6.7 Set Notation and Venn Diagrams

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22 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
$A = \{\text{even numbers}\}$
$B = \{4, 7, 8, 11\}$

(a) List the members of $A \cup B$

.....

(1)

(b) Is it true that $20 \in A$?
Give a reason for your answer.

.....

.....

(1)

C is a set such that $A \cap C = \varnothing$ **and** $B \cap C = \{7\}$
The set C has 3 members.

(c) List the members of one possible set C.

.....

(2)

24 $\mathscr{E} = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13\}$

$A = \{2, 4, 6, 8, 10, 12\}$
$B = \{3, 6, 9, 12\}$

(a) List the members of the set $A \cup B$

.....

(1)

C is a set with 4 members.

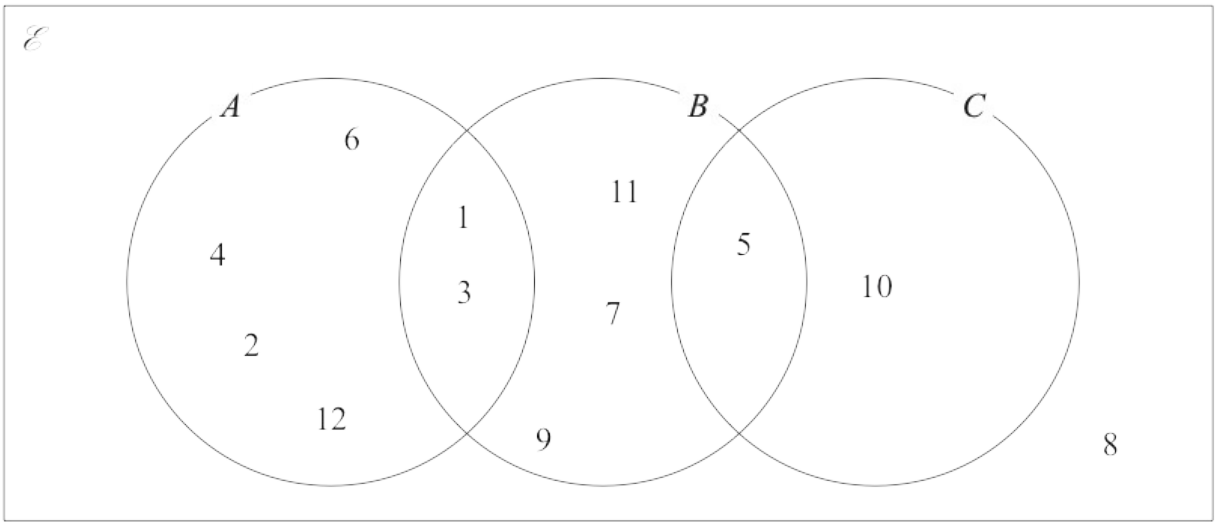
$A \cap C = \varnothing$ and $B \cap C = \varnothing$

(b) List the members of set C

.....

(2)

17 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)

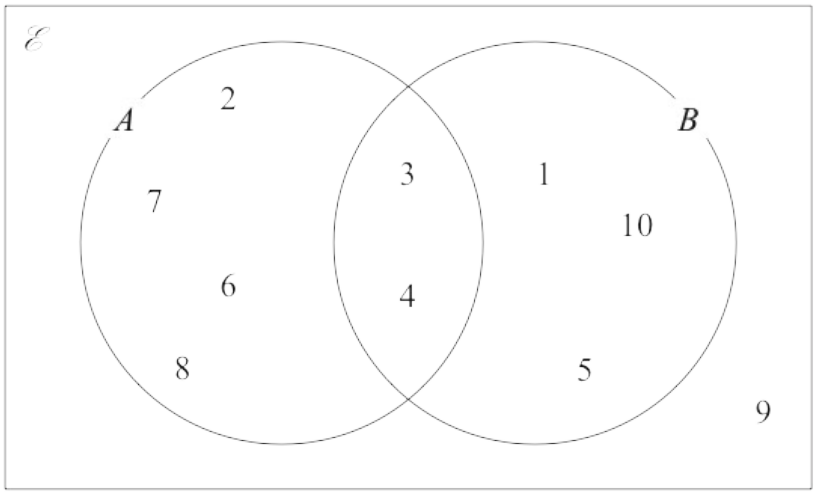
One of the numbers in the Venn diagram is picked at random.

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

.....

(2)

12 The Venn diagram shows the numbers in the universal set, $\mathscr{E}$, and two sets A and B.



(a) List the members of the set

(i) A

.....

(ii) $A \cap B$

.....

(iii) A'

.....

(3)

A number is picked at random from the universal set.

