

**Question 1:**

There are 1000 people in a population. 100 of these people have a disease and 900 do not have the disease.

A test for the disease is available.

If a person has the disease, the test yields a positive result with 90% probability.

If a person does not have the disease, the test yields a negative result with 90% probability.

- a) Suppose Sarah tested negative. What is the probability that she is actually free of the disease?
- b) Suppose Tom tested positive. What is the probability that she actually has the disease?

**Question 2:**

It is known that a disease affects about 10% of a population.

A test for the disease is available.

If a person has the disease, the test yields a positive result with 90% probability.

If a person does not have the disease, the test yields a negative result with 90% probability.

- a) Suppose Sarah tested negative. What is the probability that she is actually free of the disease?
- b) Suppose Tom tested positive. What is the probability that she actually has the disease?