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Topical Worksheets for Cambridge IGCSE™

Mathematics (0580)

Probability (I)

1st edition, for examination until 2025

1 The time taken for each of 120 students to complete a cooking challenge is shown in the table.

Time (t minutes)	$20 < t \leqslant 25$	$25 < t \leqslant 30$	$30 < t \leqslant 35$	$35 < t \leqslant 40$	$40 < t \leqslant 45$
Frequency	44	32	28	12	4

(a) Write down the modal time interval.

..... $< t \leqslant$ ..... [1]

(b) Write down the interval containing the median time.

..... $< t \leqslant$ ..... [1]

(c) Calculate an estimate of the mean time.

..... min [4]

(d) A student is chosen at random.

Find the probability that this student takes more than 40 minutes.

..... [1]

[Total: 7]

2 Samira and Sonia each have a bag containing 20 sweets.
In each bag, there are 5 red, 6 green and 9 yellow sweets.

(a) Samira chooses one sweet at random from her bag.

Write down the probability that she chooses a yellow sweet.

..... [1]

(b) Sonia chooses two sweets at random, without replacement, from her bag.

(i) Show that the probability that she chooses two green sweets is $\frac{3}{38}$.

[2]

(ii) Calculate the probability that the sweets she chooses are **not** both the same colour.

..... [4]

[Total: 7]

3 The heights, h metres, of the 120 boys in an athletics club are recorded.
The table shows information about the heights of the boys.

Height (h metres)	$1.3 < h \leqslant 1.4$	$1.4 < h \leqslant 1.5$	$1.5 < h \leqslant 1.6$	$1.6 < h \leqslant 1.7$	$1.7 < h \leqslant 1.8$	$1.8 < h \leqslant 1.9$
Frequency	7	18	30	24	27	14

(a) **(i)** Write down the modal class.

..... $< h \leqslant$ ..... [1]

(ii) Calculate an estimate of the mean height.

..... m [4]

(b) **(i)** One boy is chosen at random from the club.

Find the probability that this boy has a height greater than 1.8 m.

..... [1]

(ii) Three boys are chosen at random from the club.

Calculate the probability that one of the boys has a height greater than 1.8 m and the other two boys each have a height of 1.4 m or less.

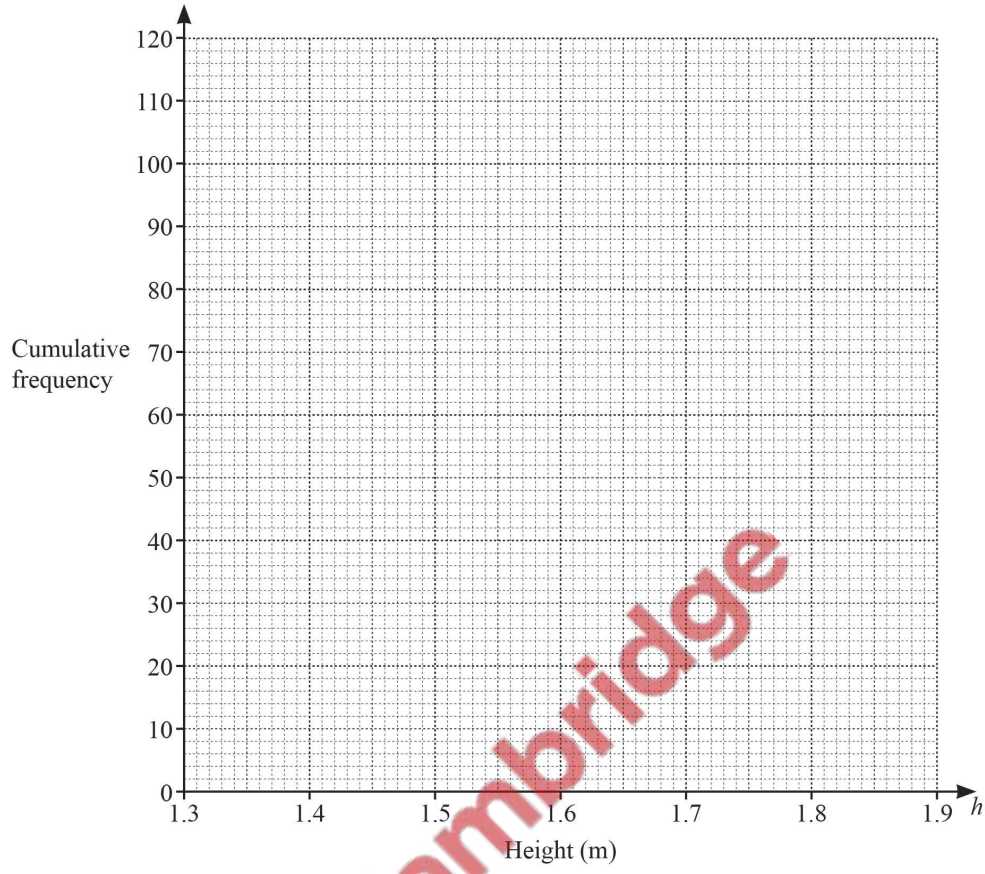
..... [4]

(c) **(i)** Use the frequency table to complete the cumulative frequency table.

