Corrigés — Dénombrement

Chapitre 5

Solution 1.
Arrangements : $A^4_{\{26\}} = 26 \times 25 \times 24 \times 23 = 358800$.

Solution 2.
$A^3_{\{10\}} = 10 \times 9 \times 8 = 720$.

Solution 3.
$A^3_{\{30\}} = 30 \times 29 \times 28 = 24360$.

Solution 4.
$\binom{32}{5} = \frac{32!}{5! \times 27!} = \frac{32 \times 31 \times 30 \times 29 \times 28}{120} = 201376$.

Solution 5.
$(2x-1)^5 = \sum_{k=0}^{5} \binom{5}{k} (2x)^k (-1)^{5-k} = -1 + 5 \times 2x - 10 \times 4x^2 + 10 \times 8x^3 - 5 \times 16x^4 + 32x^5 = 32x^5 - 80x^4 + 80x^3 - 40x^2 + 10x - 1$.

Solution 6.
$2^n = (1+1)^n = \sum_{k=0}^{n} \binom{n}{k} 1^k 1^{n-k} = \sum_{k=0}^{n} \binom{n}{k}$.

Solution 7.
Choisir 2 filles parmi 15 : $\binom{15}{2} = 105$. Choisir 3 garçons parmi 20 : $\binom{20}{3} = 1140$. Total : $105 \times 1140 = 119700$.