\[ P(A) = 0.01 \]

We want to know the probability that the person is HIV+ given that the ELISA test says they are HIV+. To do this, we need to understand the prevalence of HIV in the population. Let's say the prevalence is close to 1 (highly likely). We are given that the sensitivity of the test is 0.95, which means it will correctly identify 95% of the HIV+ cases.
3 ways to compute $P(A | +)$ from the 2x2 numerical facts:

1. $P(\text{+} | \text{HIV+})$ really is $\text{HIV+}$
2. $P(\text{+} | 1 \text{not HIV+})$ close to 1

$P(A | +) = \frac{95}{293} = 0.32$ (\text{driven by presence})

$P(\text{really HIV+} \mid \text{ELISA +}) = 0.32$ (\text{demible})
The ELISA test is performed on the patient's sample. The test shows a positive result, indicating the presence of antibodies.

The true positive is noted by A, and the false positive errors are marked. The true negative is indicated by not A.

The equation is given as:

\[ P(\text{false } +) = P(\text{not } A | +) = \frac{198}{293} \]

\[ P(\text{false } -) = P( A | - ) = \frac{5}{9707} \approx 0.05\% \]
Bayes's Theorem

\[ P(A | +) = \frac{P(A) \cdot P(+ | A)}{P(+)} \]

Bayes's Theorem in odds form

\[ \frac{P(A | +)}{P(\text{not } A | +)} = \frac{P(A)}{P(\text{not } A)} \frac{P(+ | A)}{P(+ | \text{not } A)} \]
\[
\frac{P(A \cap +)}{P(\text{not } A \mid +)} = \frac{P(A)}{P(\text{not } A)} \cdot \frac{P(+ \mid A)}{P(+ \mid \text{not } A)}
\]

Posterior odds ratio in favor of A given +

Prior odds ratio in favor of A being true

Bayes factor or likelihood ratio in favor of A given +

\[
\left( \frac{.01}{.99} \right) \cdot \frac{.85}{1 - .98}
\]

95 to 1 odds ratio against true HIV +

47.5 to 1 odds ratio in favor of true HIV +