



PROBABILITY

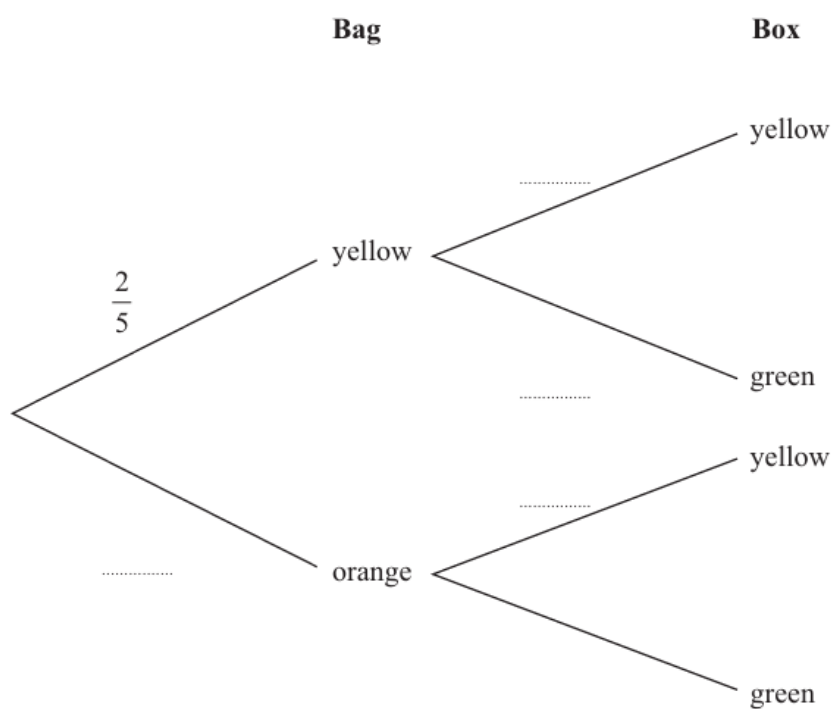
Question 1

In a bag, there are only 2 yellow beads and 3 orange beads.

In a box, there are only 3 yellow beads and 5 green beads.

Chi takes at random a bead from the bag and a bead from the box.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Chi takes two beads of different colours.

(3)

Question 2

There are 15 buttons in a box.

3 of the buttons are red
2 of the buttons are pink
10 of the buttons are blue

Pete takes at random three buttons from the box.

Work out the probability that there is still at least one pink button in the box.

.....(3)

Question 3

Mark has three bags, bag A, bag B and bag C

Bag A contains 120 counters.

The probability of taking at random a red counter from bag A is 0.45

Bag B contains 80 counters.

The probability of taking at random a red counter from bag B is 0.3

Bag C is empty.

Mark puts all the counters from bag A and bag B into bag C

Mark takes at random a counter from bag C

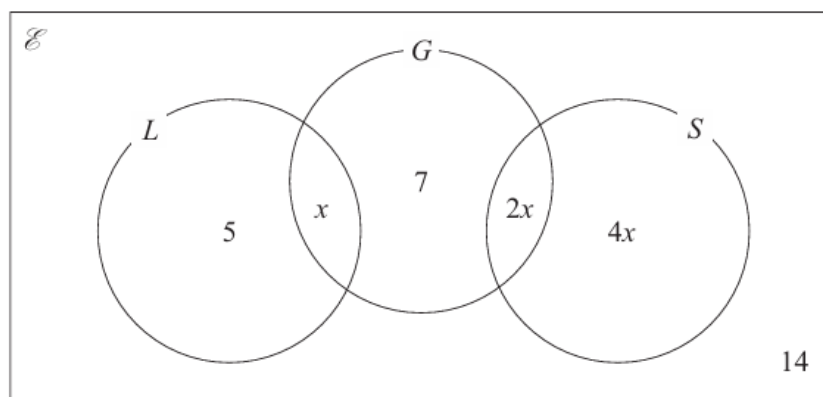
Work out the probability that he takes a red counter.