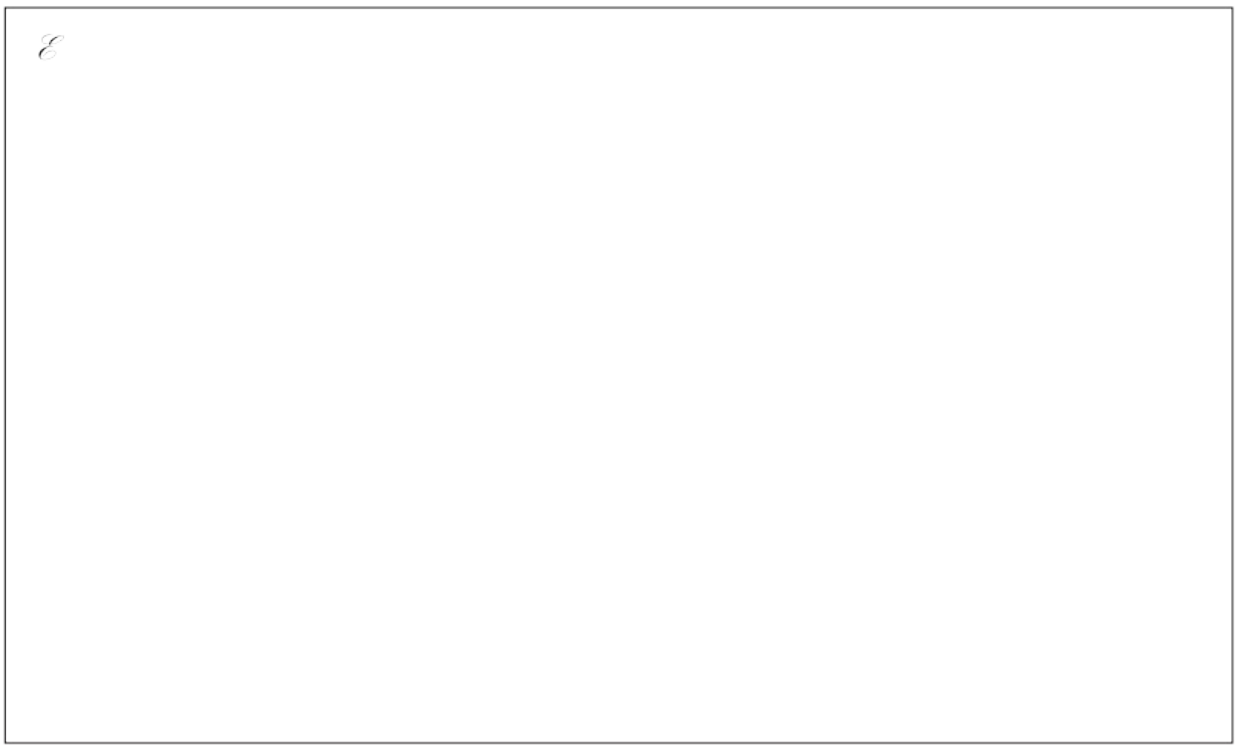
(b) Find the probability that this number is in set B but not in set A.

.....

(2)

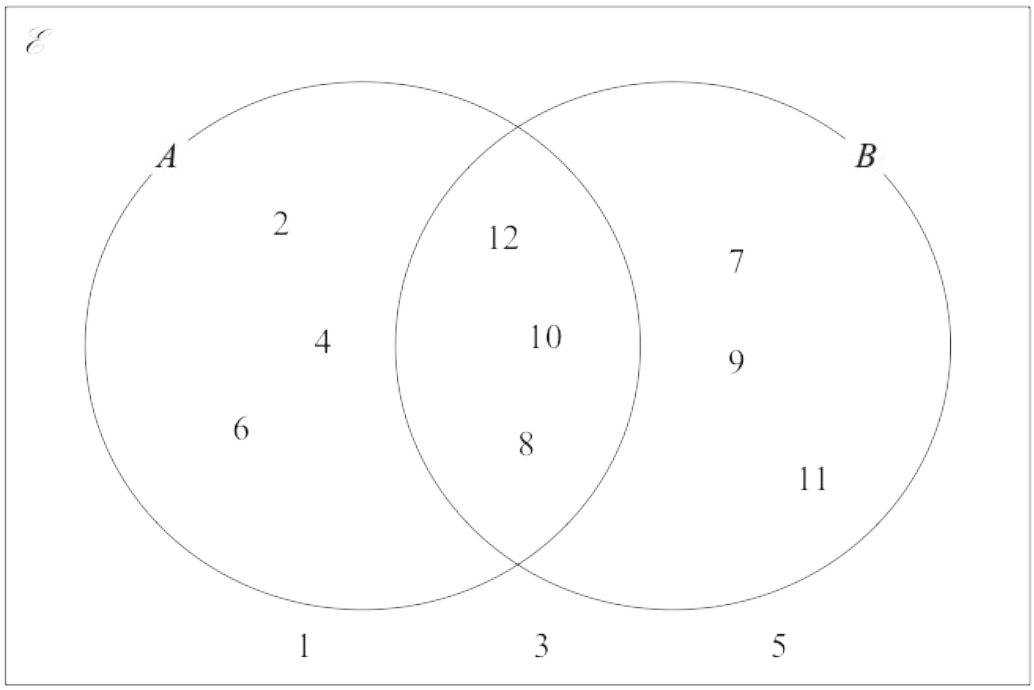
18 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
$A = \{\text{odd numbers}\}$
$A \cap B = \{1, 3\}$
$A \cup B = \{1, 2, 3, 4, 5, 6, 7, 9, 11, 12\}$

