PROMYS5

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§1 Thoughts, Ideas, Claims and Proofs

Denote $f(m,n)$ to be the answer for mxn board.

Confession: I am using geogebra to make grids

Thought: $f(m,n) = \gcd(m,n) \cdot f(m/\gcd(m,n), n/\gcd(m,n))$

Proof: Umm lets see. if it is a $g \cdot x$ x $g \cdot y$ board then by similarity we can find g x x y grids on the diagonal line with the line intersecting both the corners. Thus, $f(gx, gy) = g \cdot f(x,y)$.

So we limit to thinking about $f(x,y)$ with $\gcd(x,y) = 1$. Now I am going to think about the 3 x 5 grid. Ok so, thinking about "when" there is a change in the current "box" of the line by thinking about the y coords as the x coords change,

$$(0, \frac{3}{5}, 1, \frac{6}{5}, \frac{9}{5}, 2, \frac{12}{5}, 3)$$