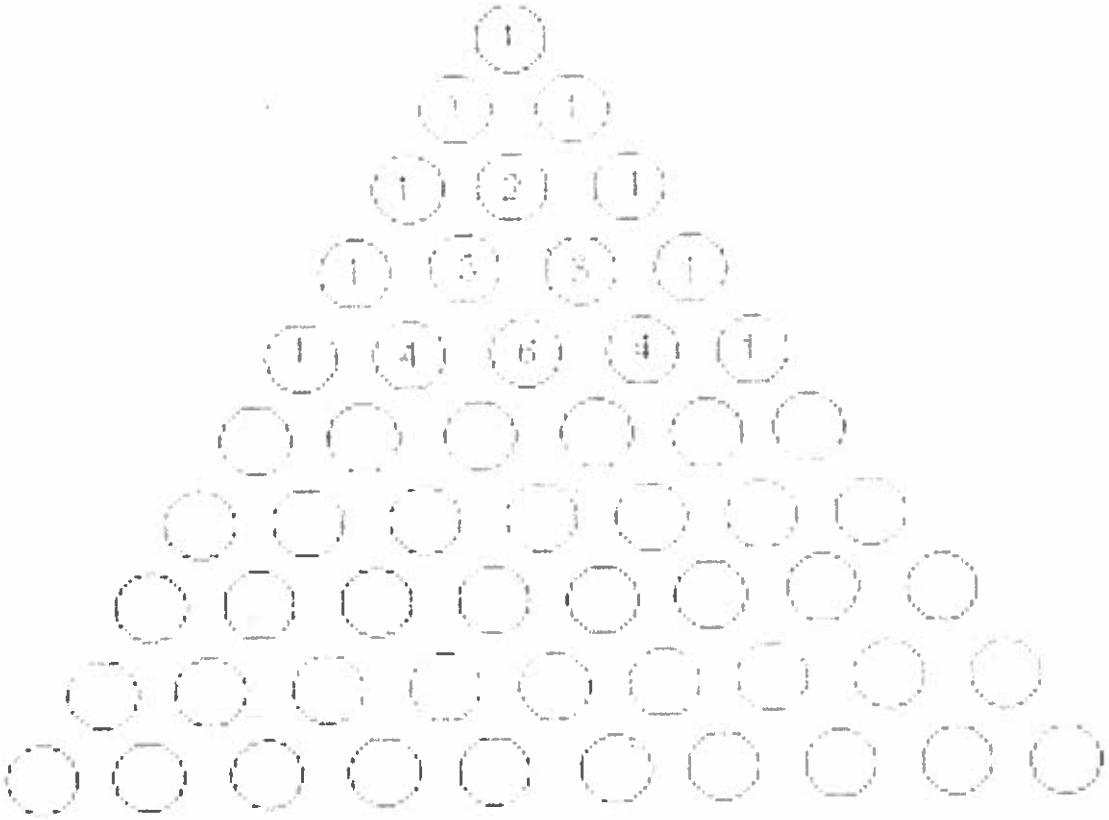
STATISTICS 12

PASCAL'S TRIANGLE

1. Complete the triangle:



Check the following properties of the Pascal's Triangle:

1. The sums of the rows:

The sum of the numbers in any row is equal to 2 to the n^{th} power or 2^n, when n is the number of the row. For example:

$2^0 = 1$
$2^1 = 1+1 = 2$
$2^2 = 1+2+1 = 4$
$2^3 = 1+3+3+1 = 8$
$2^4 = 1+4+6+4+1 = 16$

2. Prime Numbers:

If the 1st element in a row is a prime number (remember, the 0th element of every row is 1), all the numbers in that row (excluding the 1's) are divisible by it. For example, in row 7 (1 7 21 35 35 21 7 1) 7, 21, and 35 are all divisible by 7.

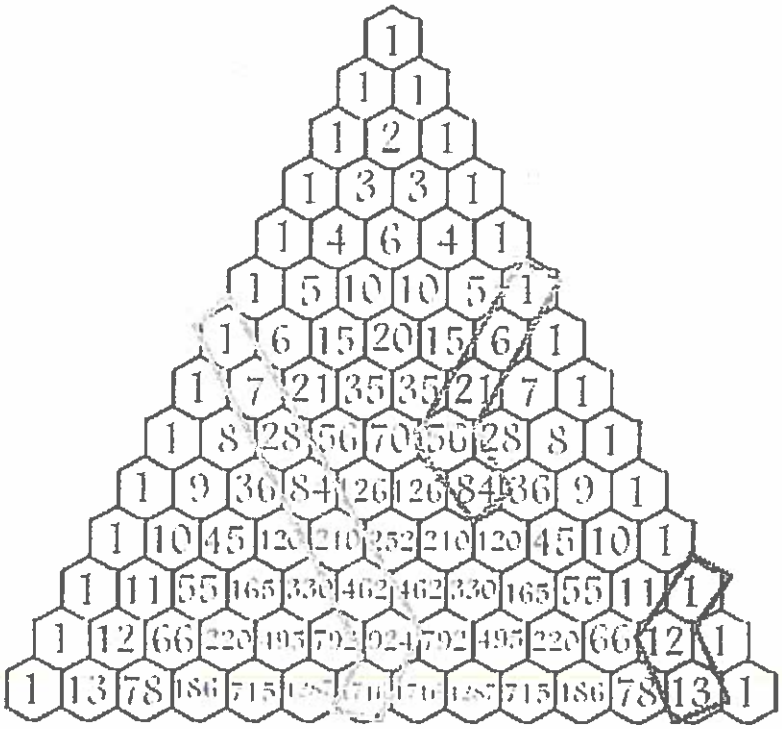
3.Hocky Stick Pattern

If a diagonal of numbers of any length is selected starting at any of the 1's bordering the sides of the triangle and ending on any number inside the triangle on that diagonal, the sum of the numbers inside the selection is equal to the number below the end of the selection that is not on the same diagonal itself..

