Two is the Best Number - Part 4

1   Warm-Up

1. On the island of knights and knaves, knights always tell the truth and knaves always lie.

   Island inhabitant Arthur says, "At the king's feast last night, 25 people sat at a round table. Each knight sat between two knaves and each knave sat between two knights. "

   Can you tell if Arthur is a knight or a knave? Explain.

2   Dominos ... Revisted

2. (From last time) Place a full set of dominos (all 28 pieces) into a line according to the rule of dominos (see below), and make sure that the left half of the leftmost domino has 6 spots on it. How many spots are there on the right half of the rightmost domino? Explain why this happens.

   Rule of Dominos: When two dominos are placed next to each other, end to end, the halves that are next to each other must have the same number of spots.

Double-Six Domino Set
28 Tiles
168 Pips
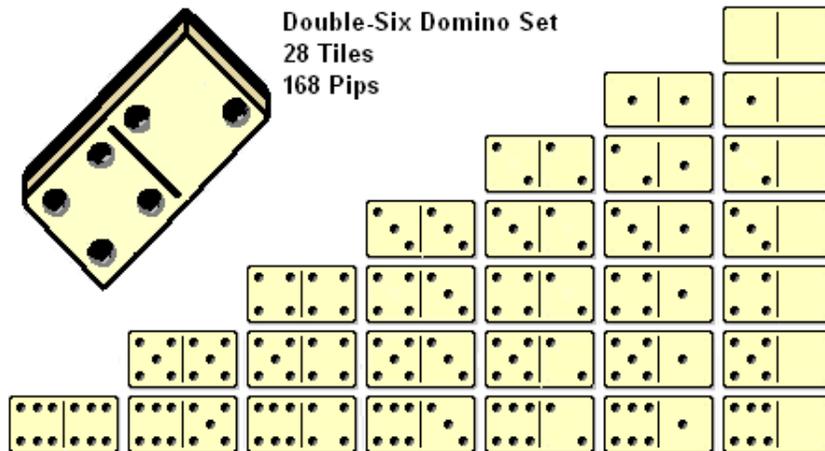
3 Problems

3. Cut each of the shapes in the figure into two parts of the same size and shape. You can cut along grid lines and along diagonals of small squares. The two parts are equal if, after the cut, you can place them on top of each other so they match. It is fine to flip and rotate the shapes.
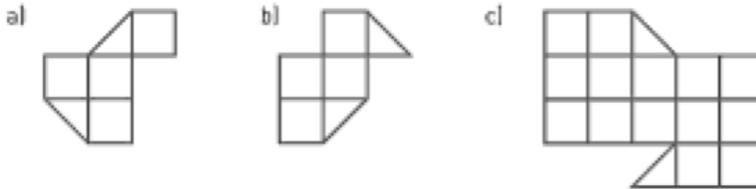

4. In this problem there is a long straight road.

   (a) A cricket jumps along the road. Every jump takes him 1 meter to the right or to the left. Could it be that in 21 jumps he will end up exactly where he started? Explain.

   (b) Another cricket jumps along the road. On every jump, he leaps 1 meter to the right or to the left. Could it be that in 33 jumps he'll end up at a point 10 meters away from the starting point?

   (c) A brown cricket and a green cricket are sitting on the road 15 meters apart. They start jumping at exactly the same moment. On every jump, each of them leaps 3 meters to the right or to the left. Whenever one jumps, the other jumps too, at the same time. Can they ever land on the same spot simultaneously? Explain.

