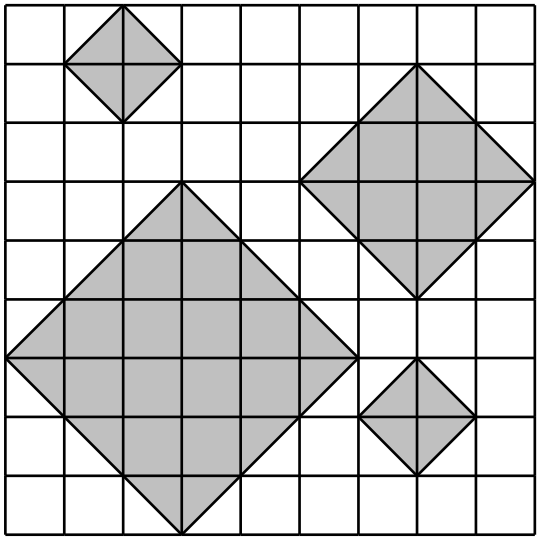
2009 Philippine Elementary Mathematics International Contest

Puzzle Competition Solution

Puzzle 1.

Hints:

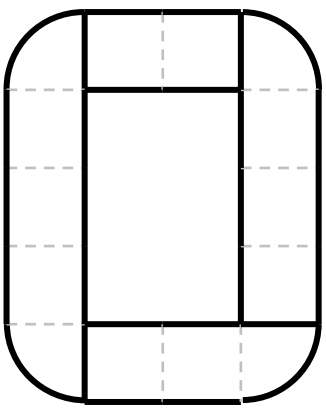
Number the pieces 1 to 9 from left to right. Start with the largest shaded square with a diagonal of length 6, formed by #2 to the left of #9. Continuing to the left, we must have #7 and then #8. Continuing to the right, we must have #5 and #3. The rest is easy.



Puzzle 2.

Hints:

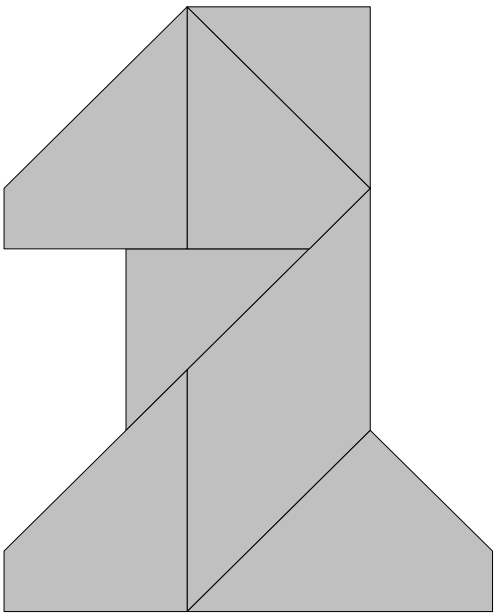
Counting the rounded corners as full squares, the areas of the pieces are 5, 5, 4, 3, 3, 3 and 2. The area of the window frame is 14. We can only have 14=5+5+4=5+4+3+2=5+3+3+3. It is then easy to see which works.



Puzzle 3.

Hints:

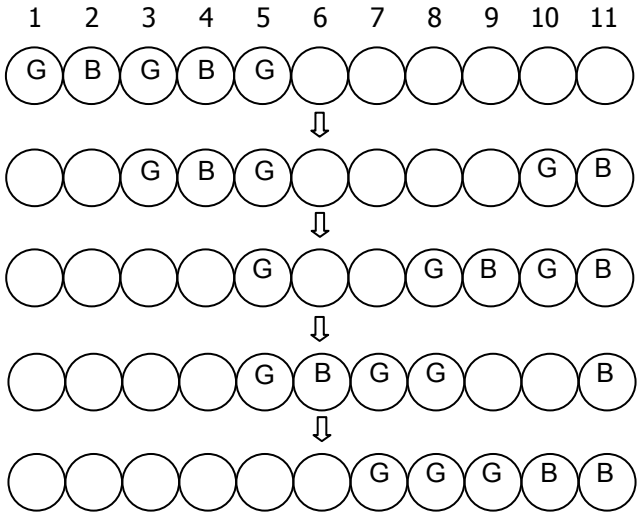
The overall figure has three angles of measure 135°, and they cannot be subdivided. There are exactly three pieces with such angles. Put them in places, and the rest will follow.



Puzzle 4.

Hints:

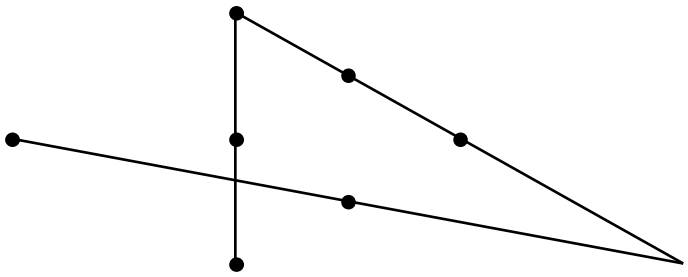
We must get a boy to position 11, and he can only come with a girl in position 10. We have to get this girl out, and she will only leave with a boy in position 9. Once this is accomplished, the rest is easy.



