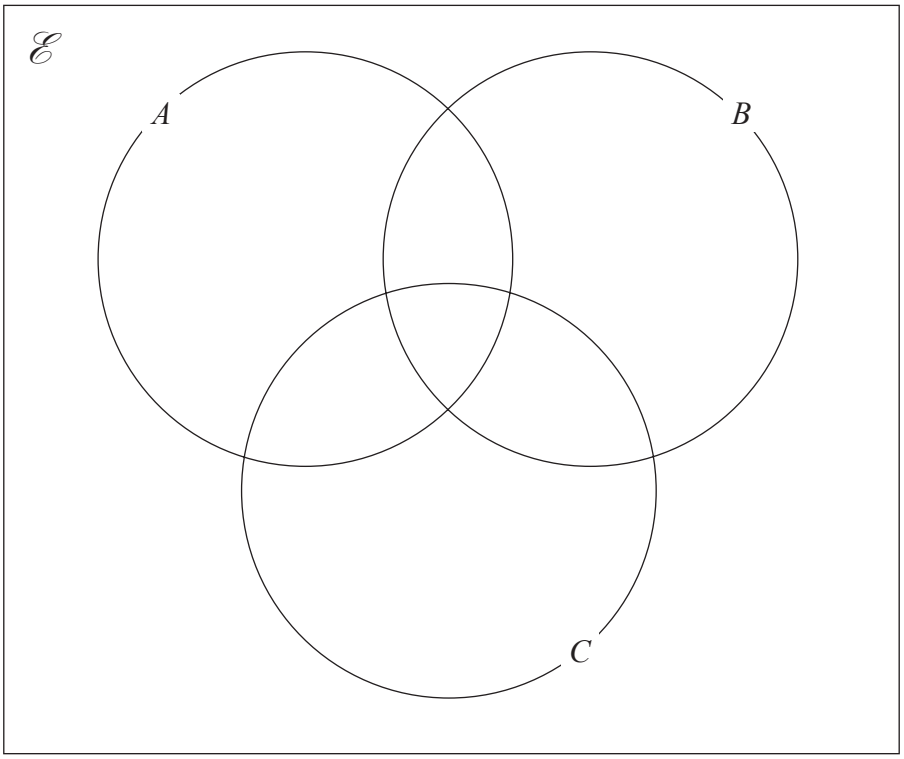
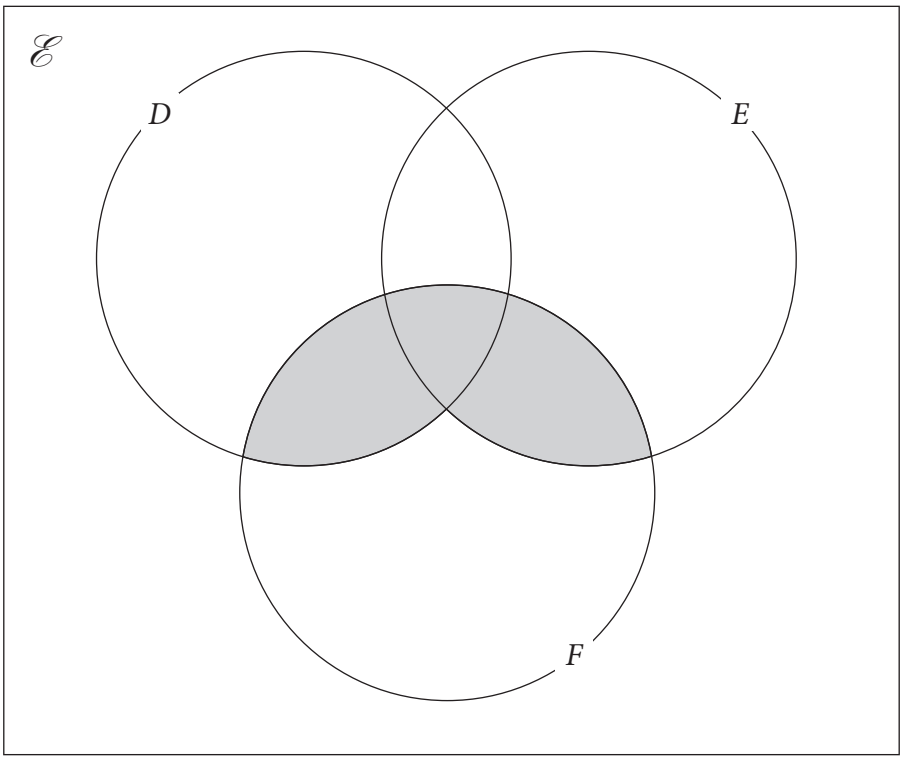
13 (a) On the Venn diagram, shade the set $(A \cup B)' \cap C$



(1)

(b) Use set notation to describe the shaded region in the Venn diagram below.



.....

