

2017-2018 Puzzle Contests

Solutions for Contest #5



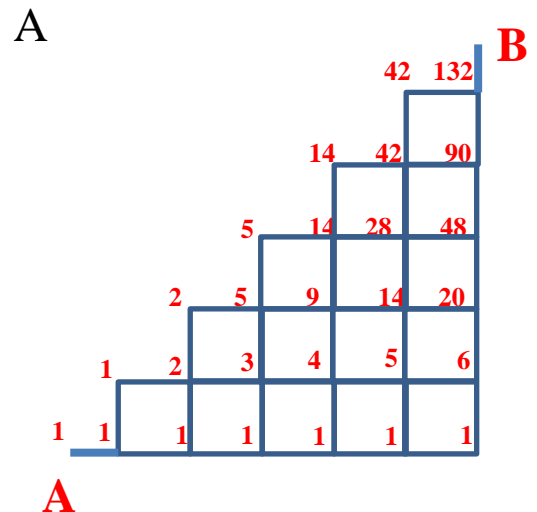
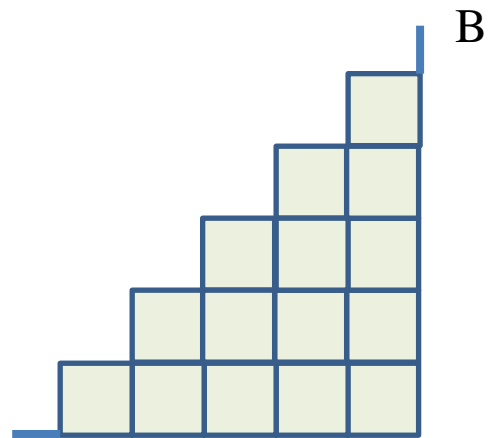
Grades 5up Puzzle Solutions:

1. The number of RSM-MetroWest students who won individual awards at a math Tournament was between 2.7% and 3.2% of the total number of students on the RSM-MetroWest team. What could be the smallest number of students on the team? (25 pts)

Answer: 32

Solution: The number of 32 satisfies to the condition. For the number of 31 and less, the number of winners is less than 1 but greater than 0, which is impossible.

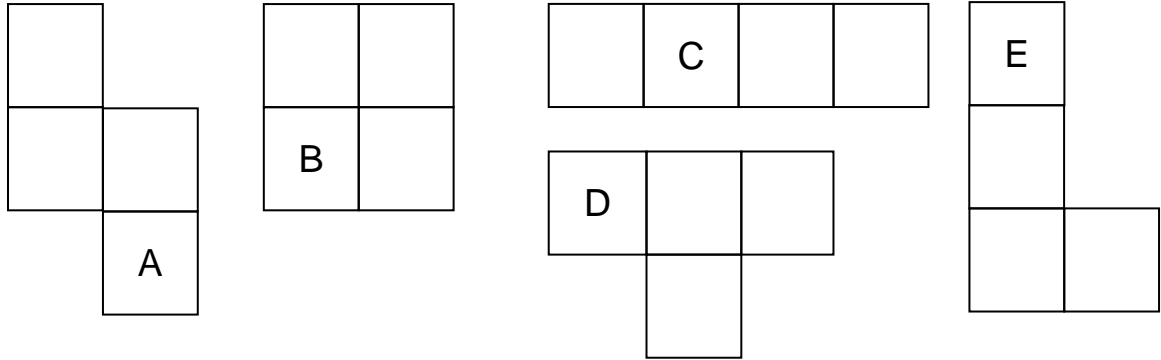
2. Moving horizontally and vertically from point A to point B along the lines in the diagram below, how many routs are there from point A to point B consisting of six horizontal and six vertical moves? (35 pts)



Answer: 132

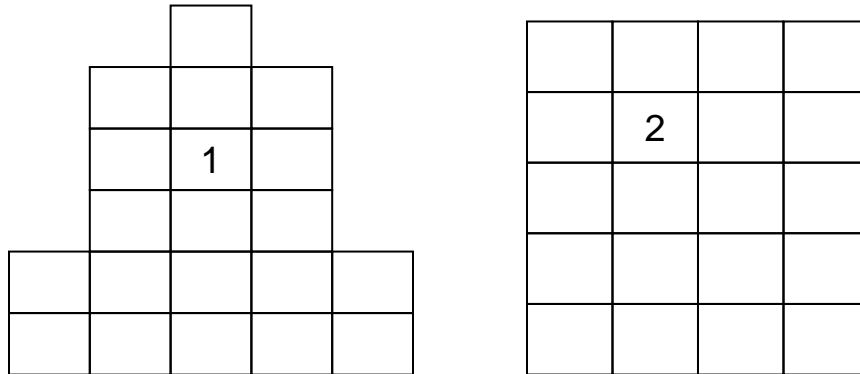
Solution: Label point A and other points on the bottom row with the number 1. For each other point, label the point with a number which is the sum of the numbers on the labels of the points immediately to the left and immediately below the point since this will give a count of the number of paths from A to that point (see at right)

3. An Architectural Firm received an order to cover the façade of a new house they are designing with slabs of a very rare stone. Only five slabs are available, and here are their shapes:



The builders are not allowed to cut the expensive slabs, but the slabs are excellent on both sides, and so can be place either side up. They can be rotated in any way as well.

The architectural firm is considering two possible designs of the house as shown below (1 and 2).



If the firm is to satisfy the order and use all of the available slabs of the rare stone to cover the façade, which of the two designs should they choose, and why?(40 pts)

Solution: Coverage for building 1 is shown. Building 2 cannot be covered. To see that, easily, let us use chess-board style coloring of the board squares. Note that there are 9 light squares in shapes A,B,C,D,E together, but 10 light squares in building squares

