

Devoir de classe Leçon 2 : La Notation Factorielle

1. Simplifie :

$$\begin{aligned} \text{a) } & \frac{(n+3)!}{(n+1)!} \\ & \frac{(n+3)(n+2)(n+1)!}{(n+1)!} \\ & \mathbf{(n+3)(n+2)} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{(n+4)!}{(n+6)!} \\ & \frac{(n+4)!}{(n+6)(n+5)(n+4)!} \\ & \frac{1}{(n+6)(n+5)} \end{aligned}$$

2. Simplifie :
(2 points)

$$\frac{7!(r+1)!}{6!(r-1)!r} = \frac{7 \times 6!(r+1)(r)(r-1)!}{6!(r-1)!r} = 7(r+1) = 7r + 7$$

3. Résous $\frac{14!}{12!} = 14n$
(1 point)

$$\begin{aligned} \frac{14 \times 13 \times 12!}{12!} &= 14n \\ 14 \times 13 &= 14n \\ n &= 1 \end{aligned}$$

4. Résous.
(2 points)

$$\begin{aligned} \frac{n!}{(n-2)!} &= 20 \\ \frac{n(n-1)(n-2)!}{(n-2)!} &= 20 \\ n^2 - n &= 20 \\ n^2 - n - 20 &= 0 \\ (n-5)(n+4) &= 0 \\ n &= 5 \quad n = -4 \end{aligned}$$

5. Résous $\frac{(n+4)!}{(n+2)!} = 6$, quand $n \in \mathbb{Z}$.

(2 points)

$$\frac{n(n-1)(n-2)!}{(n-2)!} = 20$$
$$\frac{(n+4)(n+3)(n+2)!}{(n+2)!} = 6$$
$$n^2 + 7n - 12 = 6$$
$$n^2 + 7n - 18 = 0$$
$$(n-2)(n+9) = 0$$
$$n = 2 \quad n = -9$$