(1)

(Total for Question 13 is 2 marks)

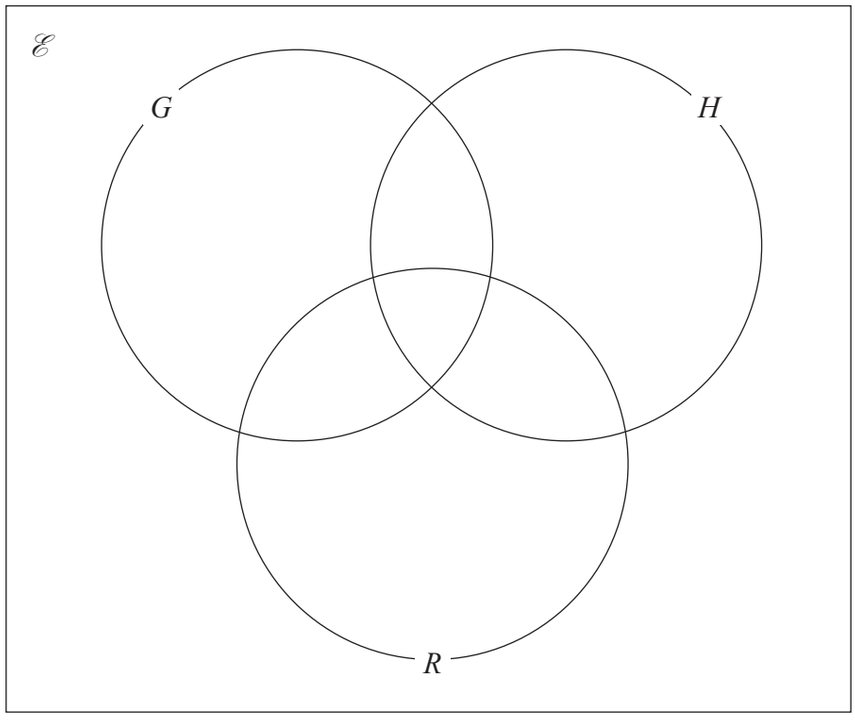
13 All the students in Year 11 at a school must study at least one of Geography (G), History (H) and Religious Studies (R).

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)

(Total for Question 13 is 5 marks)

16 Some students were asked the following question.

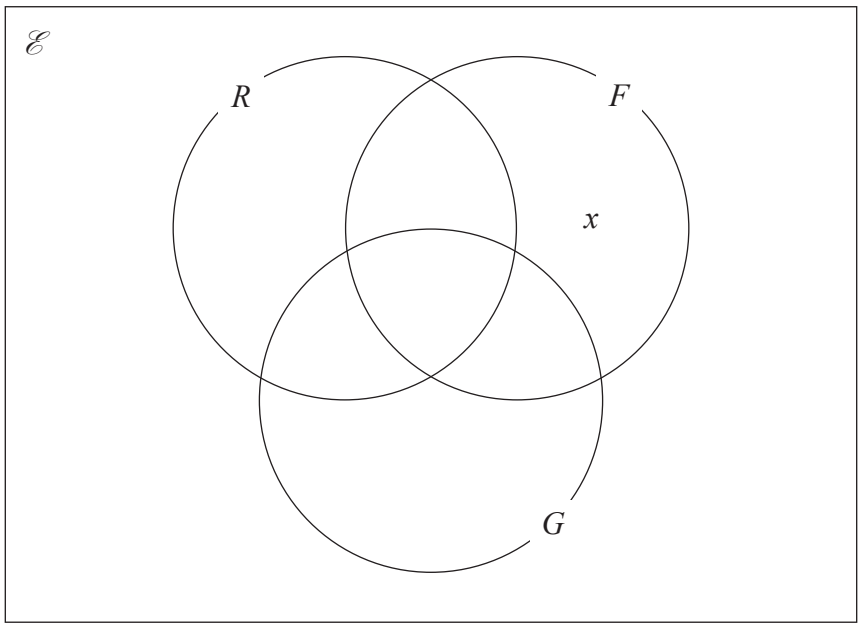
"Which of the subjects Russian (R), French (F) and German (G) do you study?"

Of these students

4 study all three of Russian, French and German
10 study Russian and French
13 study French and German
6 study Russian and German
24 study German
11 study none of the three subjects
the number who study Russian only is twice the number who study French only.

Let x be the number of students who study French only.

(a) Show all this information on the Venn diagram, giving the number of students in each appropriate subset, in terms of x where necessary.



(3)

Given that the number of students who were asked the question was 80

(b) work out the number of these students that study Russian.

.....

