Connect S

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s is the number of tiles to connect and is > 1. m, n are the cols and rows of the board in spaces. If s does not exceed the smaller dimension of the board's size ($\min\{m, n\} \geq s$), than the following equation describes the total possible locations to get connect s:

$$\underbrace{\overbrace{(m-s+1)n}^{\text{\# Row Locs}} + \overbrace{(n-s+1)m}^{\text{\# Col Locs}}}_{\text{\# Row and Col Locs}} + 2 \underbrace{\left(\overbrace{\underbrace{(|m-n|+1)}_{\text{\# Central Diags}} \underbrace{(\min\{m,n\}-s+1)}_{\text{\# Locs in each central diag}}}^{\text{\# Central Diagonal Locs}} + 2 * \overbrace{\sum_{i=1}^{\min\{m,n\}-s} i}^{\text{\# Side Diagonal Locs}} \right)}_{\text{\# Diagonal Locs}}$$