Draw a Venn diagram to show this information.



(Total for Question 18 is 4 marks)

19 Here is a Venn diagram with $\mathscr{E}$ = {whole numbers from 1 to 12}



(a) List the numbers that are in set A

(1)

(b) List the numbers that are in set $A \cap B$

(1)

(c) List the numbers that are in set $(A \cup B)'$

(1)

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

(d) Find the probability that this number is in set $A \cup B$

(2)

14 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$A = \{2, 3, 5, 7\}$
$B = \{4, 6, 8, 10\}$

(a) Explain why $A \cap B = \varnothing$

(1)

$x \in \mathscr{E}$ and $x \notin A \cup B$

(b) Write down the **two** possible values of x.

(1)

Set C is such that

$A \cup B \cup C = \mathscr{E}$
$A \cap C = \{2\}$
$B \cap C' = \{4, 6, 10\}$

(c) List all the members of set C.

(2)

17 $\mathscr{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$
$A = \{\text{even numbers}\}$
$B = \{\text{multiples of 3}\}$

List the members of the set

(i) $A \cap B$

.....

(ii) $A \cup B$

.....

(iii) A'

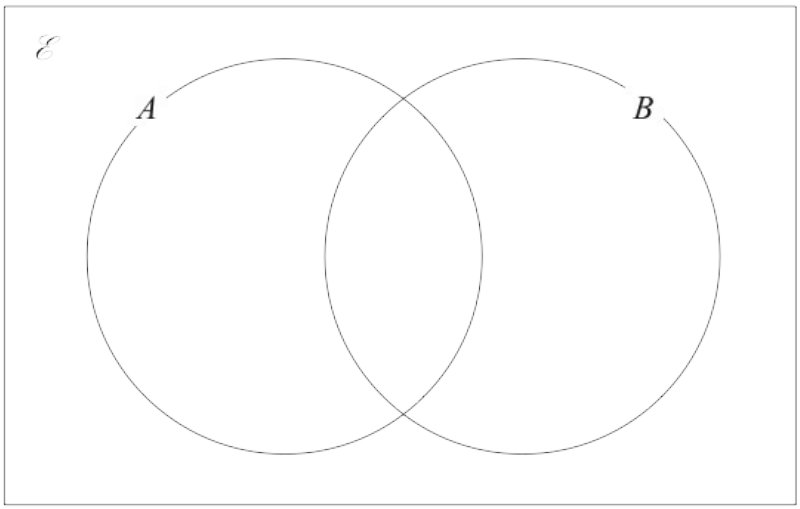
.....

(Total for Question 17 is 3 marks)

16 $\mathscr{E} = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{multiples of 5}\}$
$B = \{\text{even numbers}\}$

Complete the Venn diagram for this information.



(Total for Question 16 is 3 marks)

17 $B = \{b, l, u, e\}$

$G = \{g, r, e, y\}$

$W = \{w, h, i, t, e\}$

(a) List all the members of the set

(i) $B \cup G$

(ii) $W \cap G'$

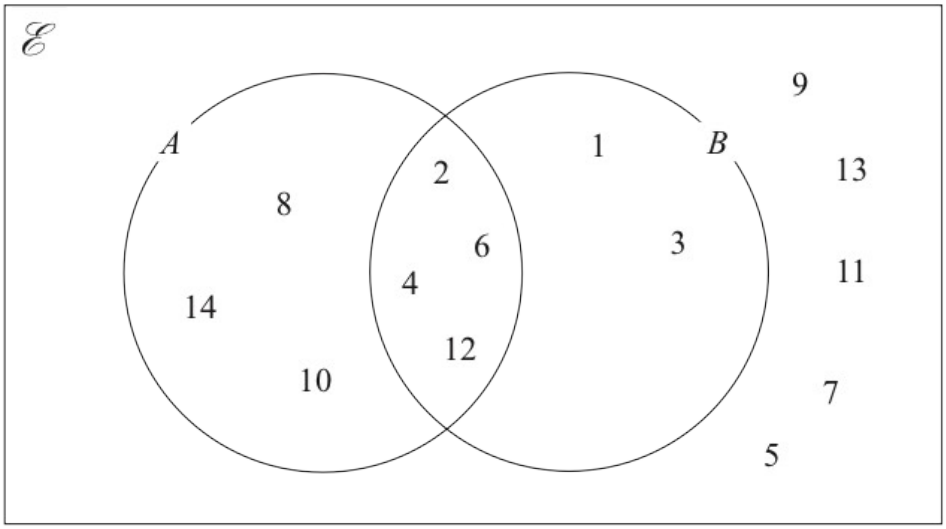
(2)

