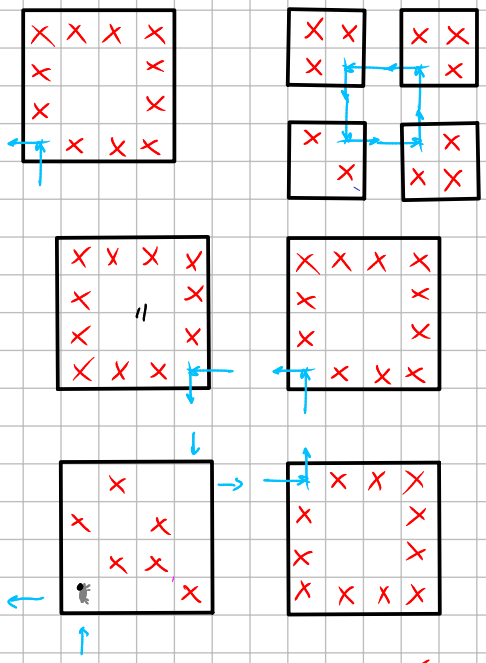
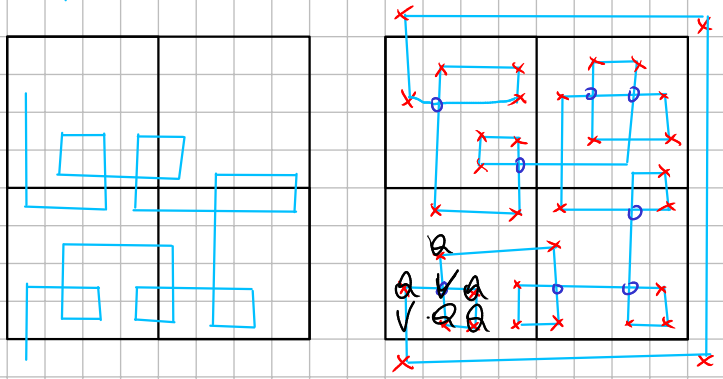


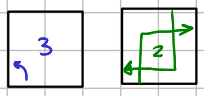


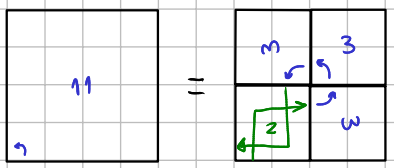
Turbo the snail is given $4n$ positive real numbers $x_1, x_2, \ldots, x_{4n}$. He starts at a point in the plane and slides x_1 meters north, x_2 meters east, x_3 meters south, x_4 meters west, and so on, cycling between north, east, south, and west. After going through all $4n$ numbers, he finds himself at the point where he started, and he never slid along the same line twice. Prove that his path intersects itself at least $n - 1$ times.

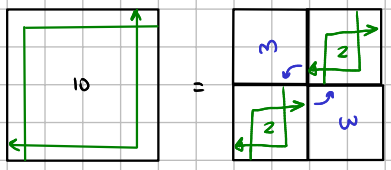
V Q V QQ QVQ

$\frac{\#Q}{\#V} = \frac{3}{1}$, $\frac{6}{1}$

Q. $\frac{6}{7}$







$A_n = 3A_{n-1} + V_{n-1}$

$V_n = 2A_{n-1} + 2V_{n-1}$

$A_n - V_n = A_{n-1} - V_{n-1} = \cdots = 1$

$A_n = 4A_{n-1} - 1$

$A_1 = 3$, $A_2 = 11$, $A_3 = 43$, $A_4 = 171$, $\boxed{A_5 = 683}$