Probability
Difficulty: Hard

Question Paper 2

Level	IGCSE
Subject	Maths (0580/0980)
Exam Board	CIE
Topic	Probability
Paper	Paper 4
Difficulty	Hard
Booklet	Question Paper 2

Time allowed: **90 minutes**

Score: **/78**

Percentage: **/100**

Grade Boundaries:

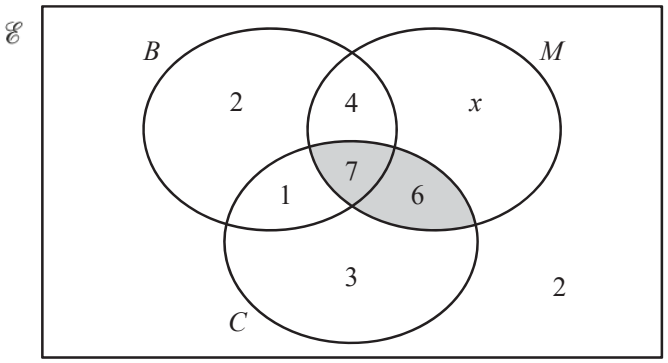
CIE IGCSE Maths (0580)

A*	A	B	C	D
>83%	67%	51%	41%	31%

CIE IGCSE Maths (0980)

9	8	7	6	5	4
>95%	87%	80%	69%	58%	46%

30 students were asked if they had a bicycle (B), a mobile phone (M) and a computer (C).
The results are shown in the Venn diagram.



(a) Work out the value of x. [1]

(b) Use set notation to describe the shaded region in the Venn diagram. [1]

(c) Find $n(C \cap (M \cup B)')$. [1]

(d) A student is chosen at random.

(i) Write down the probability that the student is a member of the set M' [1]

(ii) Write down the probability that the student has a bicycle. [1]

(e) Two students are chosen at random from the students who have computers.

Find the probability that each of these students has a mobile phone but no bicycle. [3]

Gareth has 8 sweets in a bag.
4 sweets are orange flavoured, 3 are lemon flavoured and 1 is strawberry flavoured.

(a) He chooses two of the sweets at random.

Find the probability that the two sweets have different flavours. [4]

(b) Gareth now chooses a third sweet.

Find the probability that **none** of the three sweets is lemon flavoured. [2]

Kenwyn plays a board game.
Two cubes (dice) each have faces numbered 1, 2, 3, 4, 5 and 6.
In the game, a **throw** is rolling the **two** fair 6-sided dice and then adding the numbers on their top faces.
This total is the number of spaces to move on the board.
For example, if the numbers are 4 and 3, he moves 7 spaces.

(a) Giving each of your answers as a fraction in its simplest form, find the probability that he moves

(i) two spaces with his next throw, [2]

(ii) ten spaces with his next throw. [3]

(b) What is the most likely number of spaces that Kenwyn will move with his next throw? [2]
Explain your answer.

(c)

95	**96**	**97**	**98**	**99** Go back 3 spaces	**100** WIN

To win the game he must move **exactly** to the 100th space.
Kenwyn is on the 97th space.
If his next throw takes him to 99, he has to move back to 96.
If his next throw takes him over 100, he stays on 97.

Find the probability that he reaches 100 in either of his next two throws. [5]

E	N	L	A	R	G	E	M	E	N	T

Prettie picks a card at random from the 11 cards above and does not replace it.
She then picks a second card at random and does not replace it.

(a) Find the probability that she picks

(i) the letter L and then the letter G, [2]

(ii) the letter E twice, [2]

(iii) two letters that are the same. [2]

(b) Prettie now picks a third card at random.

Find the probability that the three letters

(i) are all the same, [2]

(ii) **do not** include a letter E, [2]

(iii) include exactly two letters that are the same. [5]

(a)

Two discs are chosen at random **without** replacement from the five discs shown in the diagram.

(i) Find the probability that both discs are numbered 2. [2]

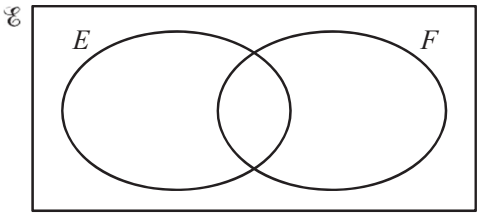
(ii) Find the probability that the numbers on the **two** discs have a total of 5. [3]

(iii) Find the probability that the numbers on the two discs do **not** have a total of 5. [1]

(b) A group of international students take part in a survey on the nationality of their parents.

E = {students with an English parent}
F = {students with a French parent}

$n(\mathscr{E}) = 50$, $n(E) = 15$, $n(F) = 9$ and $n(E \cup F)' = 33$.



(i) Find $n(E \cap F)$. [1]

(ii) Find $n(E' \cup F)$. [1]

(iii) A student is chosen at random.
Find the probability that this student has an English parent and a French parent. [1]

(iv) A student who has a French parent is chosen at random.
Find the probability that this student also has an English parent. [1]

(a) Emile lost 2 blue buttons from his shirt.

A bag of spare buttons contains 6 white buttons and 2 blue buttons.

Emile takes 3 buttons out of the bag at random **without replacement**.

Calculate the probability that

(i) all 3 buttons are white, [3]

(ii) exactly one of the 3 buttons is blue. [3]

(b) There are 25 buttons in another bag.

This bag contains x blue buttons.

Two buttons are taken at random **without replacement**.

The probability that they are both blue is $\frac{7}{100}$

(i) Show that $x^2 - x - 42 = 0$. [4]

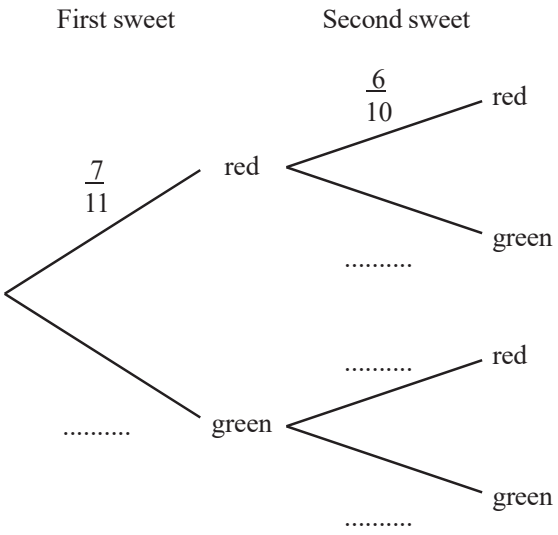
(ii) Factorise $x^2 - x - 42$. [2]

(iii) Solve the equation $x^2 - x - 42 = 0$. [1]

(iv) Write down the number of buttons in the bag which are **not** blue. [1]

A bag contains 7 red sweets and 4 green sweets.
Aimee takes out a sweet at random and eats it.
She then takes out a second sweet at random and eats it.

(a) Complete the tree diagram.



[3]

(b) Calculate the probability that Aimee has taken

(i) two red sweets, [2]

(ii) one sweet of each colour. [3]

(c) Aimee takes a third sweet at random.
Calculate the probability that she has taken

(i) three red sweets, [2]

(ii) at least one red sweet. [3]