More on algebra

math612.1 612.1 Numbers, arithmetic and algebra

Gunnar Stefansson (editor) with contributions from very many students

September 3, 2018

Some Squares

If a and b are real numbers, then

$$(a + b)^2 = a^2 + 2ab + b^2$$

Pascal's Triangle

Pascal's triangle is a geometric arrangement of the binomial coefficients in a triangle

$$
\begin{array}{ccccc}
 & & 1 & & \\
 & 1 & & 1 & \\
1 & & 2 & & 2
\end{array}
$$

Factorials

We define the factorial of an integer n as
$$n! = n \cdot (n - 1) \cdot (n - 2) \cdot \ldots \cdot 3 \cdot 2 \cdot 1$$

Combinations

The number of different ways one can choose a subset of size x from a set of n elements is determined using the following calculation:

$$\binom{n}{x} = \frac{n!}{x!\,(n-x)!}$$

The binomial theorem

$$(a + b)^n = \sum_{x=0}^{n} \binom{n}{x} a^x b^{n-x}$$