A: The email is spam.

B: The email mentions "free money".

We are given the following probabilities:

P(A) = 0.8 (probability of an email being spam)

P(B|A) = 0.1 (probability of the phrase "free money" being used in a spam email)

P(B|A') = 0.01 (probability of the phrase "free money" being used in a non-spam email)

We want to find P(A|B), the probability that the email is spam given that it mentions "free money."

By Bayes' theorem, we have:

P(A|B) = (P(B|A) \* P(A)) / P(B)

To find P(B), we can use the law of total probability:

P(B) = P(B|A) \* P(A) + P(B|A') \* P(A')

We know that P(A') = 1 - P(A) since A and A' are complementary events. Therefore:

P(B) = P(B|A) \* P(A) + P(B|A') \* (1 - P(A))

Substituting the given values:

P(B) = (0.1 \* 0.8) + (0.01 \* 0.2) = 0.08 + 0.002 = 0.082

Now, we can substitute the values into Bayes' theorem:

P(A|B) = (0.1 \* 0.8) / 0.082 = 0.08 / 0.082 ≈ 0.9756

Therefore, the probability that the email is spam, given that it mentions "free money," is approximately 0.9756 or 97.56%.