Serena writes down the statement $B \cap G \cap W = \varnothing$

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

(1)

14 The numbers from 1 to 14 are shown in the Venn diagram.



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

.....

(1)

(b) List the members of the set B'

.....

(1)

A number is picked at random from the numbers in the Venn diagram.

(c) Find the probability that this number is in set A but is **not** in set B.

.....

(2)

20 $\mathscr{E} = \{20, 21, 22, 23, 24, 25, 26, 27, 28, 29\}$

$A = \{\text{odd numbers}\}$
$B = \{\text{multiples of 3}\}$

List the members of the set

(i) $A \cap B$

.....

(1)

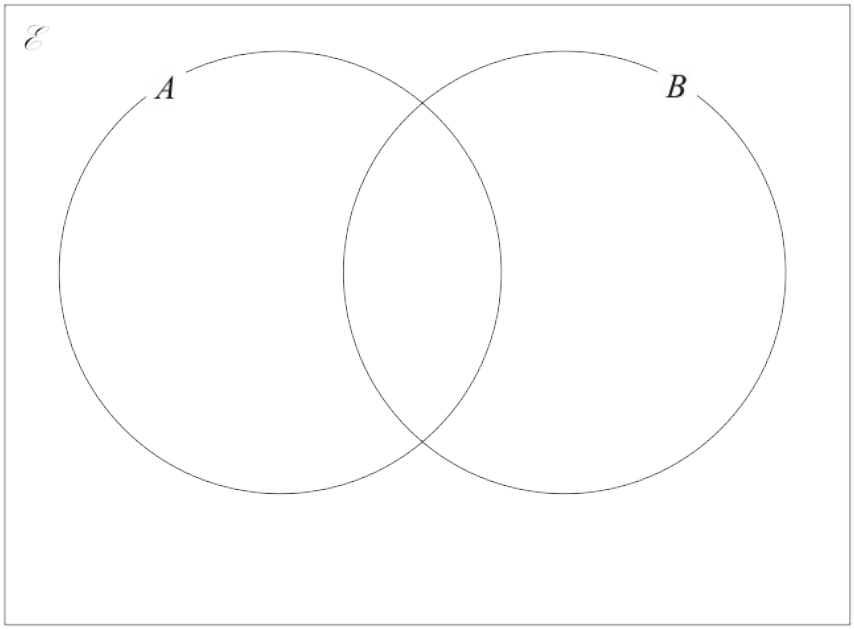
(ii) $A \cup B$

.....

(1)

14 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
$A = \{2, 4, 6, 8, 10, 12\}$
$B = \{3, 6, 9, 12\}$

(a) Complete the Venn diagram below for the sets $\mathscr{E}$, A and B.



(3)

One of the numbers in $\mathscr{E}$ is to be chosen at random.

(b) Find the probability that this number is not in set A **and** not in set B.

.....

(2)

14 $\mathscr{E} = \{21, 22, 23, 24, 25, 26, 27, 28, 29, 30\}$
$A = \{22, 24, 26, 28, 30\}$
$B = \{21, 24, 27, 30\}$

(a) List the members of the set

(i) $A \cap B$

.....

(ii) A'

.....

(2)

$C = \{23, 25, 29\}$

(b) Using set notation, find an expression for C in terms of A and B.