(3)

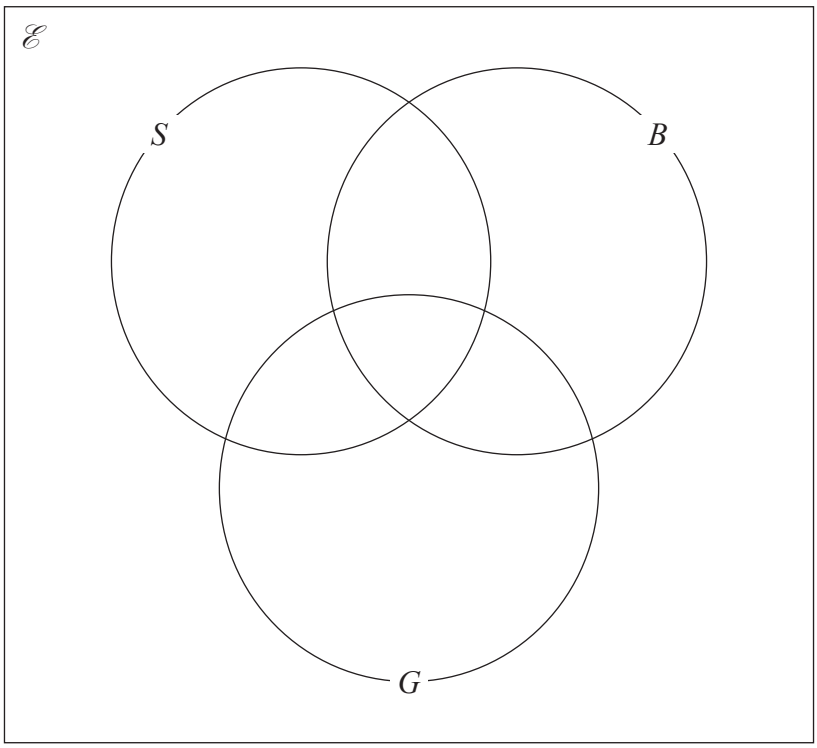
(Total for Question 16 is 6 marks)

16 120 people who visited a sports centre were asked if they went swimming (S), played basketball (B) or used the gym (G).

Their answers showed that

28 people went swimming
16 people played basketball
27 people used the gym
3 people went swimming and played basketball
5 people played basketball and used the gym
7 people went swimming and used the gym
2 people went swimming, played basketball and used the gym

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



(3)

One of the people who went swimming is chosen at random.

(b) Find the probability that this person also played basketball.

.....

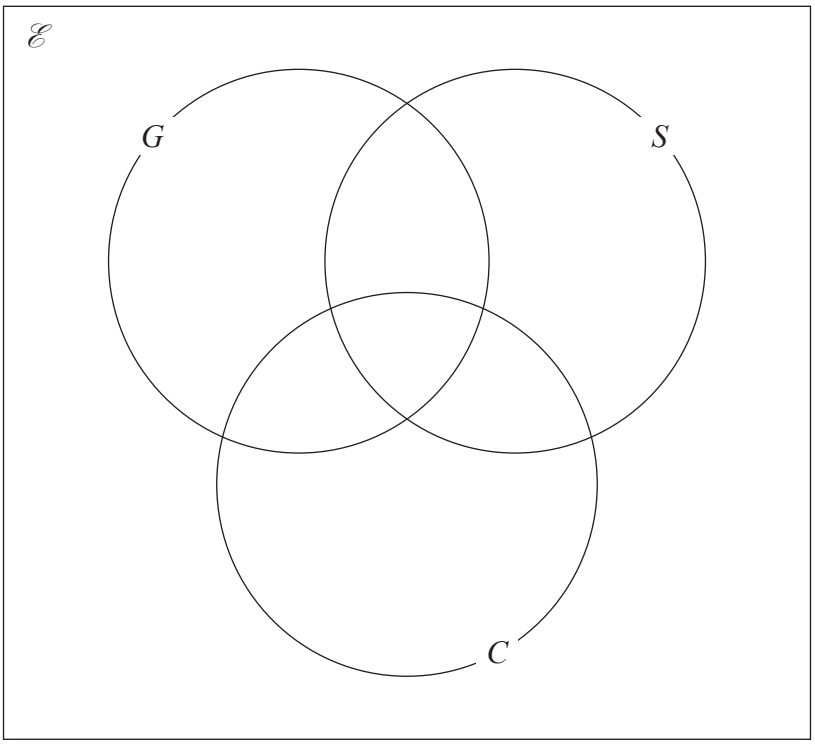
(1)

(Total for Question 16 is 4 marks)

16 100 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)

