Part 1

Exercise 1

Product Rule

$$4 \times 2 \times 3 \times 3 = 72$$

Exercise 2

① 10

990

$\binom{000}{111}{222}{3}$

$10\left(\binom{10}{1} \times 10\right)$

② total $= 10^3$

start odd $= \frac{10^3}{2} = 500$

③ $\binom{9}{1} \times \binom{3}{2}$

4 4 ☐

4 · 4

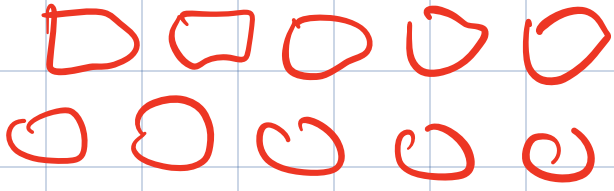
Exercice 3

① $\begin{pmatrix} 10 \\ 4 \end{pmatrix}$

② $\begin{pmatrix} 10 \\ 1 \end{pmatrix} + \begin{pmatrix} 10 \\ 2 \end{pmatrix} + \begin{pmatrix} 10 \\ 3 \end{pmatrix} + \begin{pmatrix} 10 \\ 4 \end{pmatrix}$

③ $- \begin{pmatrix} ② \end{pmatrix}$

④ $\begin{pmatrix} 10 \\ 5 \end{pmatrix}$



Exercice 4

① $\binom{30}{4}$ $28 = (20+8)^2$

=

② $\binom{30}{1} \times \binom{29}{1} \times \binom{28}{1} \times \binom{27}{1}$

Exercice 5

① $8!$

② $\binom{6}{1} \times \binom{2}{1} \times \binom{4}{1} \times \binom{3}{1} \times \binom{2}{1}$

$+ \binom{2}{1} \times \binom{4}{1} \times \binom{3}{1} \times \binom{2}{1}$

5!×2

$(2!) \times 7 \times 6!$

AB

$2 \times 7!$

③ 4 couples avec l'homme à droite

$(A_1 A_2 A_3 A_4) \times (W_1 W_2 W_3 W_4)$

$\frac{16}{2}$ couples ordonnés

$(2 \times 8) \times 7!$

$A_1 B_1 \quad A_1 B_2$

$A_2 B_1 \quad A_1 B_2$

$$\frac{8 \times 4 \times 3 \times 3 \times 2 \times 2 \times 1 \times 1}{2 \times 4! \times 4!} = 8 \times 4 \times 4$$

$$= 16 \times 8 \times 9$$

(ii)

$$= 64 \times 2 \times 9$$

$$= (640 - 64) \times 2$$

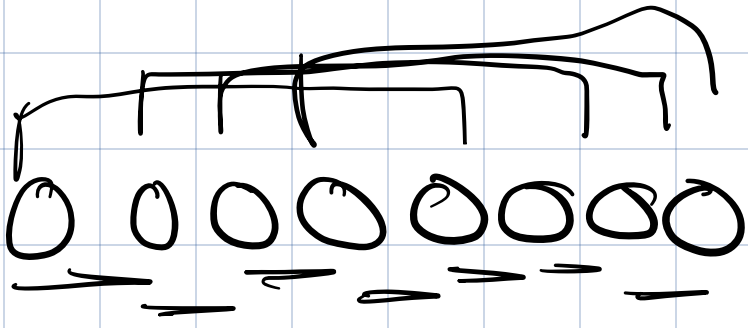
$$= 1280 - 128$$

$$= 1152$$

(1) (2) (3)

H F

$4 \times (3!) \times (3!)$



(3) $(2!) \times 4 \times (2!) \times 3$

$\times (2!) \times 2 \times (2!) \times 1$

$4! \times 2^4$

Exercice 6

$x_1 + x_2 + x_3 \leq 8$

$$x_1 + x_2 + x_3 + x_4 = 8$$

$$\begin{array}{cccc} 0 & 1 & 2 & 5 \\ 0 & 1 & 1 & 6 \\ 0 & 0 & 0 & 8 \end{array} \qquad \begin{pmatrix} - & - & 1 \\ & & \\ & 8 & \end{pmatrix}$$

$r = 4$

$n = 8$

$$= \begin{pmatrix} 12 \\ 4 \end{pmatrix}$$

$$=$$