Probability Review

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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.

1. What is the probability an email contains the phrase "free money" and is spam?

2. Write the event that an email contains the phrase "free money" as the union of disjoint events.

3. What is the probability that an email contains the phrase "free money?"

4. A new email has just arrived, which does mention "free money." What is the probability that it is spam?