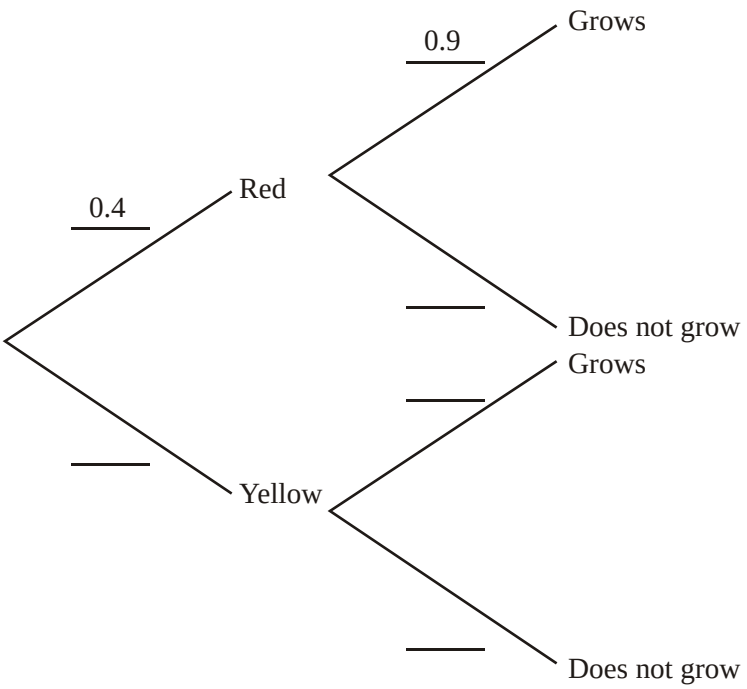
Standard Level

1. A packet of seeds contains 40% red seeds and 60% yellow seeds. The probability that a red seed grows is 0.9, and that a yellow seed grows is 0.8. A seed is chosen at random from the packet.

(a) Complete the probability tree diagram below.



(3)

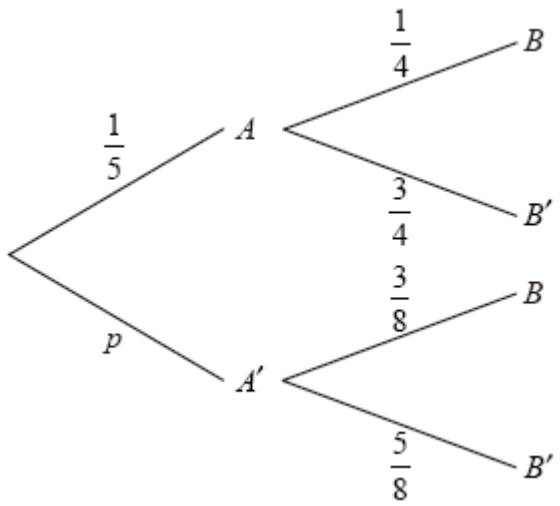
(b) (i) Calculate the probability that the chosen seed is red and grows.

(ii) Calculate the probability that the chosen seed grows.

(iii) Given that the seed grows, calculate the probability that it is red.

(7)
(Total 10 marks)

2. The diagram below shows the probabilities for events A and B, with $P(A') = p$.



(a) Write down the value of p.

(1)

(b) Find $P(B)$.

(3)

(c) Find $P(A' \mid B)$.

(3)
(Total 7 marks)

3. In any given season, a soccer team plays 65 % of their games at home.
When the team plays at home, they win 83 % of their games.
When they play away from home, they win 26 % of their games.

The team plays one game.

(a) Find the probability that the team wins the game.

(4)

(b) If the team does not win the game, find the probability that the game was played at home.

(4)
(Total 8 marks)

Higher Level (but still very easy)

1. In a class of 20 students, 12 study Biology, 15 study History and 2 students study neither Biology nor History.

(a) Illustrate this information on a Venn diagram.

(2)

(b) Find the probability that a randomly selected student from this class is studying both Biology and History.

(1)

(c) Given that a randomly selected student studies Biology, find the probability that this student also studies History.

(1)
(Total 4 marks)

2. An influenza virus is spreading through a city. A vaccination is available to protect against the virus. If a person has had the vaccination, the probability of catching the virus is 0.1; without the vaccination, the probability is 0.3. The probability of a randomly selected person catching the virus is 0.22.

(a) Find the percentage of the population that has been vaccinated.

(3)

(b) A randomly chosen person catches the virus. Find the probability that this person has been vaccinated.

(2)
(Total 5 marks)

3. In a population of rabbits, 1 % are known to have a particular disease. A test is developed for the disease that gives a positive result for a rabbit that **does** have the disease in 99 % of cases. It is also known that the test gives a positive result for a rabbit that **does not** have the disease in 0.1 % of cases. A rabbit is chosen at random from the population.

(a) Find the probability that the rabbit tests positive for the disease.

(2)

(b) Given that the rabbit tests positive for the disease, show that the probability that the rabbit does not have the disease is less than 10 %.

(3)

(Total 5 marks)

4. Two players, A and B, alternately throw a fair six–sided dice, with A starting, until one of them obtains a six. Find the probability that A obtains the first six.

(Total 7 marks)