Height (h metres)	$h \leqslant 1.4$	$h \leqslant 1.5$	$h \leqslant 1.6$	$h \leqslant 1.7$	$h \leqslant 1.8$	$h \leqslant 1.9$
Cumulative frequency	7	25				

[2]

(ii) On the grid, draw a cumulative frequency diagram to show this information.



[3]

(d) Use your diagram to find an estimate for

(i) the median height,

..... m [1]

(ii) the 40th percentile.

..... m [2]

[Total: 18]

4 Soraya makes 30 flags.
11 flags are pink, 7 are yellow, 5 are blue, 4 are silver and 3 are green.
Soraya takes a flag at random.

Find the probability that the flag she takes is

(a) pink,

..... [1]

(b) not blue,

..... [1]

(c) red.

..... [1]

[Total: 3]

5 A box contains 22 coloured pencils.
6 pencils are pink, 9 pencils are blue and 7 pencils are yellow.

A pencil is taken at random from the box.

Write down the probability that this pencil is green.

..... [1]

[Total: 1]

6 The probability that the school bus is late is $\frac{9}{10}$.

If the school bus is late, the probability that Seb travels on the bus is $\frac{15}{16}$.

If the school bus is on time, the probability that Seb travels on the bus is $\frac{3}{4}$.

Find the probability that Seb travels on the bus.

..... [3]

[Total: 3]

7

1	2	3	4	5

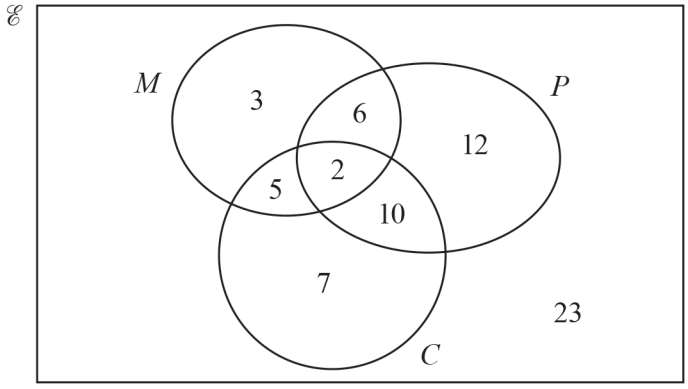
The diagram shows five cards.
Two of the cards are taken at random, without replacement.

Find the probability that both cards show an even number.

..... [2]

[Total: 2]

8 The Venn diagram below shows information about the number of gardeners who grow melons (M), potatoes (P) and carrots (C).



(a) A gardener is chosen at random from the gardeners who grow melons.

Find the probability that this gardener does not grow carrots.

..... [2]

(b) Find $n((M \cap P) \cup C')$.

..... [1]

[Total: 3]

9 The probability that Andrei cycles to school is r.

(a) Write down, in terms of r, the probability that Andrei **does not** cycle to school.

..... [1]

(b) The probability that Benoit **does not** cycle to school is $1.3 - r$.
The probability that both Andrei and Benoit **do not** cycle to school is 0.4.

(i) Complete the equation in terms of r.

(.....) × (.....) = 0.4 [1]

(ii) Show that this equation simplifies to $10r^2 - 23r + 9 = 0$.

[3]

(iii) Solve by factorisation $10r^2 - 23r + 9 = 0$.

$r =$ ..... or $r =$ ..... [3]

(iv) Find the probability that Benoit **does not** cycle to school.

..... [1]

[Total: 9]

10 Esme has a bag with 5 green counters and 4 red counters.
She takes three counters at random from the bag without replacement.

Work out the probability that the three counters are all the same colour.

..... [4]

[Total: 4]

11 Angelo has a bag containing 3 white counters and x black counters.
He takes two counters at random from the bag, without replacement.

(a) Complete the following statement.

The probability that Angelo takes two black counters is

$$\frac{x}{x+3} \times \frac{\qquad}{\qquad}.$$

[2]

(b) The probability that Angelo takes two black counters is $\frac{7}{15}$.

(i) Show that $4x^2 - 25x - 21 = 0$.

[4]

(ii) Solve by factorisation.
$4x^2 - 25x - 21 = 0$

$x =$ ..... or $x =$ ..... [3]

(iii) Write down the number of black counters in the bag.

..... [1]

[Total: 10]

12 Ravi has a bag that contains 10 red balls and 8 blue balls.
He takes two balls at random from the bag, without replacement.

Find the probability that one ball is red and one ball is blue.

..... [3]

[Total: 3]

13 Talika has a bag that contains 10 red balls and 8 blue balls.
She takes three balls at random from the bag, without replacement.

