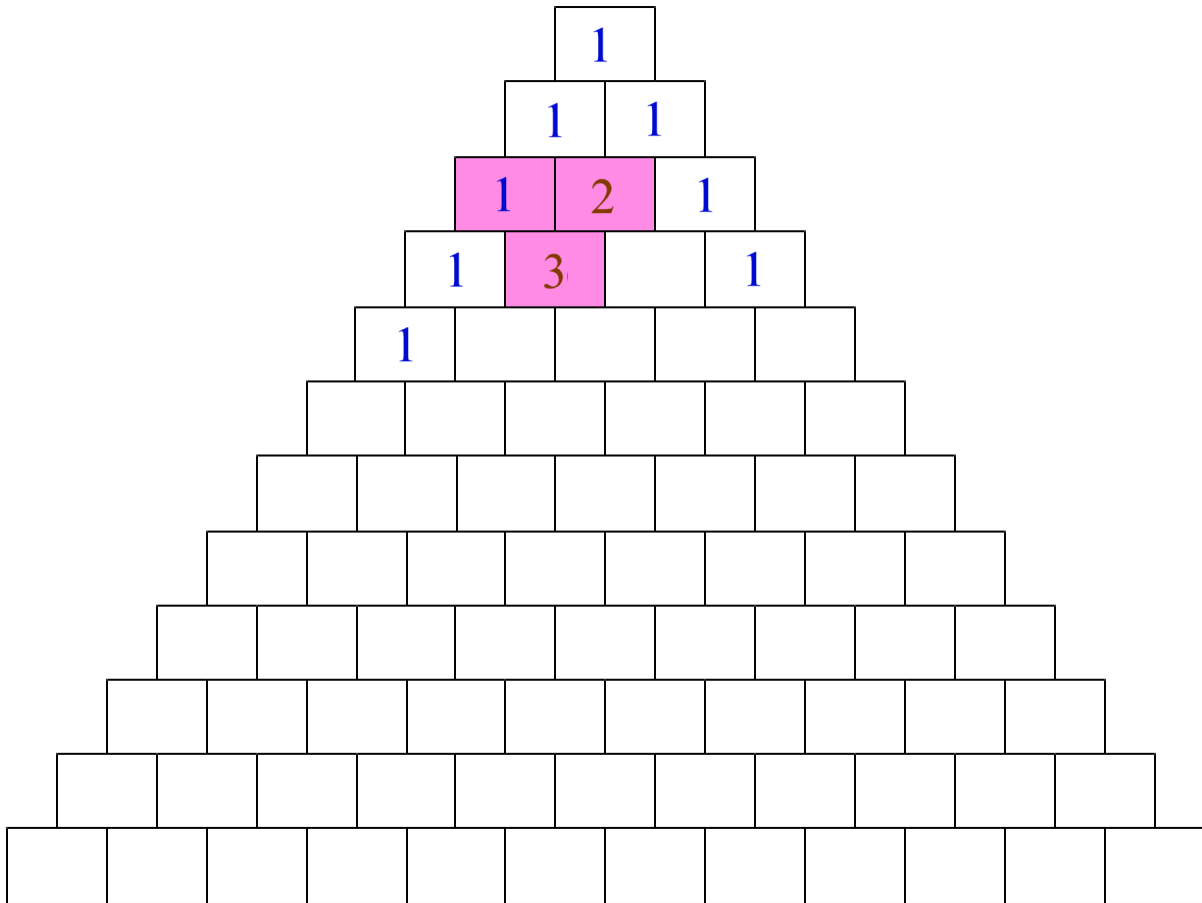# Patterns in Pascal's Triangle

1. This is **Pascal's triangle** but you need to fill it in. Down the left and right sides, the blocks will have number 1's. Then, to fill in the other space, *add* the two numbers right above it (slightly to the right and to the left). For example, the colored number 3 comes from adding the 1 and 2 above it.

2. After filling in the triangle, add the numbers in each row and make a list.

The sum of row 1: ____1____

The sum of row 2: ____2____

The sum of row 3: ____4____

The sum of row 4: _____

The sum of row 5: _____

The sum of row 6: _____

The sum of row 7: _____

The sum of row 8: _____

The sum of row 9: _____
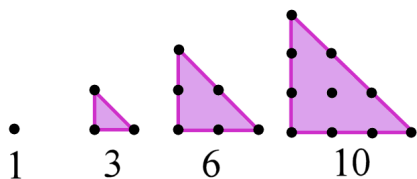
The sum of row 10: _____

The sum of row 11: _____

The sum of row 12: _____

What do you notice about the row sums?

