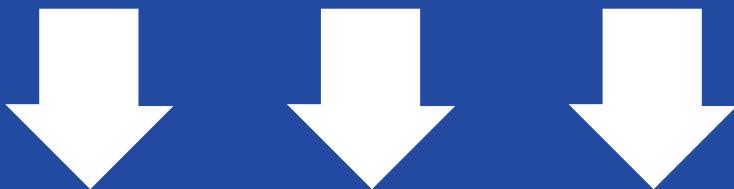


# Maths Complémentaires Terminale

Bernoulli & binomiale



**CORRIGÉ DE L'EXERCICE**

## FACTORIELLE

2

## CORRECTION

**Simplifier les expressions comportant la notion de factorielle:**

On rappelle que pour  $n \geq 0$ :  $n! = n \times (n - 1) \times (n - 2) \times \dots \times 2 \times 1$ .

1. Pour  $n \geq 2$ , on a:

$$A = \frac{n!}{(n-2)!} = \frac{n \times (n-1) \times (n-2)!}{(n-2)!} = n \times (n-1).$$

Ainsi:  $\frac{n!}{(n-2)!} = n \times (n-1)$ .

2. Pour  $n \geq 1$ , on a:

$$B = \frac{(n-1)!}{(n+2)!} = \frac{(n-1)!}{(n+2) \times (n+1) \times n \times (n-1)!} = \frac{1}{(n+2) \times (n+1) \times n}.$$

Ainsi:  $\frac{(n-1)!}{(n+2)!} = \frac{1}{(n+2) \times (n+1) \times n}$ .

3. Pour  $n \geq 1$ , on a:

$$\begin{aligned}
 C &= \frac{n!}{(n+1)!} - \frac{(n-1)!}{n!} = \frac{n!}{(n+1) \times n!} - \frac{(n-1)!}{n \times (n-1)!} \\
 &= \frac{1}{n+1} - \frac{1}{n} \\
 &= \frac{n-(n+1)}{n \times (n+1)} \\
 &= -\frac{1}{n \times (n+1)}.
 \end{aligned}$$

Ainsi:  $\frac{n!}{(n+1)!} - \frac{(n-1)!}{n!} = -\frac{1}{n \times (n+1)}.$