1) Tot = 200   Pol = 150   Bio = 50

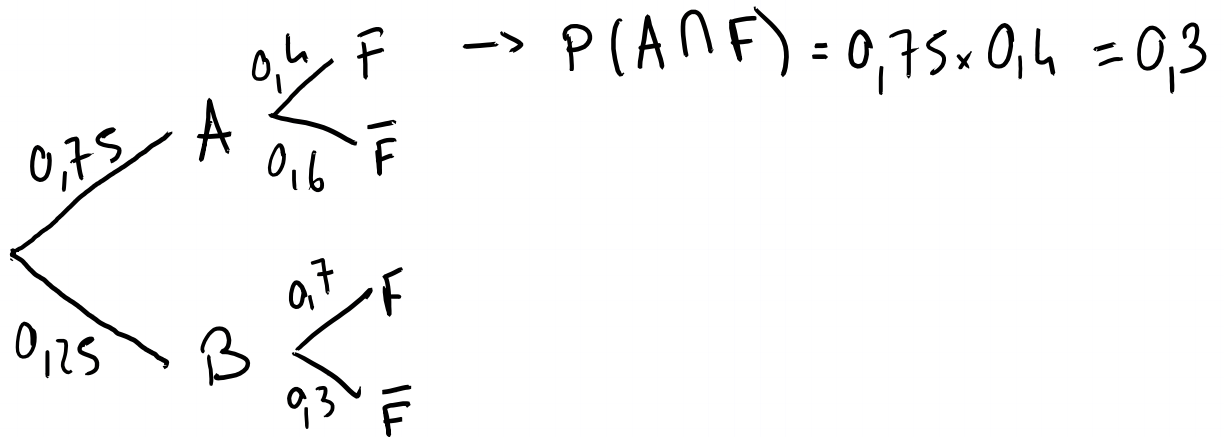$$\downarrow \qquad\qquad \downarrow$$
$$A \qquad\qquad B$$

$$P(A) = \frac{130}{200} = \frac{15}{20} = 0{,}75$$

$$P(B) = \frac{50}{200} = \frac{5}{20} = 0{,}25$$

$$P_A(f) = 0{,}4 \qquad\qquad P_B(F) = 0{,}7$$

$$A \underset{0{,}6}{\overset{0{,}4}{<}} \begin{matrix} F \\ \bar{F} \end{matrix} \quad \rightarrow P(A \cap F) = 0{,}75 \times 0{,}4 = 0{,}3$$

0,75 ← A

0,25 → B

$$B \underset{0{,}3}{\overset{0{,}7}{<}} \begin{matrix} F \\ \bar{F} \end{matrix}$$

2) A et B sont indépendants si $p(A \cap B) = p(A) \times p(B)$

$$p(A \cup B) = p(A) + p(B) - p(A \cap B)$$

$$p(A \cap B) = p(A) + p(B) - p(A \cup B)$$

$$= 0{,}4 + 0{,}5 - 0{,}7 = 0{,}2$$

$$P(A) \times p(B) = 0{,}4 \times 0{,}5 = 0{,}2 \quad \Rightarrow \underline{Oui}$$

3) $P_F(A) = \dfrac{P(F \cap A)}{P(F)}$

$P(F) = 0{,}3 + 0{,}25 \times 0{,}7 = 0{,}475$

$P_F(A) = \dfrac{0{,}3}{0{,}475} = 0{,}63157\ldots = \dfrac{12}{19}$

4) $P_S(T) = \dfrac{1}{2}$ $\qquad P_{\bar{S}}(T) = \dfrac{1}{5}$

5) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cap B) = \dfrac{1}{3} \times \dfrac{2}{5} = \dfrac{2}{15}$

$P(\bar{A}) \times P_{\bar{A}}(B) = P(\bar{A} \cap B) = \dfrac{1}{2}$

$P(B) = P(A \cap B) + P(\bar{A} \cap B) = \dfrac{2}{15} + \dfrac{1}{2} = \dfrac{4+15}{30} = \dfrac{19}{30}$

