

**Задание 1**

а.

$$f(p) = Np(1-p)^{N-1}$$

$$\frac{\partial f}{\partial p} = N((1-p)^{N-1} - p(N-1)(1-p)^{N-2})$$

$$N((1-p)^{N-1} - p(N-1)(1-p)^{N-2}) = 0$$

$$p = \frac{1}{N} \text{ - точка максимума}$$

б.

$$\lim_{N \rightarrow \infty} \frac{N}{N} (1 - \frac{1}{N})^{N-1} = \frac{1}{e}$$