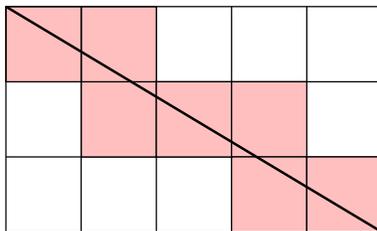


Math 219: Homework 3
Due: Friday, February 22nd

1) On graph paper, draw a $n \times m$ rectangle along with a diagonal. How many squares are touched by the diagonal?



As an example, here we have a 3×5 rectangle along with its diagonal. As you can see, 7 squares are touched by the diagonal.

2) Consider a strip of n squares. Players A and B play a game where they take turns filling in one square or two adjacent squares at a time. The player who fills in the last square wins. Player A goes first. Is there a winning strategy for either Player A or Player B, if so what is it?

3) How few straight lines are required in order to draw exactly 100 squares?

4) The following is a long division problem where every digit except 7 was replaced by X.

$$\begin{array}{r}
 X 7 X \\
 XX \overline{) XXXXX} \\
 \underline{X 7 7} \\
 X 7 X \\
 \underline{X 7 X} \\
 X X \\
 \underline{ X X} \\

 \end{array}$$

Recover the numbers from this long division problem.