$P(A \cup B) = \dfrac{1}{3} + \dfrac{19}{30} - \dfrac{2}{15} = \dfrac{10+19-4}{30} = \dfrac{25}{30} = \dfrac{5}{6}$

6) $2 \to B \quad 4 \to R$
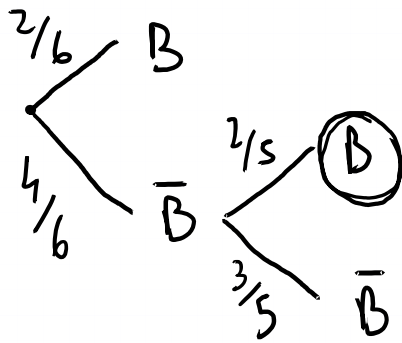
$$
\begin{array}{l}
\overset{2/6}{\diagup} B \\
\underset{4/6}{\diagdown} \bar{B} \overset{2/5}{\underset{3/5}{\diagup \bigcirc B \atop \diagdown \bar{B}}}
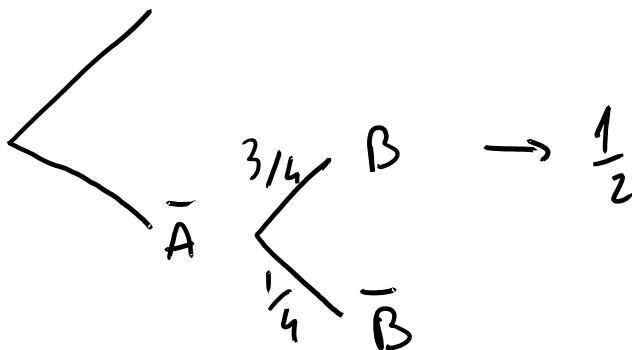\end{array}
\qquad
\frac{4}{6} \times \frac{2}{5} = \frac{8}{30} = \frac{4}{15}
$$

7) $P(A) = \dfrac{150}{200} = 0,75$

8) $P_A(F) = 0,4$

9) À vérifier

10)

$$
\begin{array}{l}
\diagup \\
\diagdown \underset{\bar{A}}{} \overset{3/4}{\underset{1/4}{\diagup B \to \frac{1}{2} \atop \diagdown \bar{B}}}
\end{array}
$$

$$
P(\bar{A}) \times P_{\bar{A}}(B) = \frac{1}{2} \implies P_{\bar{A}}(B) = \frac{\frac{1}{2}}{\frac{2}{3}} = \frac{1}{2} \cdot \frac{3}{2} = \frac{3}{4}
$$

$$
P(\bar{A} \cap \bar{B}) = \frac{2}{3} \times \frac{1}{4} = \frac{2}{12} = \frac{1}{6}
$$

11)

$$\Omega \longrightarrow \mathbb{R}$$

$$\begin{pmatrix} w_1 \\ w_2 \\ w_2 \\ \vdots \end{pmatrix} \quad X \quad \begin{pmatrix} \\ \\ \end{pmatrix}$$

12) $\quad \Omega = \{x_1, \dots, x_k\} \Rightarrow \sum_{i=1}^{k} p(X = x_i) = 1$

$\vdots$

13) $\quad 10 \times \dfrac{1}{6} = \dfrac{5}{3}$
$\qquad\qquad\qquad\qquad\qquad P = \dfrac{1}{6} \qquad q = \dfrac{5}{6}$
$\qquad\qquad\qquad\qquad\qquad E(X) = np$

22) $\quad n = 9 \qquad p = 0{,}2$

$\qquad E(X) = 9 \times 0{,}2 \qquad\qquad \sigma(X) = \sqrt{9 \times 0{,}2 \, (1 - 0{,}2)}$
$\qquad\qquad\quad np \qquad\qquad\qquad\qquad\qquad \sqrt{np(1-p)}$

23) $\quad V(X) = np(1-p) = 6 \times \dfrac{2}{5} \times \dfrac{3}{5} = \dfrac{36}{25}$