

Point Interpolation

$$A + \alpha(B - A)$$

Herón

$$s = \frac{a+b+c}{2}$$

$$A = \sqrt{s(s-a)}\sqrt{(s-b)(s-c)}$$

Ley de Coseno

$$c^2 = a^2 + b^2 - 2ab \cos(\theta)$$

Ley de Seno

$$\frac{\sin(\alpha)}{a} = \frac{\sin(\beta)}{b} = \frac{\sin(\gamma)}{c}$$

Pitagoras

$$c^2 = a^2 + b^2$$

Serie Geometrica

$$S_n = a_0 \frac{1-r^n}{1-r}$$

Serie Aritmetica

$$S_n = \sum_{k=0}^{n-1} a_i = \frac{n(a_0 + a_{n-1})}{2} = \frac{n(2a_0 + nd - d)}{2}$$

NchooseK

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

NchooseK can repeat indefinitely

$$\binom{n+k-1}{k}$$

NchooseK can repeat indefinitely

$$\frac{N!}{(r_1!)(r_2!) \dots}$$

r_i = Number of times an element repeats

This has to be met: $\sum_i^M r_i = N$

Balle

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

Epsilon

$$a == b \rightarrow \text{abs}(a - b) < \varepsilon$$

$$a <= b \rightarrow a < b + \varepsilon$$

$$a < b \rightarrow a < b - \varepsilon$$

$$a >= b \rightarrow a > b - \varepsilon$$

$$a > b \rightarrow a > b + \varepsilon$$

Expected

$$\sum xP(x)$$

Derangement and Factorial

$$D(0) = 1$$

$$D(1) = 0$$

$$D(n) = (n-1)(D(n-1) + D(n-2))$$

$$F(0) = 1$$

$$F(1) = 1$$

$$F(n) = (n-1)(F(n-1) + F(n-2))$$

Prime Sieve

```
bool B[100000010];
void sieve() {
    int N = 100000010;
    for(int i = 4; i < N; i += 2) B[i] = 1;
    for(int i = 9; i < N; i += 3) B[i] = 1;
    for(int i = 5, j = 2; i*i < N; i += j, j = 6-j) {
        if(B[i]) continue;
        for(int k = i*i; k < N; k += i)
            B[k] = 1;
    }
}
```