Calculate the probability that the three balls are the same colour.

..... [4]

[Total: 4]

14 20 students each record the mass, p grams, of their pencil case.
The table below shows the results.

Mass (p grams)	$0 < p \leqslant 50$	$50 < p \leqslant 100$	$100 < p \leqslant 125$	$125 < p \leqslant 150$	$150 < p \leqslant 200$
Frequency	2	5	4	6	3

(a) Calculate an estimate of the mean mass.

..... g [4]

(b) Use the frequency table above to complete the cumulative frequency table.

Mass (p grams)	$p \leqslant 50$	$p \leqslant 100$	$p \leqslant 125$	$p \leqslant 150$	$p \leqslant 200$
Cumulative frequency					20

[2]

(c) A student is chosen at random.

Find the probability that this student has a pencil case with a mass greater than 150 g.

..... [1]

[Total: 7]

15 A group of 200 people were asked which city they would like to visit next.
The table shows the results.

City	London	Paris	New York	Tokyo
Number of people	50	48	56	46

(a) A person from the group is chosen at random.

Write down the probability that this person would like to visit either Paris or Tokyo next.

..... [2]

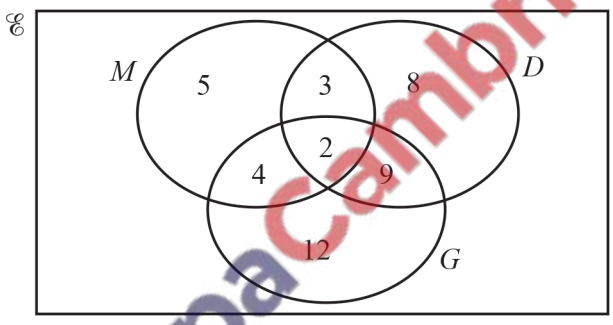
(b) Two people are chosen at random from the group of 200.

Find the probability that one person would like to visit London next and the other person would like to visit New York next.
Give your answer as a percentage.

..... % [3]

[Total: 5]

16



The Venn diagram above shows information about the number of students who study Music (M), Drama (D) and Geography (G).

(a) How many students study Music?

..... [1]

(b) How many students study exactly two subjects?

..... [1]

(c) Two students are chosen at random from those who study Drama.

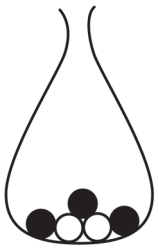
Calculate the probability that they both also study Music.

..... [3]

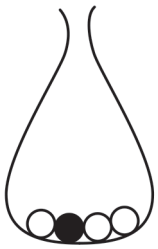
(d) In the Venn diagram above, shade $M \cap D'$. [1]

[Total: 6]

17



Bag A



Bag B

Bag A contains 3 black balls and 2 white balls.
Bag B contains 1 black ball and 3 white balls.

A ball is taken at random from each bag.

(a) Show that a black ball is more likely to be taken from bag A than from bag B.

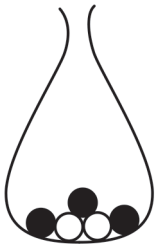
[1]

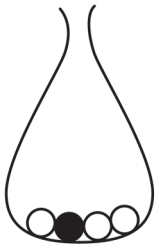
(b) Find the probability that the two balls have different colours.

..... [3]

[Total: 4]

18


Bag *A*


Bag *B*

Bag *A* contains 3 black balls and 2 white balls.
Bag *B* contains 1 black ball and 3 white balls.

A ball is taken at random from bag *A* and its colour is recorded.
This ball is then placed in bag *B*.
A ball is then taken at random from bag *B*.

Find the probability that the ball taken from bag *B* has a different colour to the ball taken from bag *A*.

..... [3]

[Total: 3]

19 A box contains 20 packets of potato chips.

6 packets contain barbecue flavoured chips.
10 packets contain salt flavoured chips.
4 packets contain chicken flavoured chips.

(a) Maria takes two packets at random **without replacement**.

(i) Show that the probability that she takes two packets of salt flavoured chips is $\frac{9}{38}$.

[2]

(ii) Find the probability that she takes two packets of different flavoured chips.

..... [4]

(b) Maria takes three packets at random, **without replacement**, from the 20 packets.

Find the probability that she takes **at least two** packets of chicken flavoured chips.

..... [3]

[Total: 9]

20 The diagram shows two sets of cards.

Set *A*	1	1	2	2	2
Set *B*	0	1	1	1	2

(a) Jojo chooses two cards at random from Set *A* without replacement.

Find the probability that the two cards have the same number.

..... [3]

(b) Jojo replaces the two cards.
Kylie then chooses one card at random from Set *A* and one card at random from Set *B*.

Find the probability that the two cards have the same number.

..... [3]

(c) Who is the most likely to choose two cards that have the same number?
Show all your working.

..... [1]

[Total: 7]