1. A spam filter is designed by looking at commonly occurring phrases in spam. Suppose that 80% of email is spam. In 10% of the spam emails, the phrase “free money” is used, whereas this phrase is only used in 1% of non-spam emails. A new email has just arrived, which does mention “free money”. What is the probability that it is spam?

**Answer:**

X= email which is spam

Y= email with free memory space

P(X/Y) = P(Y/X) \* P(X)/P(Y)

=0.1/0.8/ (0.1\*0.8) + (0.01\*0.2)

  = 80/82

=0.9756