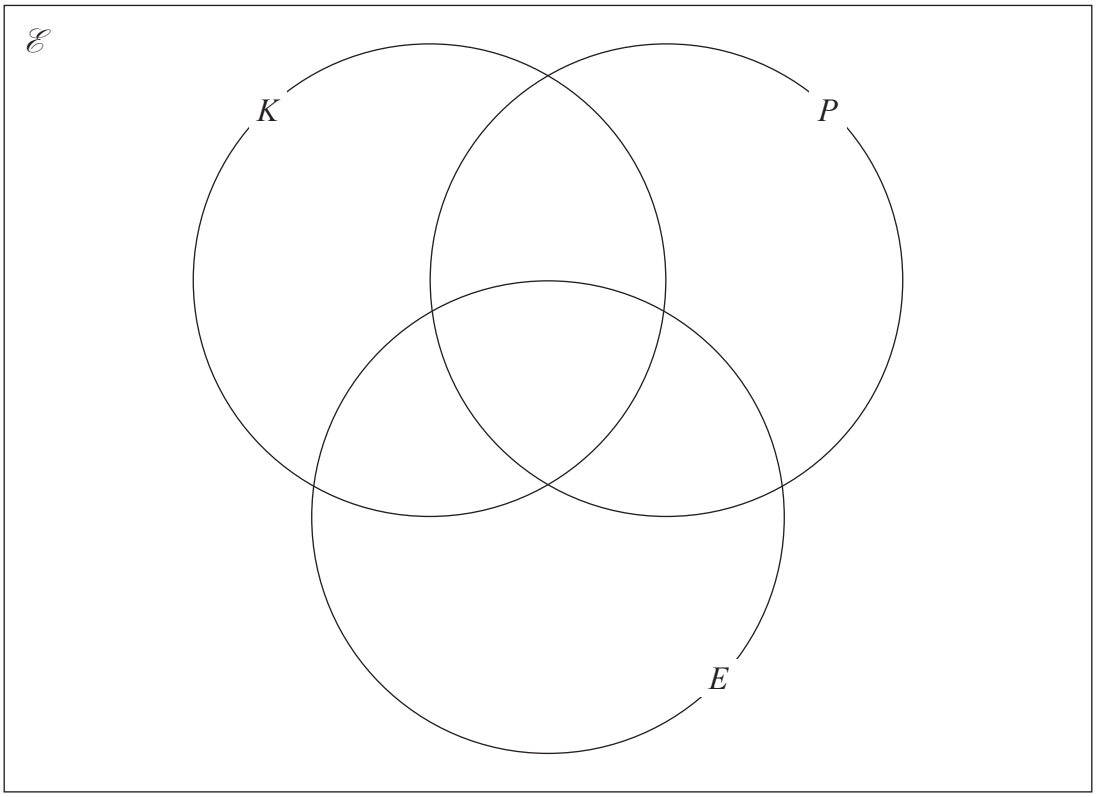
(Total for Question 16 is 8 marks)

16 60 art students were asked if they would like to attend workshops for knitting (K), for photography (P) or for embroidery (E)

Of these students

9 chose knitting, photography and embroidery
17 chose knitting and photography
16 chose photography and embroidery
20 chose knitting and embroidery
28 chose photography
39 chose embroidery
2 chose none of the workshops

(a) Using this information, complete the Venn diagram to show the numbers of students in each subset.



(3)

One of the students is chosen at random.

Given that this student chose photography,

(b) find the probability that this student also chose knitting.

.....

(2)

(c) Find $n(P \cap K')$

.....

(1)

(d) Find $n([P \cup E] \cap K)$

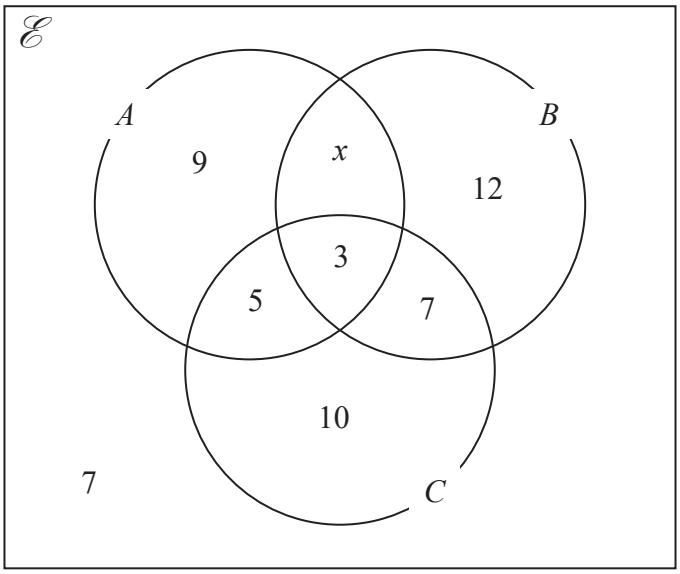
.....

(1)

(Total for Question 16 is 7 marks)

16 The Venn diagram shows a universal set $\mathscr{E}$ 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

$x =$ .....

(1)

(b) Find $n(A')$

.....

(1)

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

.....

