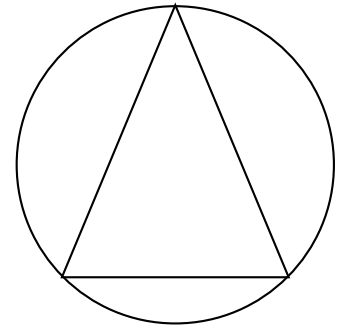


BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2007

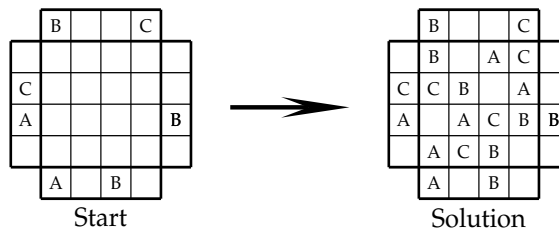
Junior Final, Part B

Thursday May 3

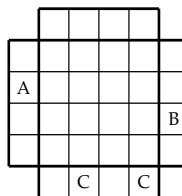
- Joan has a collection of nickels, dimes, and quarters worth \$2.00. If the nickels were dimes and the dimes were nickels, the value of the coins would be \$1.70. Determine all of the possibilities for the number of nickels, dimes, and quarters that Joan could have.
- A $3 \times 3 \times 3$ cube is formed by stacking $1 \times 1 \times 1$ cubes. Determine the total number of cubes with sides of integral length that are contained in the $3 \times 3 \times 3$ cube.
- The lengths of the sides of a triangle are 13, 13, and 10. The circumscribed circle of a triangle is a circle that goes through each of the three vertices of the triangle and has its centre inside the triangle. See the diagram. Find the radius of the circumscribed circle.



- The game of End View consists of a tableau with a four by four grid, one additional row at the top and at the bottom, and one additional column at on the right and on the left. The letters A, B, and C are placed in the four by four grid in such a way that every letter appears exactly once in each row and each column. This means that there will be exactly one empty square in each row and each column. Hint letters are placed in the additional rows and columns, at the end of some rows and columns of the four by four grid, to indicate the nearest letter that can be found by reading that row or column of the grid. The diagram below shows the starting tableau and the resulting solution tableau for a game of End View.



The starting tableau for another End View game is shown below.



Fill in the tableau above with the complete solution. Give a justification of the steps that you used to find the solution.

- Determine all of the positive integer solutions, x and y , to the equation

$$\frac{1}{x} - \frac{1}{y} = \frac{1}{12}$$