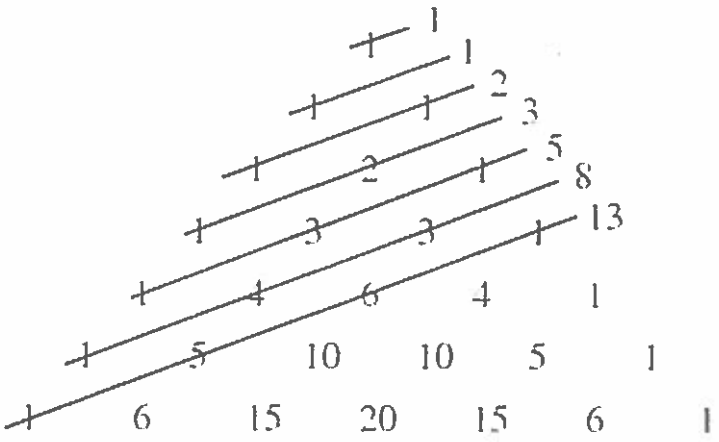
1+6+21+56 = 84

1+7+28+84+210+462+924 = 1716

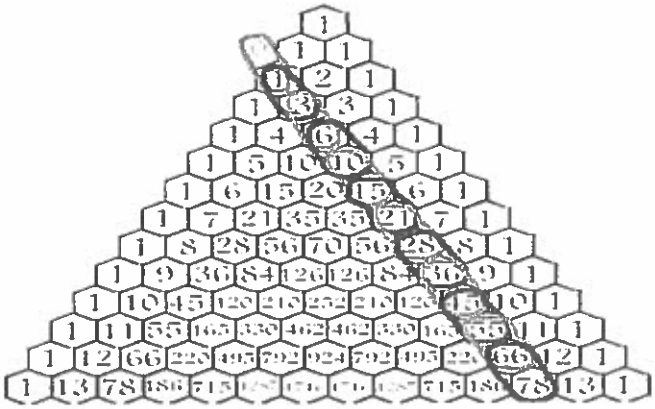
1+12 = 13



4. Fibonnacci Sequence

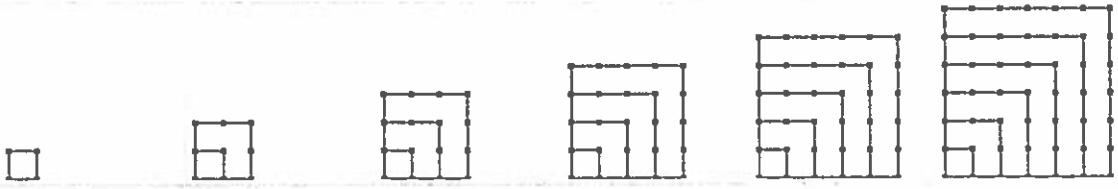


5. Square numbers

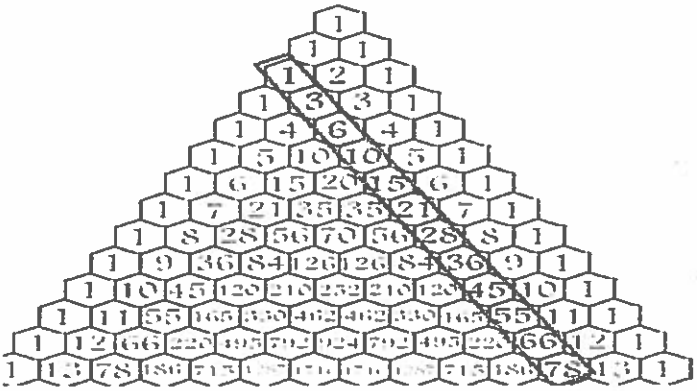


Square Numbers are another type of polygonal numbers. They are found in the same diagonal as the triangular numbers. A Square Number is the sum of the two numbers in any circled area in the diagram. (The colors are different only to distinguish between the separate "rubber bands"). The n^{th} square number is equal to the n^{th} triangular number plus the $(n-1)^{th}$ triangular number. (Remember, any number outside the triangle is 0). The interesting thing about these 4-sided polygonal numbers is that their name explains them perfectly. The very first square number is 0^2. The second is 1^2, the third is 2^2 (4), the fourth is 3^2 (9), and so on.

Square numbers

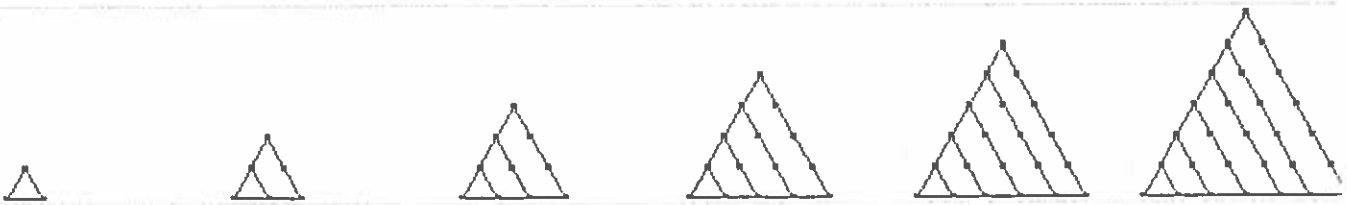


6. Triangular Numbers



riangular Numbers are just one type of polygonal numbers.. The triangular numbers can be found in the diagonal starting a w 3 as shown in the diagram. The first triangular number is 1, the second is 3, the third is 6, the fourth is 10, and so on.

Triangular numbers



Resources: http://ptri1.tripod.com/