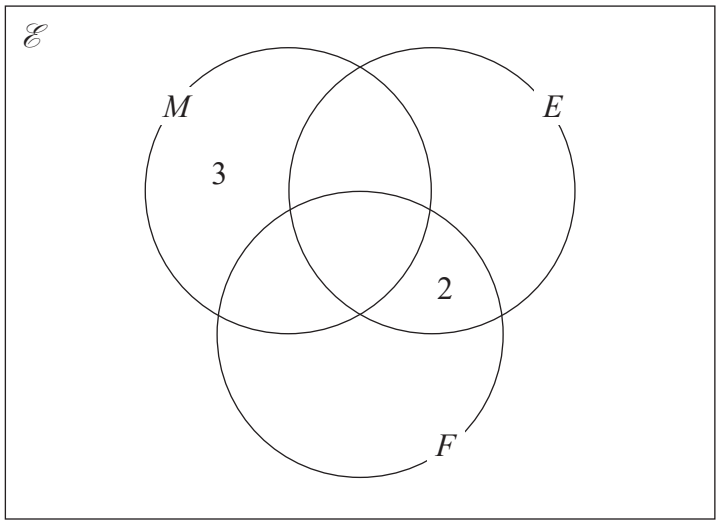
(1)

(Total for Question 16 is 3 marks)

16 There are 32 students in a class.
In one term these 32 students each took a test in Maths (M), in English (E) and in French (F).

25 students passed the test in Maths.
20 students passed the test in English.
14 students passed the test in French.
18 students passed the tests in Maths and English.
11 students passed the tests in Maths and French.
4 students failed all three tests.
x students passed all three tests.

The incomplete Venn diagram gives some more information about the results of the 32 students.

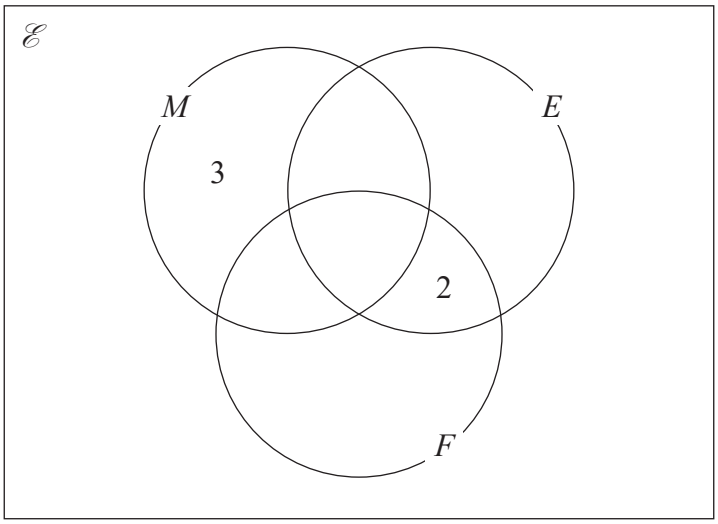


(a) Use all the given information about the results of students who passed the test in Maths to find the value of x.

$x =$ .....

(2)

(b) Use your value of x to complete the Venn diagram to show the number of students in each subset.



(2)

A student who passed the test in Maths is chosen at random.

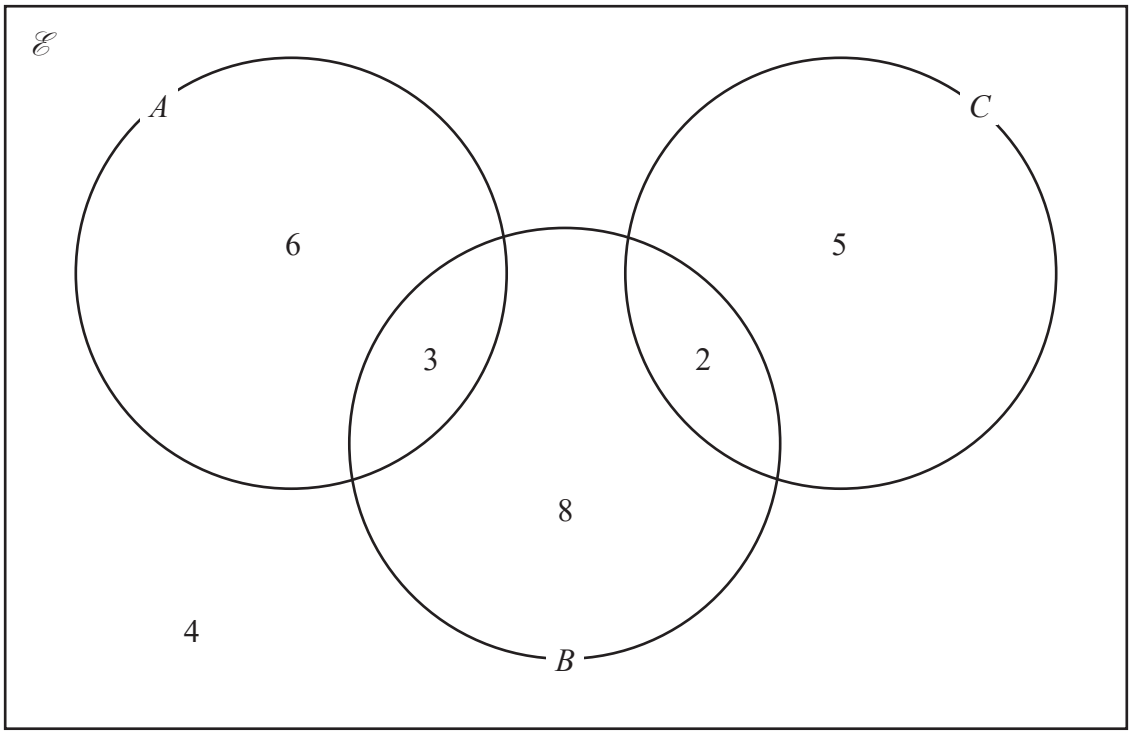
(c) Find the probability that this student failed the test in French.