3. Can you find a *diagonal* with the numbers 1, 2, 3, 4, 5, 6, 7?
   (A diagonal is a line from corner to corner in a shape, such as in a square.)

4. *Triangular numbers* start like this:

1   3   6   10

   a. Continue the pattern of triangular numbers.

   b. Find a diagonal with triangular numbers in Pascal's triangle.

   c. Can you find something special about the triangular numbers?
       (Hint: it has to do with how much each number differs from the previous.)

5. Below you will find an empty Pascal's triangle to explore with. You can fill it with some other number
   on all the sides, such as 2, 3, or 20.
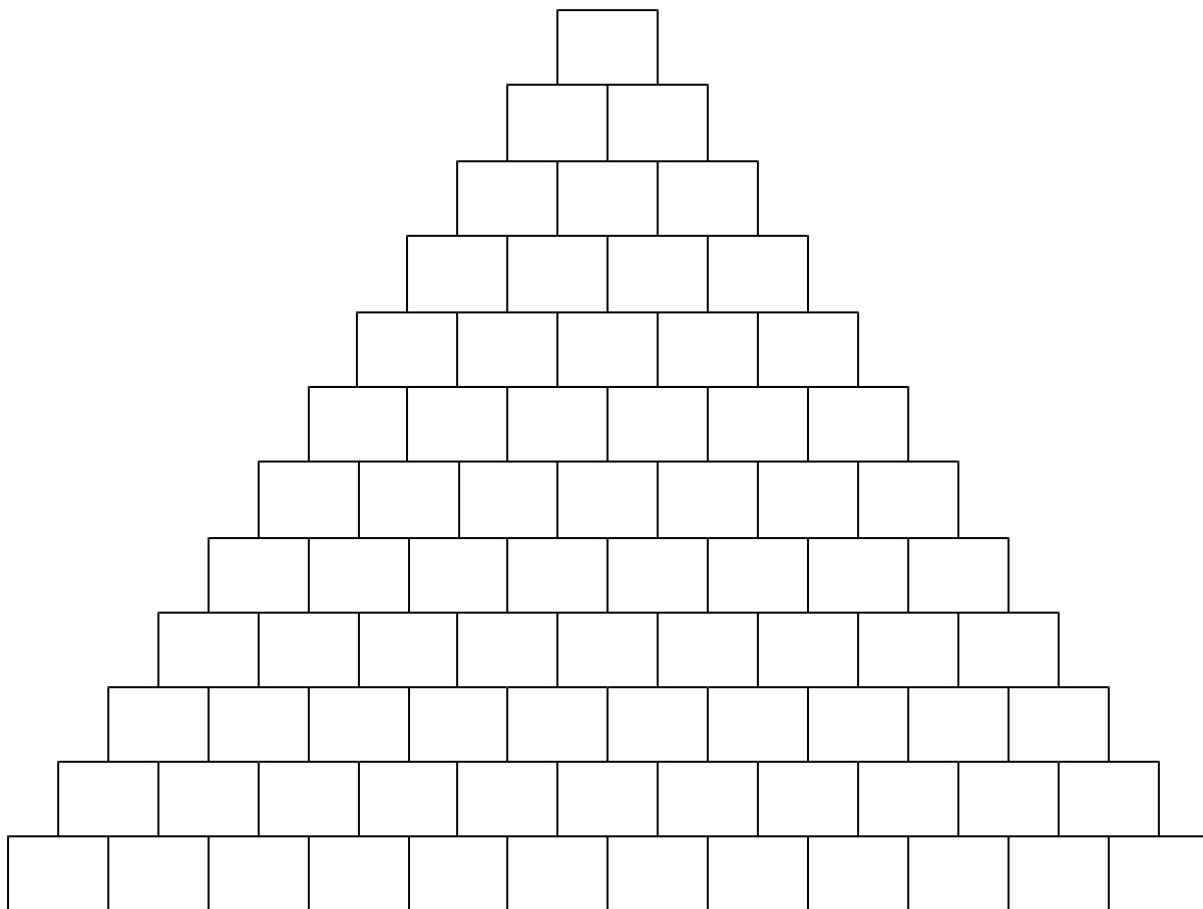
   Read more about Pascal's triangle and its patterns at **http://ptri1.tripod.com/**