.....(3)

Question 4

Bianca asked 40 students which of the languages Latin (L), Greek (G) and Sanskrit (S) they study.

The Venn diagram gives some information about her results.
It shows the number of students in each subset.



One of these students is selected at random.

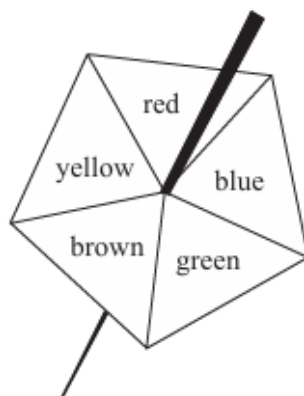
Work out the probability that this student studies Latin or Sanskrit.

.....

(3)

Question 5

Here is a biased 5-sided spinner.



When the spinner is spun, it can land on red, blue, green, brown or yellow.

The table gives the probabilities that the spinner lands on red or on blue or on green.

Colour	red	blue	green	brown	yellow
Probability	0.15	0.26	0.33		

When the spinner is spun once, the probability that the spinner lands on brown is 0.06 more than the probability that the spinner lands on yellow.

Jenine spins the spinner 150 times.

Work out an estimate for the number of times the spinner lands on yellow.

(4)

Question 6

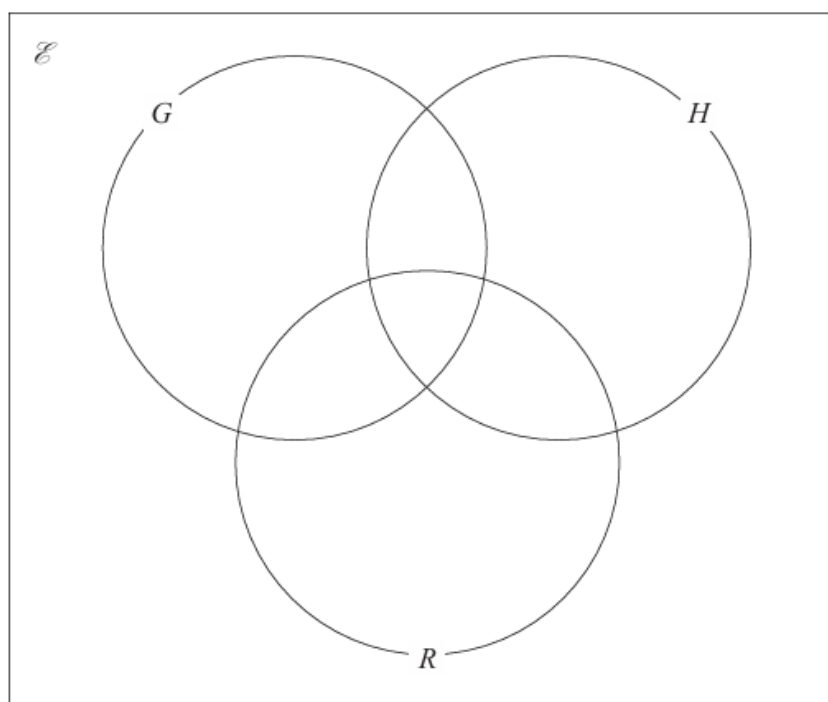
All the students in Year 11 at a school must study at least one of Geography (G), History (H) and Religious Studies (R).

In Year 11 there are 65 students.

Of these students

- 15 study Geography, History and Religious Studies
- 21 study Geography and History
- 16 study Geography and Religious Studies
- 30 study Geography
- 18 study only Religious Studies
- 37 study Religious Studies

- (a) Using this information, complete the Venn diagram to show the number of students in each region of the Venn diagram.



(3)

A student in Year 11 who studies both History and Religious Studies is chosen at random.