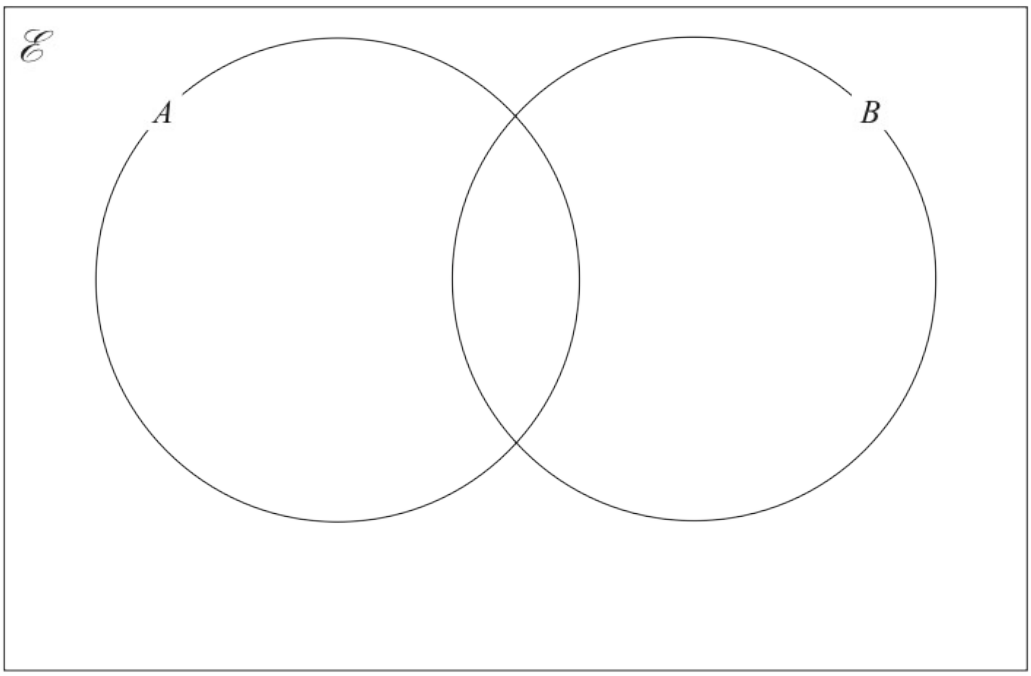
.....

(1)

14 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

$A = \{\text{even numbers}\}$

$B = \{\text{multiples of 3}\}$



Complete the Venn diagram for the sets $\mathscr{E}$, A and B.

(Total for Question 14 is 3 marks)

18 $\mathscr{E}$ = {letters of the alphabet}
B = {b, r, a, z, i, l}
I = {i, r, e, l, a, n, d}

(a) List the members of the set

(i) $B \cup I$

.....

(ii) $B \cap I'$

.....

(2)

K = {k, e, n, y, a}

Cody writes down the statement $B \cap K = \varnothing$
Cody's statement is wrong.

(b) Explain why.

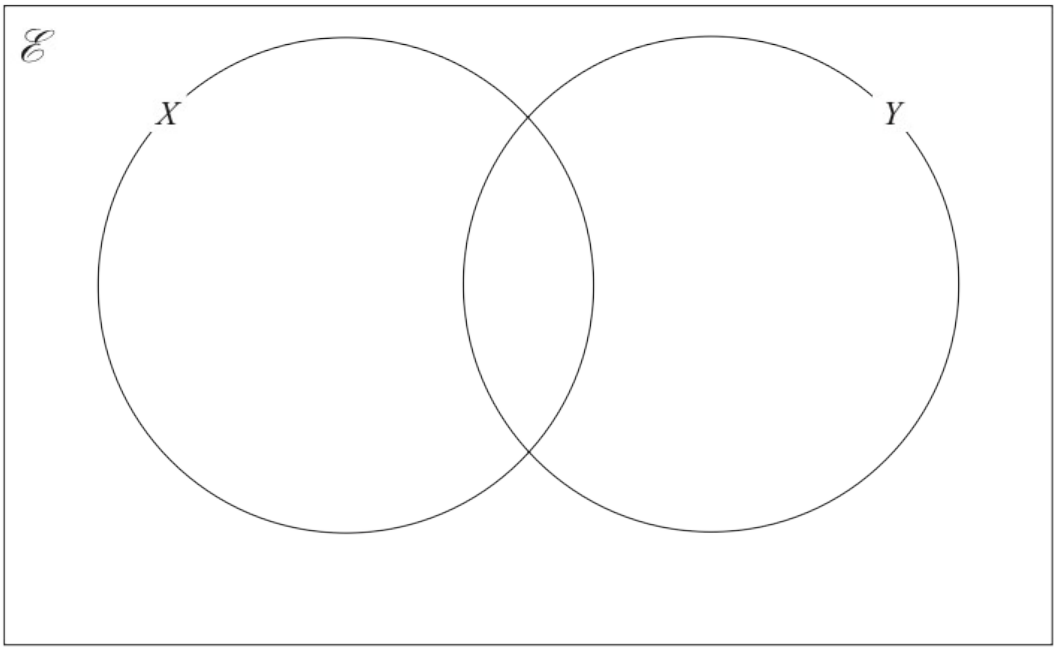
.....

.....

(1)

15 $\mathscr{E} = \{2, 4, 6, 8, 10, 12, 14, 16, 18\}$
$X = \{4, 8, 12, 16\}$
$Y = \{6, 12, 18\}$

(a) Complete the Venn diagram for this information.