.....

(1)

(Total for Question 16 is 5 marks)

17 The Venn diagram shows a universal set $\mathscr{E}$ and three sets A, B and C.



6, 3, 8, 2, 5 and 4 represent the **numbers** of elements.

Find

(i) $n(A \cup B)$

.....

(1)

(ii) $n(A \cap C)$

.....

(1)

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

.....

(1)

(iv) $n(A' \cup B' \cup C')$

.....

(1)

(Total for Question 17 is 4 marks)

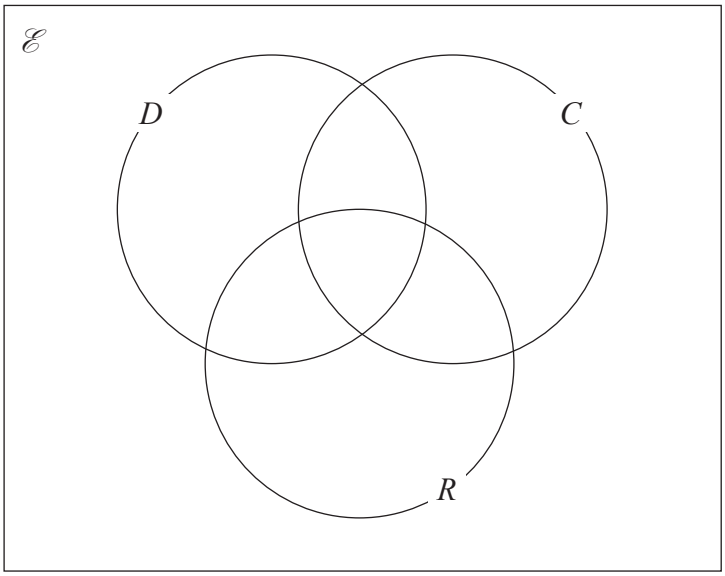
17 Some students in a school were asked the following question.

"Do you have a dog (D), a cat (C) or a rabbit (R)?"

Of these students

28 have a dog
18 have a cat
20 have a rabbit
8 have both a cat and a rabbit
9 have both a dog and a rabbit
x have both a dog and a cat
6 have a dog, a cat and a rabbit
5 have not got a dog or a cat or a rabbit

(a) Using this information, complete the Venn diagram to show the number of students in each appropriate subset.
Give the numbers in terms of x where necessary.



(3)

Given that a total of 50 students answered the question,

(b) work out the value of x.

$x =$ .....

(2)

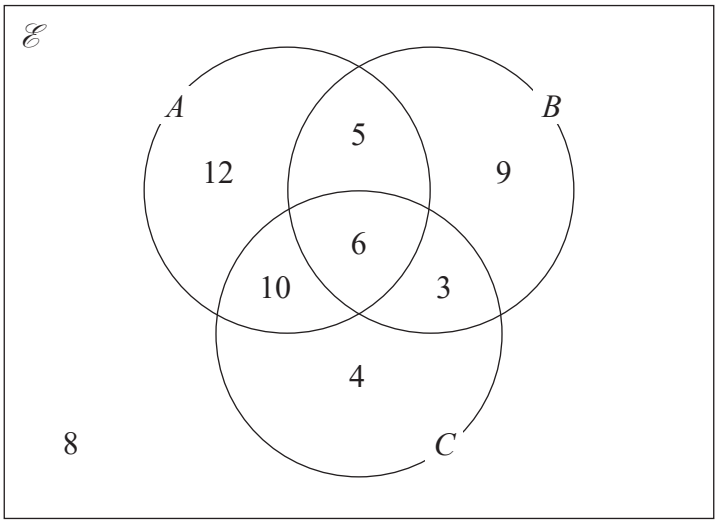
(c) Find $n(C' \cap D')$

.....

(1)

(Total for Question 17 is 6 marks)

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



12, 5, 9, 10, 6, 3, 4 and 8 represent the **numbers** of elements.

Find

(i) $n(A \cup B)$

.....

(1)

(ii) $n(A' \cap B')$

.....

(1)

(iii) $n([A \cap B] \cup C)$

.....

