

1. The temperatures in $^{\circ}\text{C}$, at midday in Geneva, were measured for eight days and the results are recorded below.

7, 4, 5, 4, 8, T , 14, 4

The mean temperature was found to be 7°C .

- (a) Find the value of T . (3)
- (b) Write down the mode. (1)
- (c) Find the median. (2)
- (Total 6 marks)

2. A cumulative frequency graph is given below which shows the height of students in a school.

- (a) Write down the median height of the students. (1)
- (b) Write down the 25th percentile. (1)
- (c) Write down the 75th percentile. (1)

The height of the tallest student is 195 cm and the height of the shortest student is 136 cm.

- (d) Draw a box and whisker plot on the grid below to represent the heights of the students in the school.

(3)
(Total 6 marks)

3. The probability that it will snow tomorrow is 0.3.
If it snows tomorrow the probability that Chuck will be late for school is 0.8.
If it does not snow tomorrow the probability that Chuck will be late for school is 0.1.

- (a) Complete the tree diagram below.

(3)

(b) Find the probability that it does not snow tomorrow and Chuck is late for school.

(1)

(c) Find the probability that Chuck is late for school.

(2)

(Total 6 marks)

4. A class consists of students studying Spanish or French or both. Fifteen students study Spanish and twelve study French.

The probability that a student studies French given that she studies Spanish is .

(a) Draw a Venn diagram to illustrate this information.

(3)

(b) Find the probability that a student studies Spanish given that she studies one language only.

(3)

(Total 6 marks)

5. The Venn diagram below represents the students studying Mathematics (A), Further Mathematics (B) and Physics (C) in a school.

50 students study Mathematics
38 study Physics
20 study Mathematics and Physics but not Further Mathematics
10 study Further Mathematics but not Physics
12 study Further Mathematics and Physics
6 study Physics but not Mathematics
3 study none of these three subjects.

(a) Copy and complete the Venn diagram **on your answer paper**.

(3)

(b) Write down the number of students who study Mathematics but not Further Mathematics.

(1)

(c) Write down the total number of students in the school.

(1)

(d) Write down $n(B \cap C)$.

(2)

(Total 7 marks)

6. In a mountain region there appears to be a relationship between the number of trees growing in the region and the depth of snow in winter. A set of 10 areas was chosen, and in each area the number of trees was counted and the depth of snow measured. The results are given in the table below.

Number of trees (x)	Depth of snow in cm (y)
45	30
75	50
66	40
27	25
44	30
28	5
60	35
35	20
73	45
47	25

- (a) Use your graphic display calculator to find
- (i) the mean number of trees;
 - (ii) the standard deviation of the number of trees;
 - (iii) the mean depth of snow;
 - (iv) the standard deviation of the depth of snow.
- (4)

The covariance, $S_{xy} = 188.5$.

- (b) Write down the product-moment correlation coefficient, r .
- (2)
- (c) Write down the equation of the regression line of y on x .
- (2)
- (d) If the number of trees in an area is 55, estimate the depth of snow.
- (2)
- (e) (i) Use the equation of the regression line to estimate the depth of snow in an area with 100 trees.
- (ii) Decide whether the answer in (e)(i) is a valid estimate of the depth of snow in the area. Give a reason for your answer.

(3)
(Total 13 marks)

7. In a study on 100 students there seemed to be a difference between males and females in their choice of favourite car colour. The results are given in the table below.
A χ^2 test was conducted.

	Blue	Red	Green
Males	14	6	8
Females	31	24	17

(a) Write down the total number of male students. (1)

(b) Show that the expected frequency for males, whose favourite car colour is blue, is 12.6. (2)

The calculated value of χ^2 is 1.367.

- (c) (i) Write down the null hypothesis for this test.
(ii) Write down the number of degrees of freedom.
(iii) Write down the critical value of χ^2 at the 5 % significance level.
(iv) Determine whether the null hypothesis should be accepted. Give a reason for your answer.

(5)
(Total 8 marks)