(3)

A number is chosen at random from $\mathscr{E}$

(b) Find the probability that the number is in the set $X \cup Y$

.....

(2)

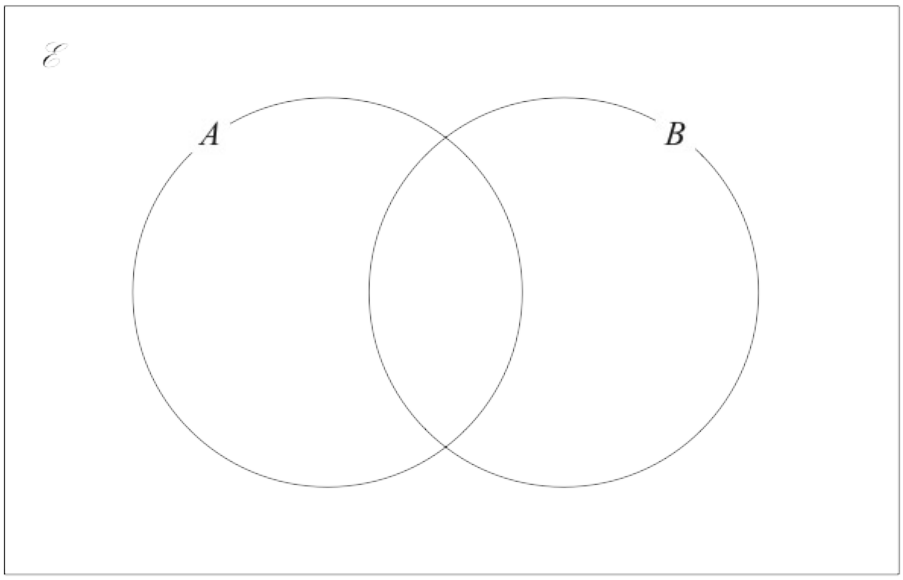
22 $\mathscr{E} = \{4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15\}$

$A \cap B = \{5, 10, 15\}$

$B' = \{7, 8, 9, 11, 12, 13, 14\}$

$A' = \{4, 6, 7, 8, 14\}$

Complete the Venn diagram for this information.



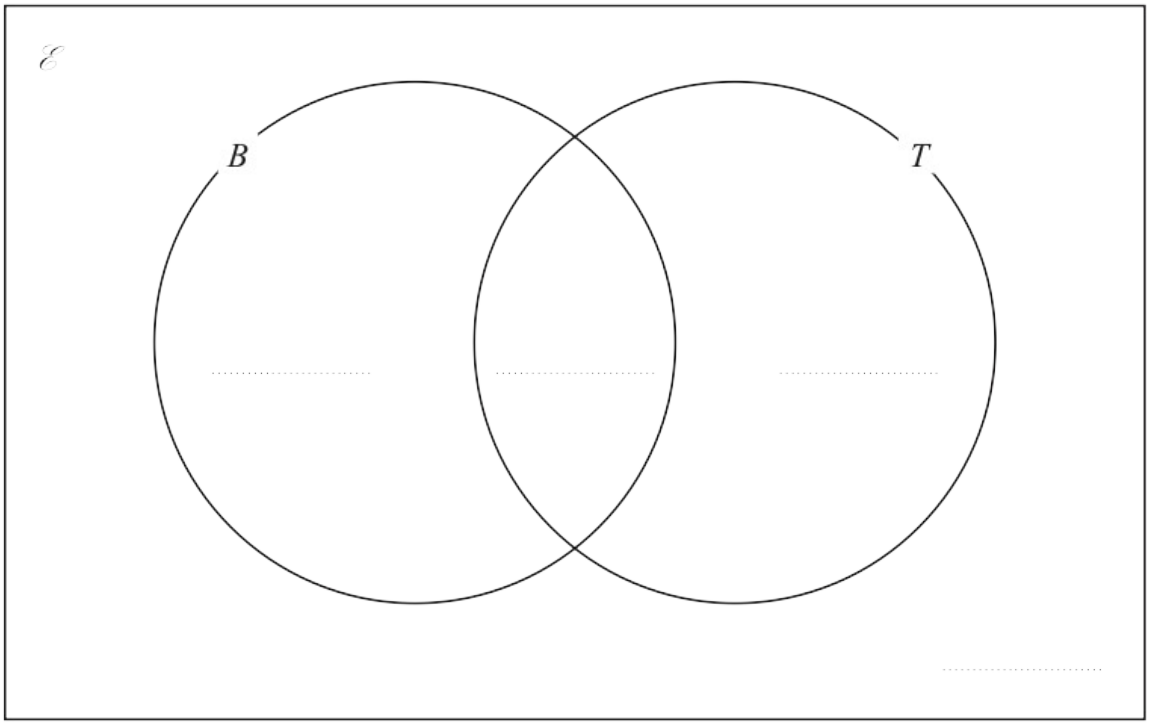
(Total for Question 22 is 3 marks)

10 50 students have lessons at a dance school.
Two of the lessons are ballet lessons (B) and tap lessons (T).