(1)

(Total for Question 19 is 3 marks)

20 A, B and C are three sets.

$n(A \cap B \cap C) = 5$

$n(A \cap B \cap C') = 2$

$n(A \cap C) = 5$

$n(A) = 17$

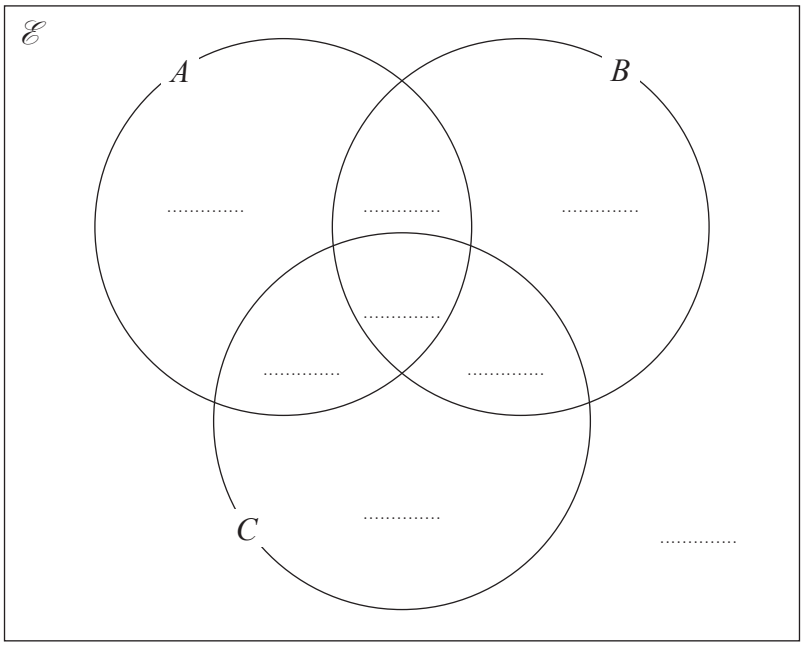
$n\left([A \cup B \cup C]'\right) = 3$

$n(A' \cap B \cap C') = 6$

$n(B \cap C) = 7$

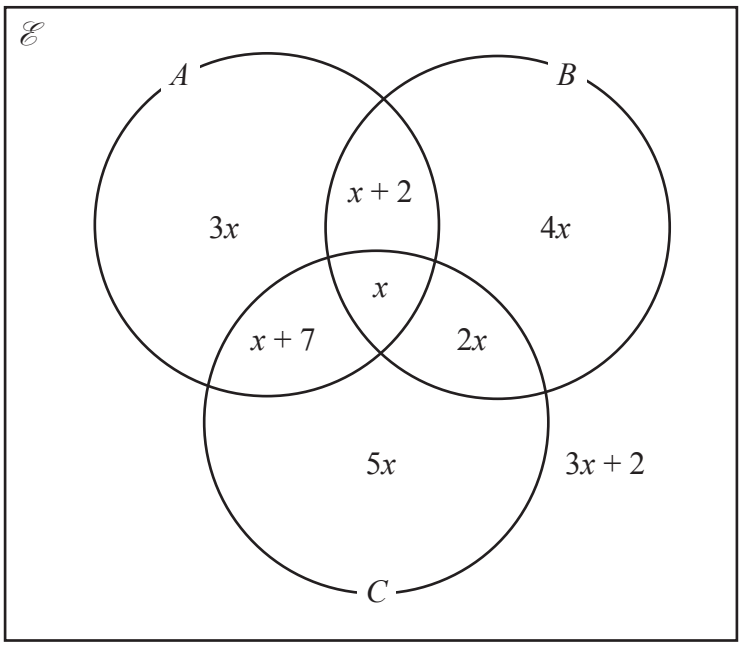
$n(C) = 14$

Complete the Venn diagram to show the number of elements in each region.



(Total for Question 20 is 4 marks)

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



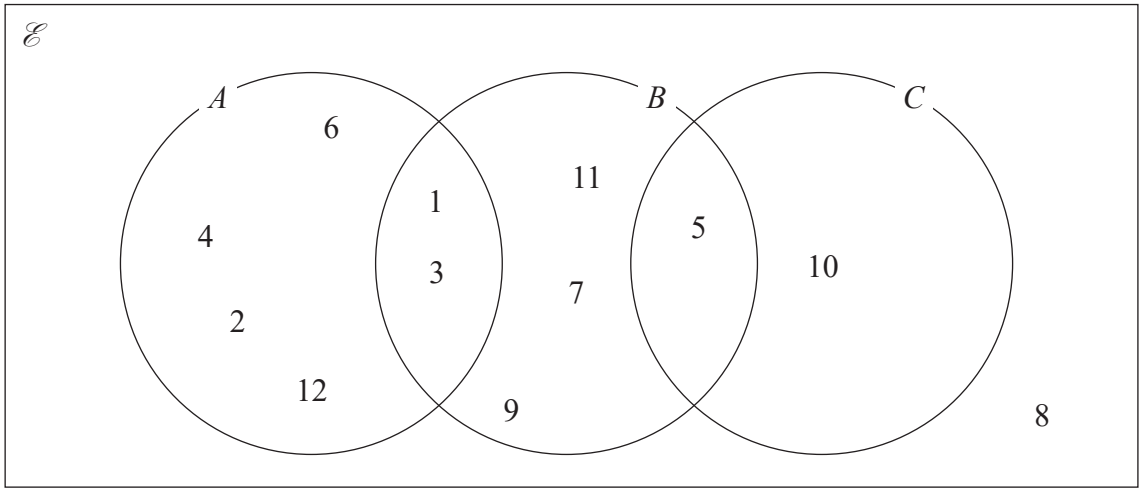
Given that $\mathrm{n}(A \cup B)' = 26$

find $\mathrm{n}(A' \cap C)$

$\mathrm{n}(A' \cap C) =$ .....