- (b) Work out the probability that this student does **not** study Geography.

.....
(2)

Question 7

A bowl contains n pieces of fruit.

Of these, 4 are oranges and the rest are apples.

Two pieces of fruit are going to be taken at random from the bowl.

The probability that the bowl will then contain $(n - 6)$ apples is $\frac{1}{3}$

Work out the value of n

Show your working clearly.

.....(6)

Question 8

There are 16 sweets in a bowl.

4 of the sweets are blackcurrant.

5 of the sweets are lemon.

7 of the sweets are orange.

Anna, Ravi and Sam each take at random one sweet from the bowl.

Work out the probability that the 5 lemon sweets are still in the bowl.

(4)

Question 9

A box contains 20 counters.

- 9 of the counters are red
- 7 of the counters are yellow
- 4 of the counters are green

Alex takes at random three counters from the box.

Work out the probability that exactly two of the three counters are the same colour.

.....(3)

Question 10

Khalid has a box of counters.

- 17 of the counters are red
- 28 of the counters are blue
- the rest of the counters are orange

Khalid is going to take at random a counter from the box.

The probability that Khalid will take an orange counter is $\frac{4}{9}$

Work out the number of orange counters that are in the box.

.....(3)

Question 11

120 gardeners were asked if they grow carrots (C) or potatoes (P) or tomatoes (T)

Of these gardeners

43 grow carrots

12 grow carrots and potatoes and tomatoes

18 grow carrots and potatoes

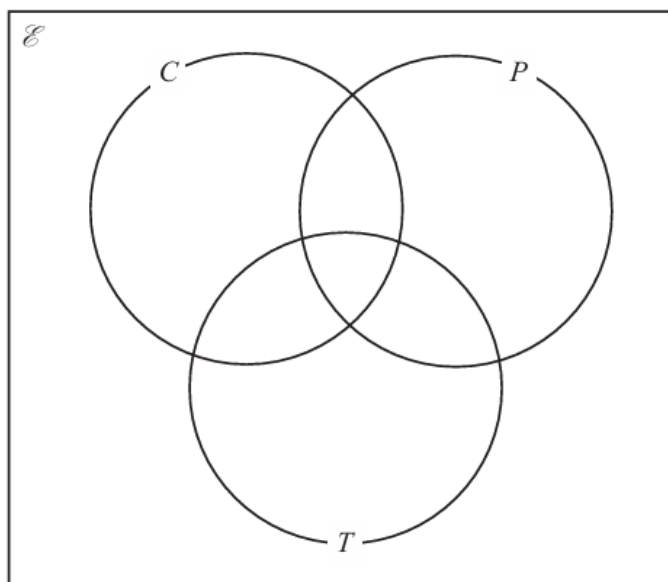
27 grow carrots and tomatoes

32 grow potatoes and tomatoes

29 do not grow carrots or potatoes or tomatoes

The number of these gardeners who grow only potatoes is equal to the number of these gardeners who grow only tomatoes.

(a) Complete the Venn diagram to show this information.



(3)

(b) Find $n(T' \cap C)$

(1)

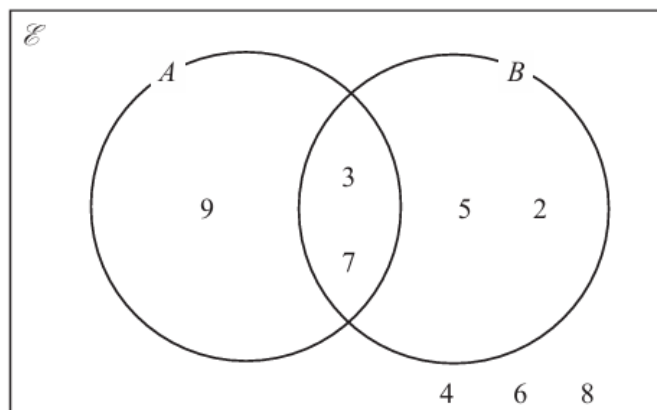
One of the gardeners who grows carrots is chosen at random.

