BAYES THEOREM.

Suppose there is a certain type of cancer which exists in the general population (the “prior”) as
\[ P(C) = 0.01 \]

Fill in:
\[ P(\neg C) = \]

There is a test for the cancer which is 90% accurate; that is:
\[ P( + | C) = 0.9 \]

Fill in the probability of a false negative; i.e.:
\[ P( - | C) = \]

The test sometimes gives a false positive:
\[ P( + | \neg C) = 0.2 \]

Then the probability of a correct negative is:
\[ P( - | \neg C) = 0.8 \]

Rewrite the mathematical sentence above in plain English:

Fill in the joint probabilities. This is not Bayes’ Law; it’s using the independence rule:
\[ X \perp Y : P(X)P(Y) = P(X,Y) \]

\[ P( +, C) = \] independent probability of positive result and having cancer

\[ P( -, C) = \] i.e., \( P( - | C) * P(C) \)

\[ P( +, \neg C) = \] etc.

\[ P( -, \neg C) = \]
Graphically draw this scenario using the area method presented in class.

Using Bayes’ Law, calculate the likelihood that a given individual has cancer after receiving a single positive test. In other words, calculate:

\[ P(C | +) = \]