3. A company maintains machines.
It has two types of contract, a service contract and a repair contract.
The company classes its customers as new customers or existing customers.
The table gives information about the company's customers.

	Service contract	Repair contract
New customer	65	82
Existing customer	231	262

The company is going to survey its customers. It plans to take a sample of 100 of its customers, stratified by customer type and contract type.

(a) Work out how many new customers with repair contracts should be sampled.

(2)

The company has developed a test for a certain fault in the machines it services.
The test sometimes gives incorrect results.

The company collects information from a sample of randomly selected machines.

- 2% of the machines have the fault
- 70% of the machines with the fault test positive for the fault
- 10% of the machines without the fault test positive for the fault.

A machine is selected at random from the sample of the machines, and tests positive for the fault.

(b) (i) Calculate the probability that the machine has the fault.

(4)

   (ii) Comment on the usefulness of the company's test.
        Give a reason for your answer.

(1)

When the company services the machines, it checks two components, α and β, for wear and tear and replaces these if needed.

   Event A is that component α needs to be replaced.

   Event B is that component β needs to be replaced.

The probability that component α needs to be replaced is 0.35
The probability that component β needs to be replaced is 0.55
The probability that neither component needs to be replaced is 0.28

(c) Show that events A and B are not independent.

(2)

(d) Find the probability that component α or component β needs to be replaced, but not both.

(2)