Homework 1

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1 Exercise 1

The hypotheses are the events D to have the disease and the events N of not having the disease
Given: P(D)=0.05 ; P(N)=0.95
The hypotheses: the events the test being positive (+) or negative (-)
Given:

$$P(+ \mid D) = 0.98; P(+ \mid N) = 0.03$$

The probability that someone testing positive for Hansen's disease under this new test actually has it:

$$\mathrm{P}(\mathrm{D} \mid +) = \frac{\mathrm{P}(+ \mid \mathrm{D}) \times \mathrm{P}(\mathrm{D})}{\mathrm{P}(+ \mid \mathrm{D}) \times \mathrm{P}(\mathrm{D}) + \mathrm{P}(+ \mid N) \times \mathrm{P}(N)} \tag{1}$$

$$\mathrm{P}(\mathrm{D} \mid +) = \frac{0.98 \times 0.05}{0.98 \times 0.05 + 0.03 \times 0.95} \approx 0.632 \tag{2}$$