Of the 50 students

31 have ballet lessons
27 have tap lessons
18 have ballet lessons and tap lessons

Complete the Venn diagram for this information.

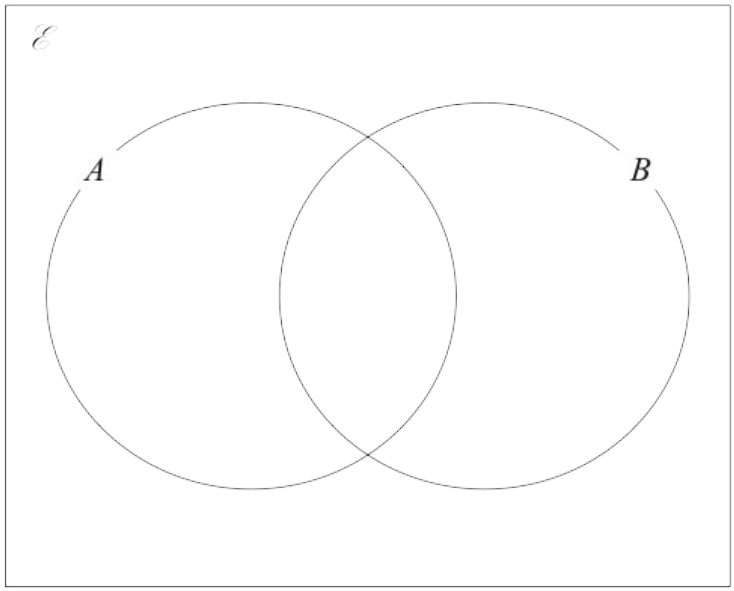


(Total for Question 10 is 3 marks)

16 $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$A = \{2, 3, 7, 8, 9\}$
$B = \{1, 2, 4, 5, 7, 8, 10\}$

Complete the Venn diagram for this information.



(Total for Question 16 is 3 marks)

21 $\mathscr{E} = \{9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$
$A = \{\text{multiples of } 3\}$
$B = \{\text{odd numbers}\}$

(a) List the members of the set

(i) $A \cap B$

.....

(1)

(ii) $A \cup B$

.....

(1)

(b) Is it true that $24 \in A$?

Tick one of the boxes below.

Yes	No
☐	☐

Give a reason for your answer.

.....

.....

(1)

Set C has 4 members such that $C \cap B' = \{10, 18\}$

(c) List the members of one possible set C

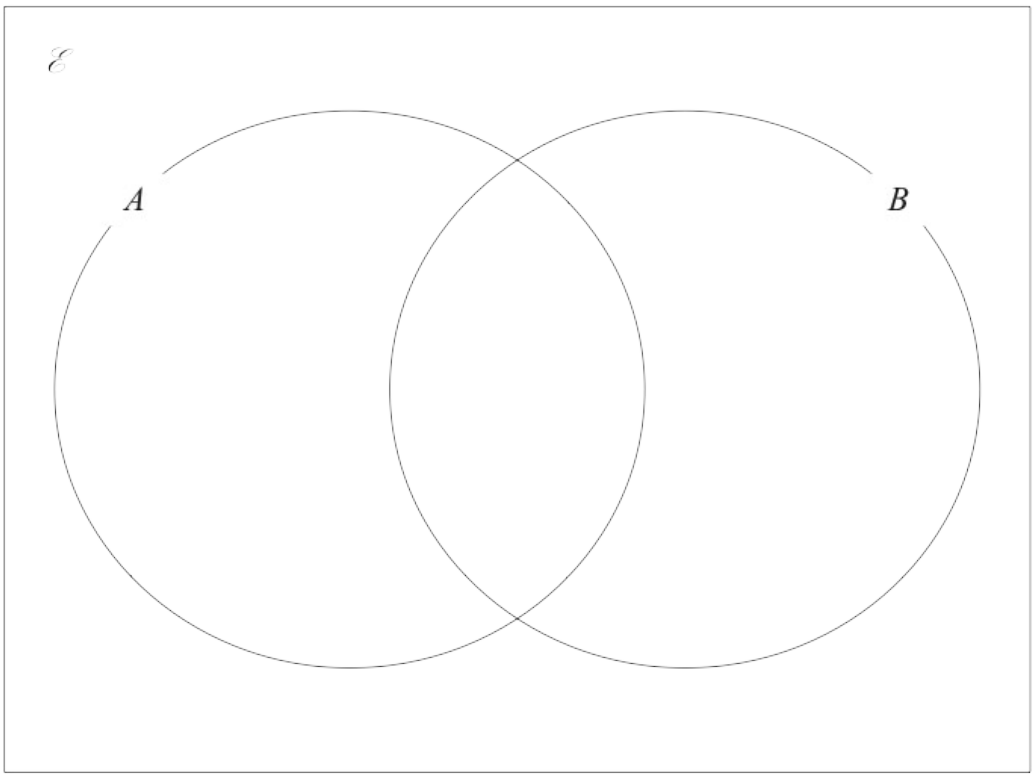
.....