(Total for Question 21 is 4 marks)

4 Here is a Venn diagram.



(a) Write down the numbers that are in the set

(i) A

.....

(ii) $B \cup C$

.....

(2)

Brian writes down the statement $A \cap C = \emptyset$

(b) Is Brian's statement correct?
You must give a reason for your answer.

.....

.....

(1)

One of the numbers in the Venn diagram is picked at random.

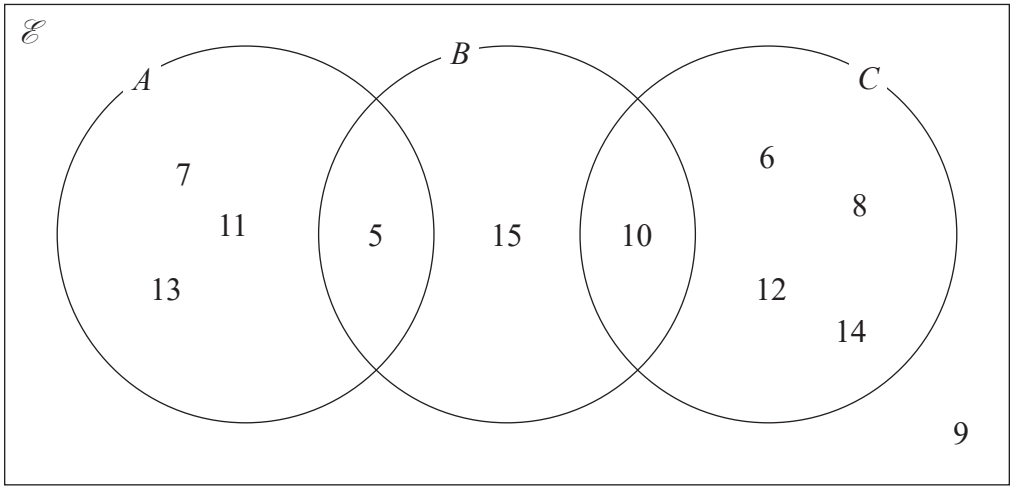
(c) Find the probability that this number is in set C'

.....

(2)

(Total for Question 4 is 5 marks)

2 Here is a Venn diagram.



(a) Write down the numbers that are in the set

(i) A

.....

(1)

(ii) $B \cup C$

.....

(1)

Dominic writes down $9 \notin C$

(b) Explain why Dominic is correct.

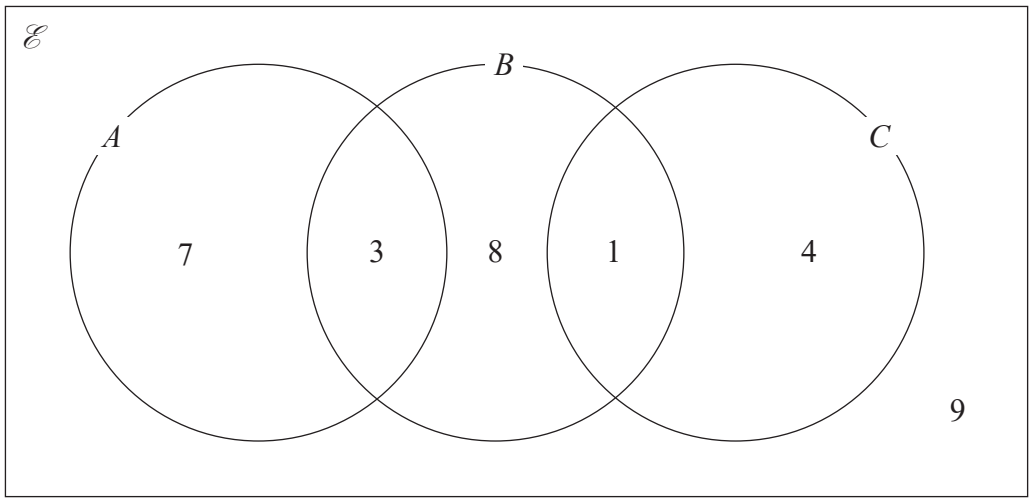
.....

.....

(1)

(Total for Question 2 is 3 marks)

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



7, 3, 8, 1, 4 and 9 represent the **numbers** of elements.

Find

(i) $n(A \cup B)$

.....

(ii) $n(A' \cap C)$

.....

(iii) $n(A' \cup B')$

.....

(Total for Question 15 is 3 marks)