(c) Calculate the probability that this gardener also grows potatoes.

(2)

Question 12

Here is a Venn diagram.



- (a) List the members of the set B

.....
(1)

- (b) List the members of the set $A \cap B$

.....
(1)

- (c) List the members of the set A'

.....
(1)

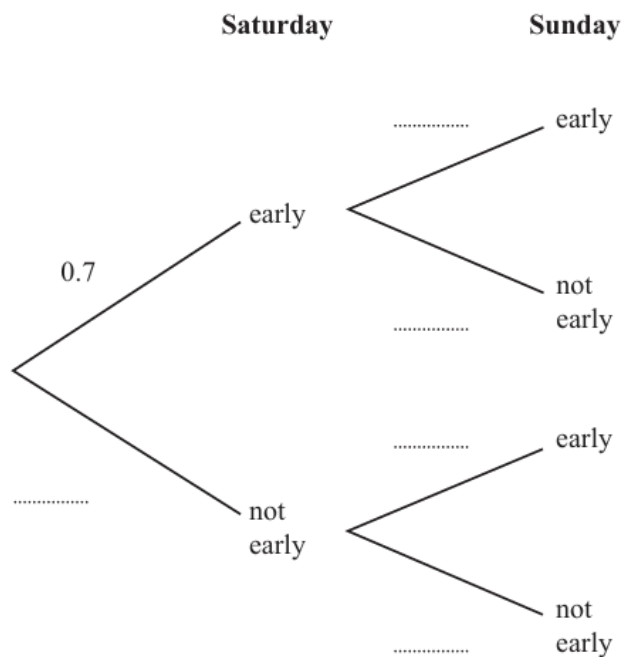
Question 13

The probability that Thomas gets to work early on Saturday is 0.7

If Thomas gets to work early on Saturday, the probability that he will get to work early on Sunday is 0.9

If Thomas does **not** get to work early on Saturday, the probability that he will get to work early on Sunday is 0.6

- (a) Use this information to complete the probability tree diagram.



(2)

- (b) Work out the probability that Thomas gets to work early on both Saturday and Sunday.

(2)

Question 14

Cody has a biased 5-sided spinner, numbered 1, 2, 3, 4, 5

The table gives the probabilities that when the spinner is spun it will land on 2 or on 3 or on 5

Number	1	2	3	4	5
Probability		0.14	0.17		0.21

The probability that the spinner will land on 1 is the same as the probability that the spinner will land on 4

Cody is going to spin the spinner 400 times.

Work out an estimate for the number of times the spinner will land on 4

.....(4)

Question 15

Kim puts 4 bananas in a bag.

The mean weight of the 4 bananas in the bag is 145 grams.

Andy puts one more banana into the bag.

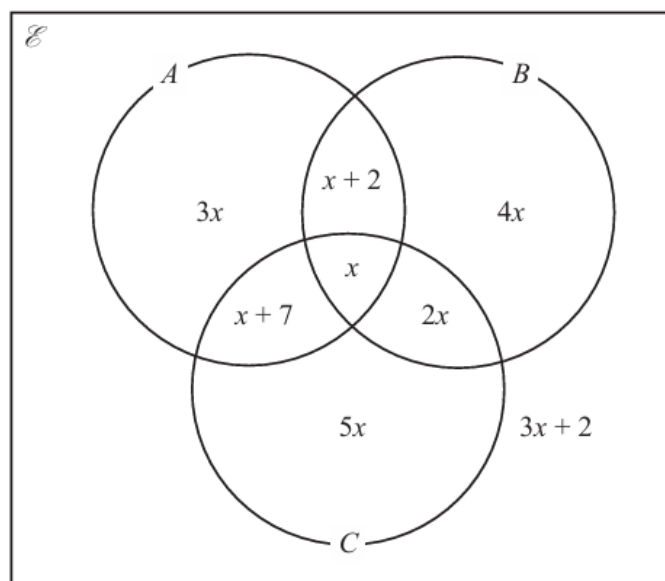
The mean weight of the 5 bananas in the bag is 142 grams.

