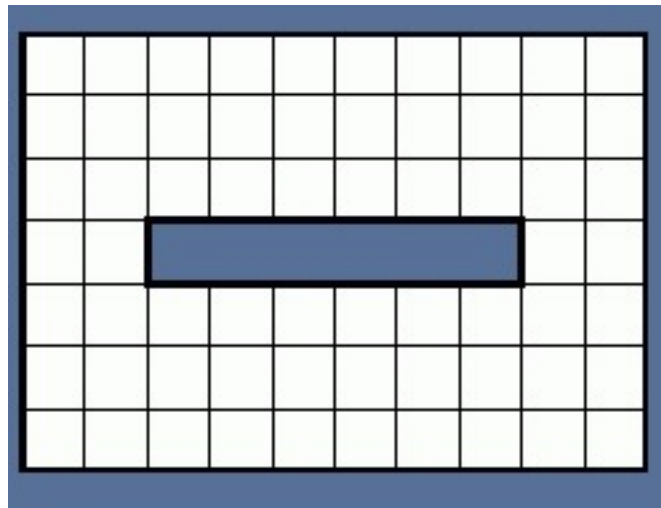# Puzzle Sheet 1

1. Take a chessboard and remove two diagonally opposite corner squares. Also take a box of dominos, where each domino is exactly the right size to cover two squares on the chessboard. Can you arrange 31 dominos on the new board in such a way that they exactly cover it?

2. Slice the holey rectangle below into two pieces that can be reassembled into a square.

3. Which is heavier, all of the snow currently on campus or all of the campus buildings?

4. (On the Ramsgate Sands, H. E. Dudeney, 1925). Thirteen youngsters were seen dancing in a ring on the Ramsgate Sands. Apparently they were playing "Round the Mulberry Bush". The puzzle is this. How many rings may they form without any child ever taking twice the hand of any other child—right hand or left? That is, no child may ever have a second time the same neigbour.

5. Can you connect 9 dots laid out in a regular 3×3 grid using 4 straight lines without lifting your pencil from the paper? Can you do it with fewer than 4 straight lines?

6. Alice, Bernard and Clare are to fight in a truel (like a duel, but for three people). They will take it in turns to shoot: Alice first, then Bernard and then Clare. Those still standing will repeat this order until just one person remains. Alice is a poor shot, hitting her target just one time in three on average. Bernard is better, hitting his target two thirds of the time. Clare is better yet, hitting with every single shot. Assume that all hits are fatal. What is Alice's best strategy?

7. A bear walks two miles south, then two miles east and then two miles north. It ends up where it started. What colour is the bear?