Puzzle 5.

Hints:

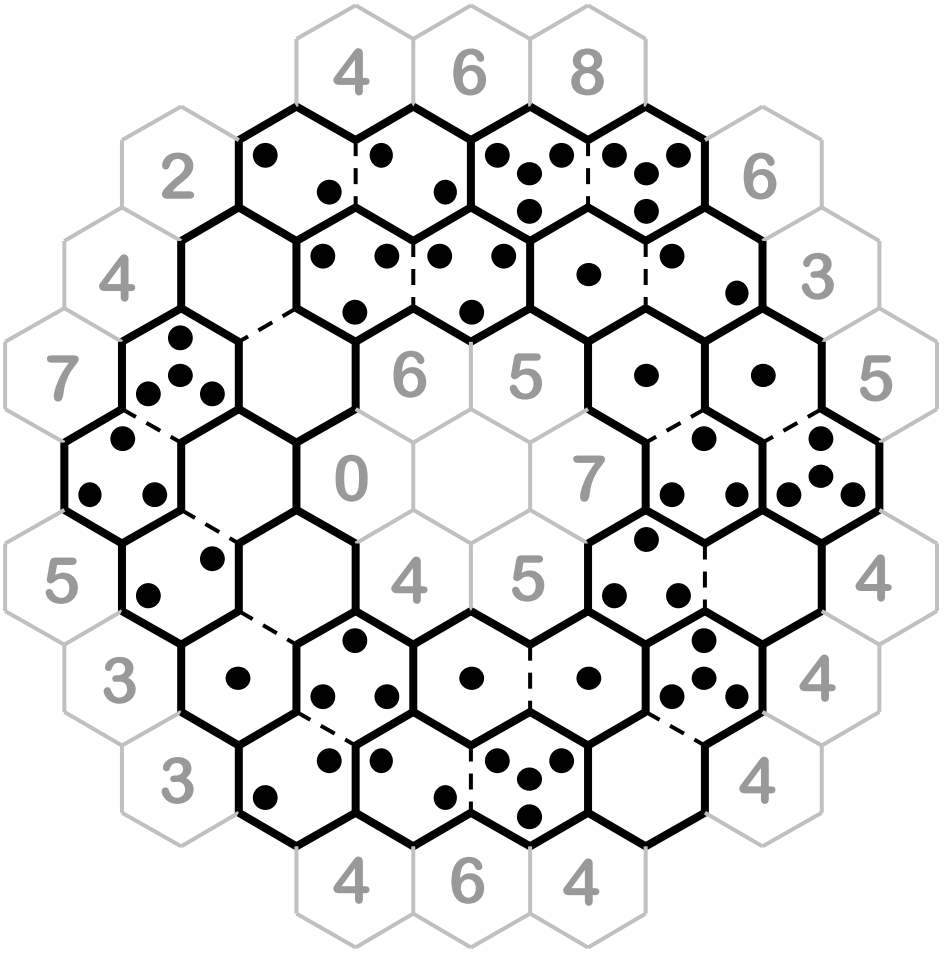
Since we have three lines and 7 points, at least one line must pass through 3 points. There are no 4 points on a line, and four lines pass through 3 points each. Three of them meet at a point, so we must make use of the fourth, the vertical one. Since it crosses the horizontal line, we should not use the latter. It is not hard to see which two lines we should then use.



Puzzle 6.

Hints:

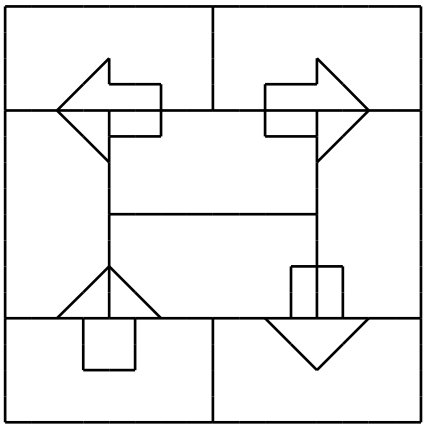
Starting with the given 8, we can determine the number of spots of each hexagon on the outer ring. Starting with the given 0, we can determine the number of spots of each hexagon on the inner ring. It is then just a matter of matching them up to form different hexagonal dominoes.



Puzzle 7.

Hints:

Number the pieces in the top row 1 to 4 from left to right, and the pieces in the bottom row 5 to 8 from left to right. We have a complete arrow head in #1 and a complete arrow stem in #3. The rest are half arrow heads and half arrow stems. Putting them together does not lead anywhere, nor does it help to put the two half arrows in #5 and #6 together. Hence these four pieces are parts of four different arrows.



Puzzle 8.

Hints:

Label the hexagons in the left column of the grid A, B and C from top to bottom, those in the central column D, E, F and G from top to bottom, and those in the right column H, I and J from top to bottom. Note that D, E and G are equivalent by turning, as are F, H and J. A and I, which are equivalent by turning, are mirror images of B and C, which are also equivalent by turning. Number the pieces in the top row 1 to 5 from left to right, and the pieces in the bottom row 6 to 10 from left to right. Now #1, #2, #3, #5 and #7 can be placed almost anywhere, whereas the other five are much more restricted. Start with those five and you are on your way.