1. De princípio, definimos:

   - H: HIV positivo
   - $\overline{H}$: HIV negativo
   - T: teste indica HIV positivo
   - $\overline{T}$: teste indica HIV positivo

   Pelo enunciado, temos:

$$
\begin{aligned}
&p(H) = 0.08 \\
&p(\overline{H}) = 1 - p(H) = 1 - 0.08 = 0.92 \\
&p(T|H) = 0.98 \\
&p(\overline{T}|H) = 1 - p(T|H) = 0.02 \\
&p(T|\overline{H}) = 0.03 \\
&p(\overline{T}|\overline{H}) = 1 - p(T|\overline{H}) = 0.97
\end{aligned}
$$

   (a) Utilizando o Teorema de Bayes.

$$
\begin{aligned}
&p(H|T) = \tfrac{p(T|H)p(H)}{p(T|H)p(H)+p(T|\overline{H})p(\overline{H})} \\
&= \tfrac{0.98 \cdot 0.08}{0.98 \cdot 0.08 + 0.03 \cdot 0.92} \approx 0.739
\end{aligned}
$$

   (b)

$$p(\overline{H}|T) = 1 - p(H|T) \approx 1 - 0.739 = 0.261$$

   (c) Utilizando o Teorema de Bayes.

$$
\begin{aligned}
&p(H|\overline{T}) = \tfrac{p(\overline{T}|H)p(H)}{p(\overline{T}|H)p(H)+p(\overline{T}|\overline{H})p(\overline{H})} \\
&= \tfrac{0.02 \cdot 0.08}{0.02 \cdot 0.08 + 0.97 \cdot 0.92} \approx 0.002
\end{aligned}
$$

   (d)

$$p(\overline{H}|\overline{T}) = 1 - p(H|\overline{T}) \approx 1 - 0.002 = 0.998$$