1. What is the number of 6-card hands with three hearts and three spades? **1 / 1 point**

81796

Correct
Exactly! It is $\binom{13}{3} \times \binom{13}{3} = 286^2 = 81796$.

2. What is the number of bit-strings (that is, strings consisting of 0's and 1's) of length 6 where the number of 0's is equal to the number of 1's? **1 / 1 point**

For example, there are two such strings of length two: 01 and 10.

20

Correct
Exactly! We just need to select three (out of six positions) of 0's.

3. What is the number of sequences of six digits where the number of even digits is equal to the number of odd digits? **1 / 1 point**

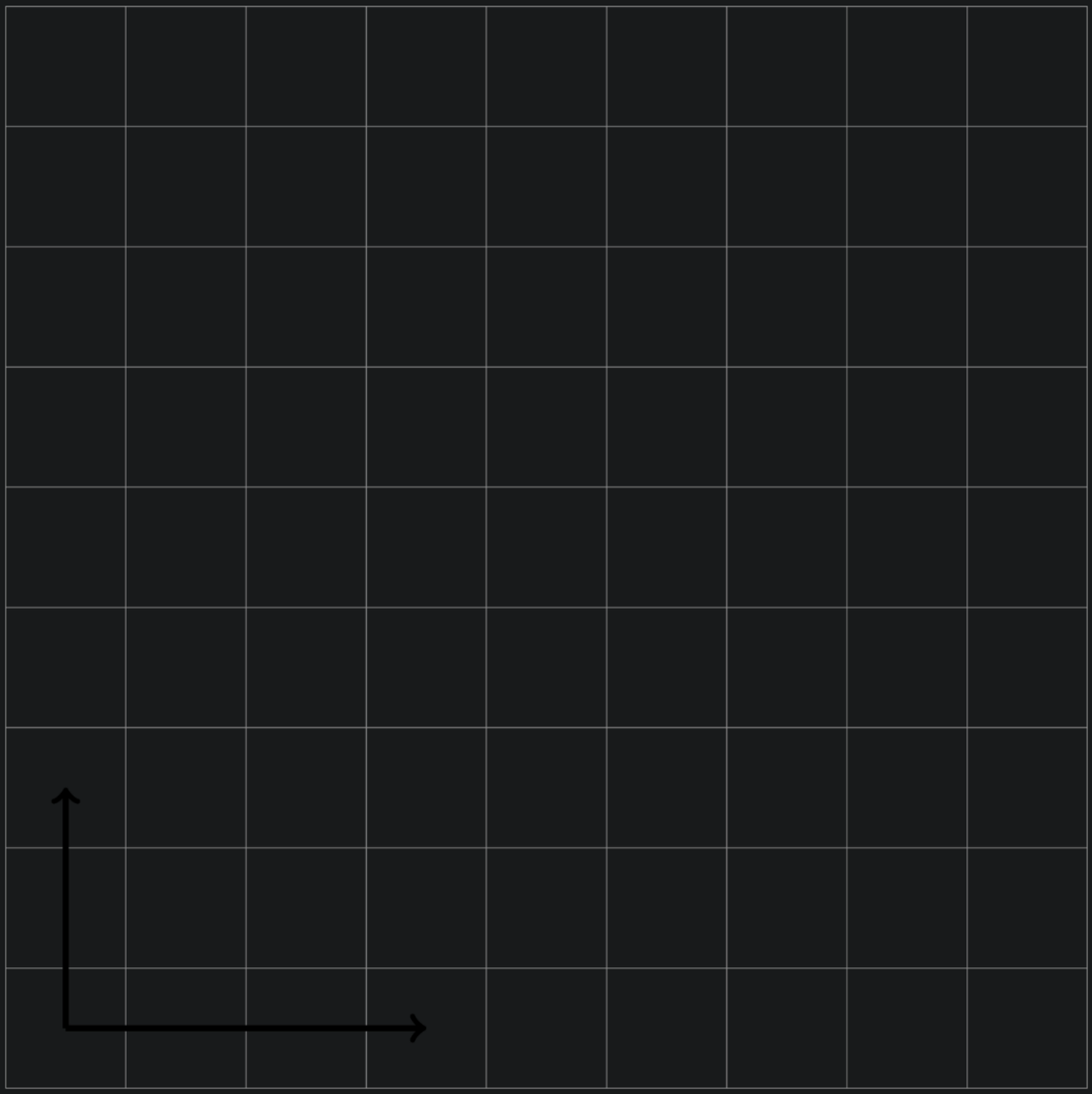
For example, there are 50 such sequences of length two: 01, 03, 05, 07, 09, 10, 12, 14, 16, 18, ..., 90, 92, 94, 96, 98.

