Combinatoire

Exercice 1.

a) $\bar{P}_8(2;3;2) = \dfrac{8!}{2! \cdot 3! \cdot 2!} = \boxed{1\ 680}$

b) $\bar{P}_7(2;2;2) + \bar{P}_7(2;3) + \bar{P}_7(2;3;2) =$

$630 + 420 + 210 = \boxed{1\ 260}$

c) $\bar{P}_6(2;2) = \dfrac{6!}{2! \cdot 2!} = \boxed{180}$

$\bar{P}_8(4;2) = \dfrac{8!}{4! \cdot 2!} = \boxed{840}$

$\bar{P}_7(4;2) + \bar{P}_7(3;2) + \bar{P}_7(4) =$

$105 + 420 + 210 = \boxed{735}$

$\bar{P}_5(2) = \dfrac{5!}{2!} = \boxed{60}$

Exercice 2.

a) $\bar{A}_5^8 = 8^5 = \boxed{32\ 768}$

b) $A_5^8 = \dfrac{8!}{3!} = \boxed{6\ 720}$

c) $8 \cdot \bar{A}_4^7 = 8 \cdot 7^4 = \boxed{19\ 208}$

d) $C_4^8 \cdot C_1^4 \cdot \bar{P}_5(2) = 70 \cdot 4 \cdot 60 = \boxed{16\ 800}$

$\bar{A}_6^9 = 9^6 = \boxed{531\ 441}$

$A_6^9 = \dfrac{9!}{3!} = \boxed{60\ 480}$

$9 \cdot \bar{A}_5^8 = 9 \cdot 8^5 = \boxed{294\ 912}$

$C_5^9 \cdot C_1^5 \cdot \bar{P}_6(2) = 126 \cdot 5 \cdot 360 = \boxed{226\ 800}$

Exercice 3.

a) $C_5^{30} = \boxed{142\ 506}$

b) $C_2^{10} \cdot C_3^{20} = \boxed{51\ 300}$

c) $C_5^{30} - C_5^{20} = \boxed{127\ 002}$

$C_4^{28} = \boxed{20\ 475}$

$C_2^7 \cdot C_2^{21} = \boxed{4\ 410}$

$C_4^{28} - C_4^{21} = \boxed{14\ 490}$

Exercice 4.

a) $C_5^{28} = \boxed{98\ 280}$

b) $C_5^{28} - C_5^{23} = \boxed{64\ 631}$

$C_6^{32} = \boxed{906\ 192}$

$C_6^{32} - C_6^{26} = \boxed{675\ 962}$