2/28/08

Special Numbers

Since ancient times people have been studying certain sets of numbers and learning about them. We study them too! For this POW, choose one set of numbers and try to learn a lot about them. Write up what you know and prepare to make a little presentation to your POW class. If you get information from a book or website, cite your source, and be sure to restate the information in your own words. With each set of numbers we've listed a couple of hints of things you might want to consider.

Here's a vocabulary reminder: A recursive rule helps you go from one term of a sequence to the next. For example, to find the next even number, add two. So the next even number after 10 is 12. An explicit rule helps you find the nth term. For example, to find the nth even number, multiply n by two. So the 10th even number is 20.

With some of these sets of numbers you can find a connection to Pascal's Triangle. You might want to include that in your report.

Have fun!

1) Triangular Numbers

1, 3, 6, 10....

Recursive rule, explicit rule, Gauss story, sides and diagonals in polygons, handshake problems...

2) Square Numbers

1, 4, 9, 16...

Recursive rule, explicit rule, Pythagorean Theorem, Pythagorean triples, Four Square Theorem, Galileo and gravity...

3) Prime Numbers

2, 3, 5, 7, 11...

Is there a rule? Testing if a number is prime. Prime factorization. Proof that the set is infinite. Goldbach Conjecture. Public Key Cryptography...

4) Powers of Two

1, 2, 4, 8, 16...

Exponential growth, bits and bytes, flipping coins, counting subsets....

5) Factorials

1, 2, 6, 24, 120...

Permutations, combinations, binomial coefficients, pizza toppings....

6) Perfect Numbers

6, 28, 496...

Explicit formula, history...