1. 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)

2. In a class of 100 boys, 55 boys play football and 75 boys play rugby. Each boy must play at least one sport from football and rugby.

    (a)   (i)   Find the number of boys who play both sports.

          (ii)   Write down the number of boys who play only rugby.

    (3)

    (b)   One boy is selected at random.

          (i)   Find the probability that he plays only one sport.

          (ii)   Given that the boy selected plays only one sport, find the probability that he plays rugby.

    (4)

    Let A be the event that a boy plays football and B be the event that a boy plays rugby.

    (c)   Explain why A and B are **not** mutually exclusive.

    (2)

    (d)   Show that A and B are **not** independent.

    (3)
    (Total 12 marks)

3. There are 20 students in a classroom. Each student plays only one sport. The table below gives their sport and gender.

|	Football	Tennis	Hockey
Female	5	3	3
Male	4	2	3

(a) One student is selected at random.

    (i) Calculate the probability that the student is a male or is a tennis player.

    (ii) Given that the student selected is female, calculate the probability that the student does not play football.

(4)

(b) Two students are selected at random. Calculate the probability that neither student plays football.

(3)
(Total 7 marks)

4. In a group of 16 students, 12 take art and 8 take music. One student takes neither art nor music. The Venn diagram below shows the events art and music. The values p, q, r and s represent numbers of students.
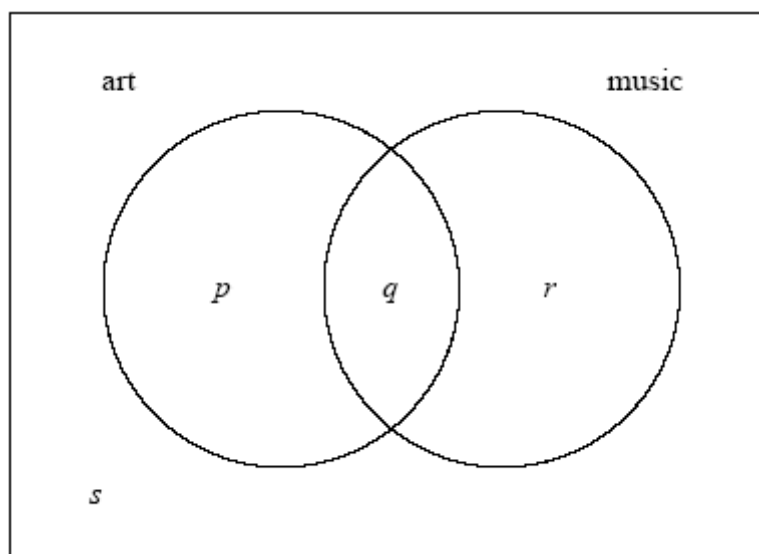
(a) (i) Write down the value of s.

    (ii) Find the value of q.

    (iii) Write down the value of p and of r.

(5)

(b) (i) A student is selected at random. Given that the student takes music, write down the probability the student takes art.

(ii) **Hence**, show that taking music and taking art are **not** independent events.

(4)

(c) Two students are selected at random, one after the other. Find the probability that the first student takes **only** music and the second student takes **only** art.

(4)
(Total 13 marks)

5. The table below shows the subjects studied by 210 students at a college.

	Year 1	Year 2	Totals
History	50	35	85
Science	15	30	45
Art	45	35	80
Totals	110	100	210

(a) A student from the college is selected at random.
   Let A be the event the student studies Art.
   Let B be the event the student is in Year 2.

(i) Find $P(A)$.

(ii) Find the probability that the student is a Year 2 Art student.

(iii) Are the events A and B independent? Justify your answer.

(6)

(b) Given that a History student is selected at random, calculate the probability that the student is in Year 1.

(2)

(c) Two students are selected at random from the college. Calculate the probability that one student is in Year 1, and the other in Year 2.

(4)
(Total 12 marks)

6. Dumisani is a student at IB World College.

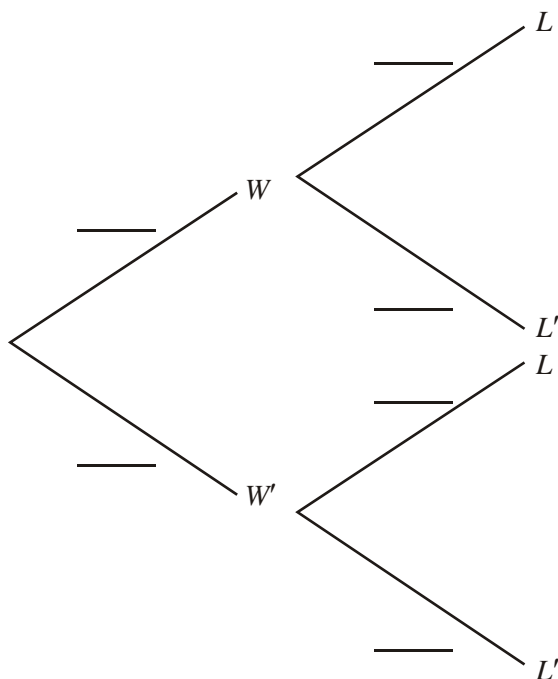The probability that he will be woken by his alarm clock is $\dfrac{7}{8}$.

If he is woken by his alarm clock the probability he will be late for school is $\dfrac{1}{4}$.

If he is not woken by his alarm clock the probability he will be late for school is $\dfrac{3}{5}$.

Let W be the event "Dumisani is woken by his alarm clock".
Let L be the event "Dumisani is late for school".

(a) Copy and complete the tree diagram below.

(4)

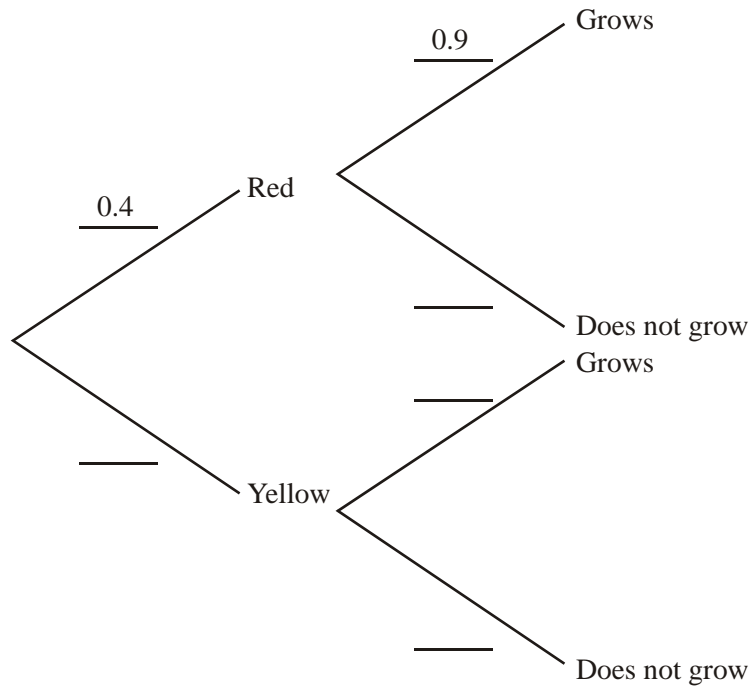(b) Calculate the probability that Dumisani will be late for school.

(3)

(c) Given that Dumisani is late for school what is the probability that he was woken by his alarm clock?

(4)
(Total 11 marks)

7. 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)