4   The Game of Cat And Mouse

5. A very polite cat chases an equally polite mouse. They take turns moving on the grid depicted below.
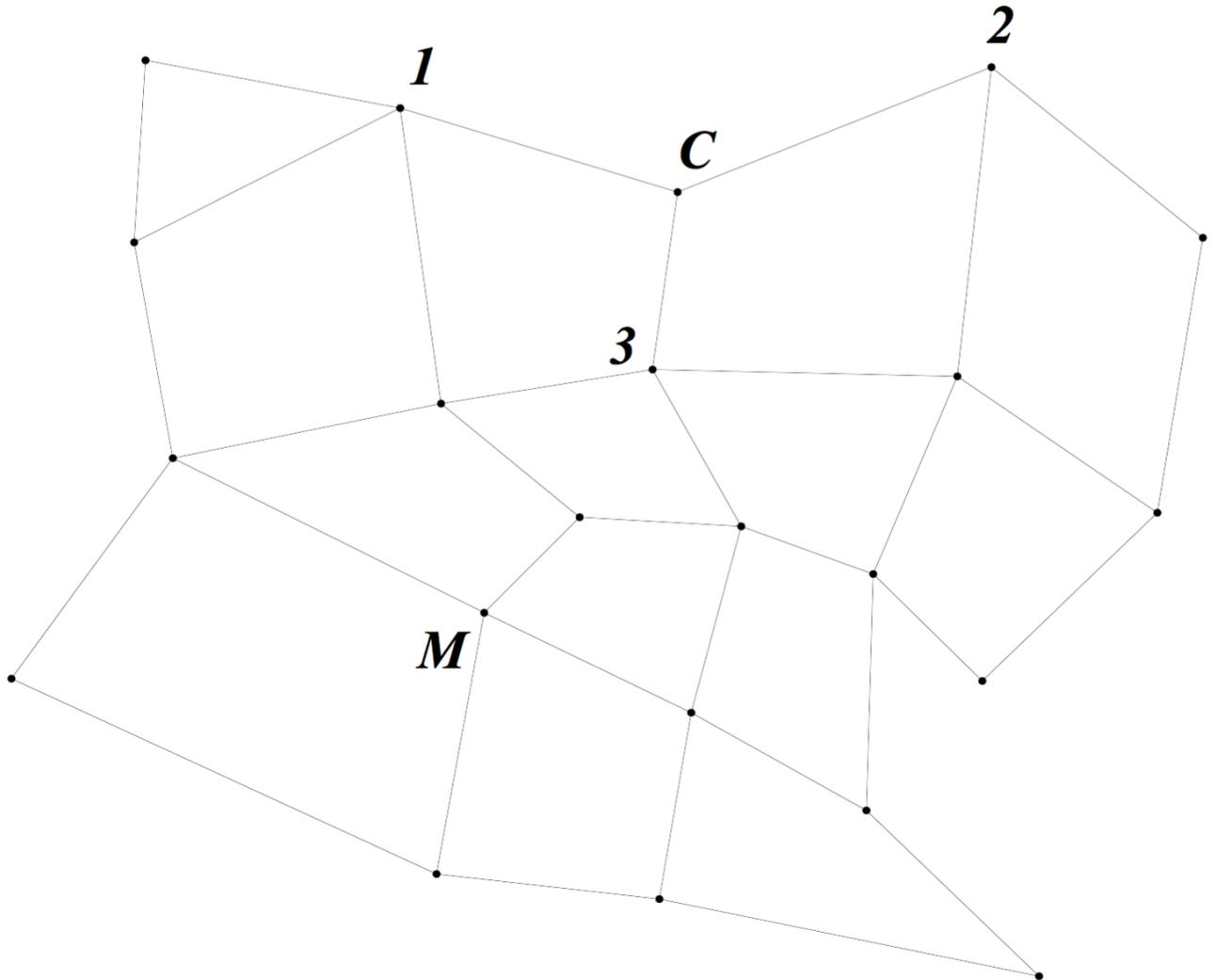
Initially, the cat is at the point labeled C; the mouse is at M. The cat goes first, and can move to any neighboring point connected to it by a single edge. Thus the cat can go to points 1, 2, or 3, but no others, on its first turn. The cat wins if it can reach the mouse in 15 or fewer moves. Can the cat win?