

## **STEP II, 1998, Q12**

- 12 The diagnostic test AL has a probability 0.9 of giving a positive result when applied to a person suffering from the rare disease mathematitis. It also has a probability  $1/11$  of giving a false positive result when applied to a non-sufferer. It is known that only 1% of the population suffer from the disease. Given that the test AL is positive when applied to Frankie, who is chosen at random from the population, what is the probability that Frankie is a sufferer?

In an attempt to identify sufferers more accurately, a second diagnostic test STEP is given to those for whom the test AL gave a positive result. The probability of STEP giving a positive result on a sufferer is 0.9, and the probability that it gives a false positive result on a non-sufferer is  $p$ . Half of those for whom AL was positive and on whom STEP then also gives a positive result are sufferers. Find  $p$ .



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