Work out the weight of the banana that Andy puts into the bag.

.....(3)

Question 16

The Venn diagram shows information about the numbers of items in set A , set B and set C , where x is an integer.



Given that $n(A \cup B)' = 26$

find $n(A' \cap C)$

$$n(A' \cap C) = \dots\dots\dots$$

(4)

Question 17

450 students were asked how they travelled to school on Monday.
Each student walked or travelled by bus or travelled by car or travelled by bicycle.
Each student used just one method of travel.

One of these students is chosen at random.

The table shows information about the probability of each method of travel.

Method of travel	walk	bus	car	bicycle
Probability	0.20	x	$2x$	0.26

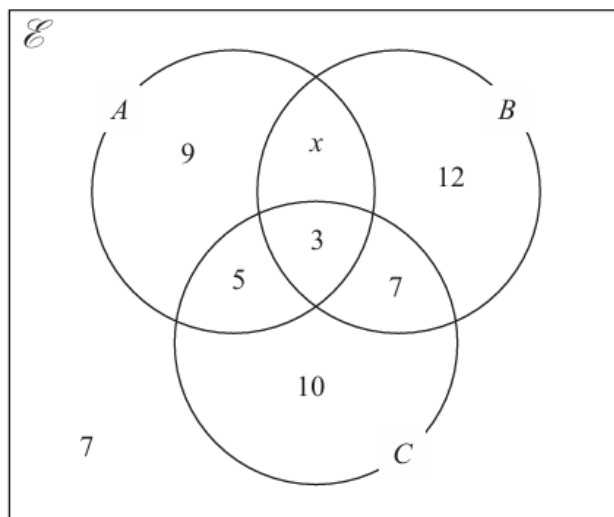
Work out how many of the 450 students travelled by car.

.....(4)

Question 18

The Venn diagram shows a universal set $\mathcal{E}$ and sets A , B and C

The numbers and the letter x represent **numbers** of elements.



Given that $n(A \cup B) = 42$

(a) find the value of x

$x = \dots\dots\dots$
(1)

(b) Find $n(A')$

$\dots\dots\dots$
(1)

(c) Find $n(B' \cap C)$

$\dots\dots\dots$
(1)

Question 19

100 farmers are asked if they have goats (G), sheep (S) or chickens (C) on their farms.

Of these farmers

31 have sheep

53 have chickens

6 have goats, sheep and chickens

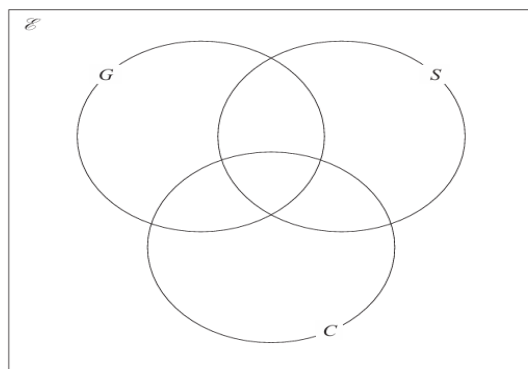
11 have sheep and goats

17 have sheep and chickens

18 have goats and chickens

20 do not have any goats, sheep or chickens

(a) Using this information, complete the Venn diagram to show the number of farmers in each appropriate subset.



(3)

(b) Find

(i) $n(G)$

.....
(1)

(ii) $n([G \cup S]')$

.....
(1)

(iii) $n(G' \cap C)$

.....
(1)

One of the farmers who has chickens is chosen at random.

(c) Find the probability that this farmer also has goats.

.....
(2)