312500

Correct
Exactly! We first select three positions for odd digits. For each of these three positions, we select one of five odd digits. For each of the remaining three positions, we select one of the five even digits. Overall, this gives $\binom{6}{3} \times 5^3 \times 5^3$.

4. In how many ways one can get from the bottom left cell to top right cell of a 9×9 grid, if each move is either two cells up or three cells to the right?

1 / 1 point



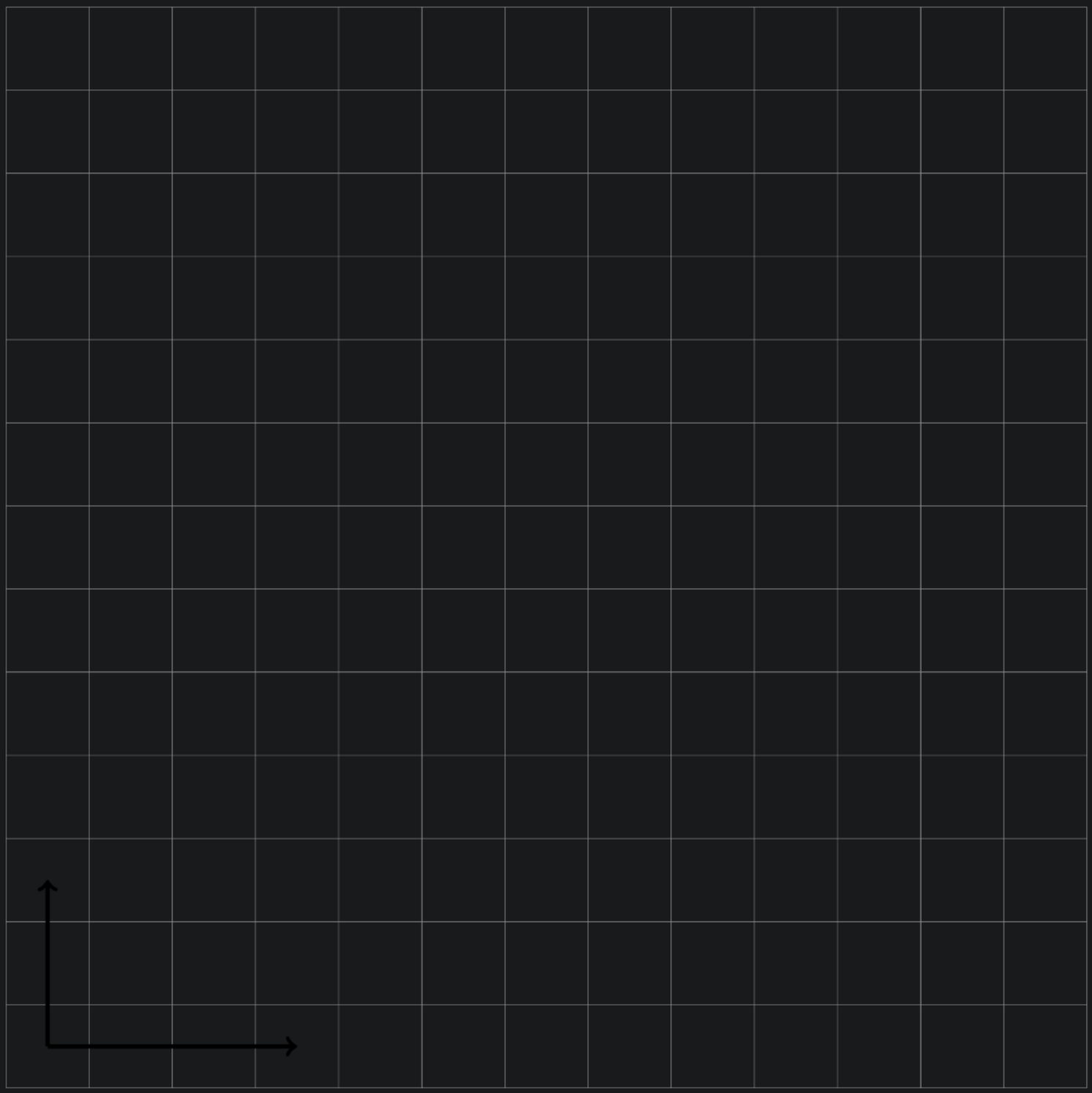
0

Correct

Exactly! One cannot reach the rightmost column.

5. In how many ways one can get from the bottom left cell to the top right cell of a 13×13 grid, if each move is either two cells up or three cells to the right?

1 / 1 point



210

Correct

Exactly! We need six moves up and four steps to the right. Hence, $\binom{10}{4} = 210$.