(2)

18 $\mathscr{E} = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

$A = \{\text{even numbers}\}$
$A \cap B = \{12, 16, 20\}$
$(A \cup B)' = \{17, 19\}$

Complete the Venn diagram for the sets $\mathscr{E}$, A and B



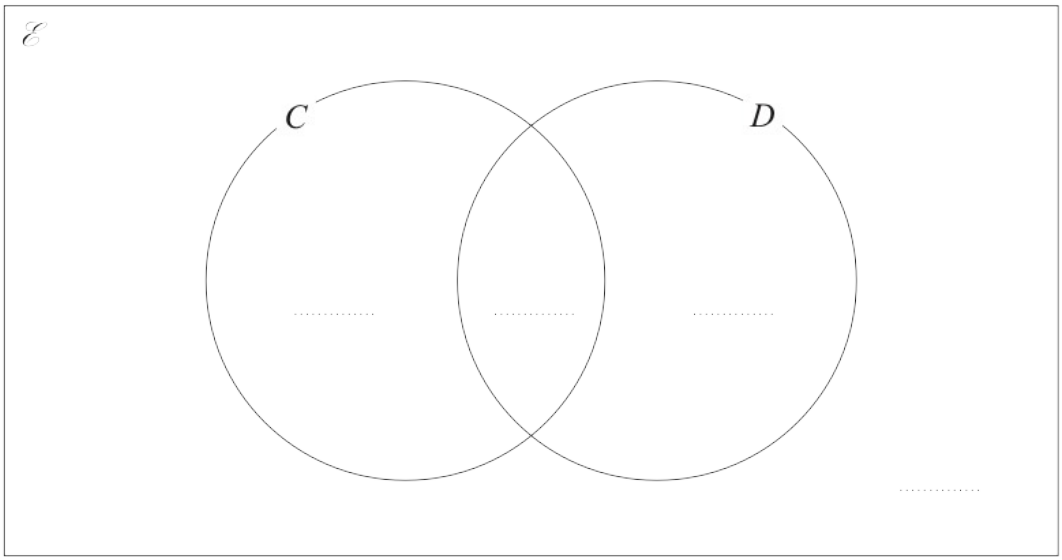
(Total for Question 18 is 3 marks)

12 30 children were asked whether they have a cat (C) or a dog (D)

Of the 30 children

5 have both a cat and a dog
13 have a dog
11 have **only** a cat

(a) Complete the Venn diagram.



(3)

One of the children is picked at random.

(b) Find the probability that this child

(i) has a dog,

.....

(1)

(ii) does not have a dog and does not have a cat.

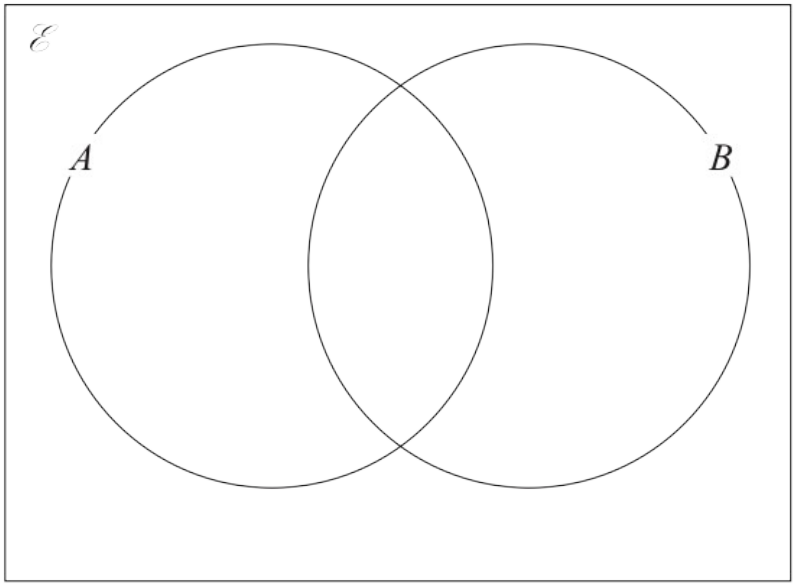
.....

(1)

15 $\mathscr{E} = \{5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$

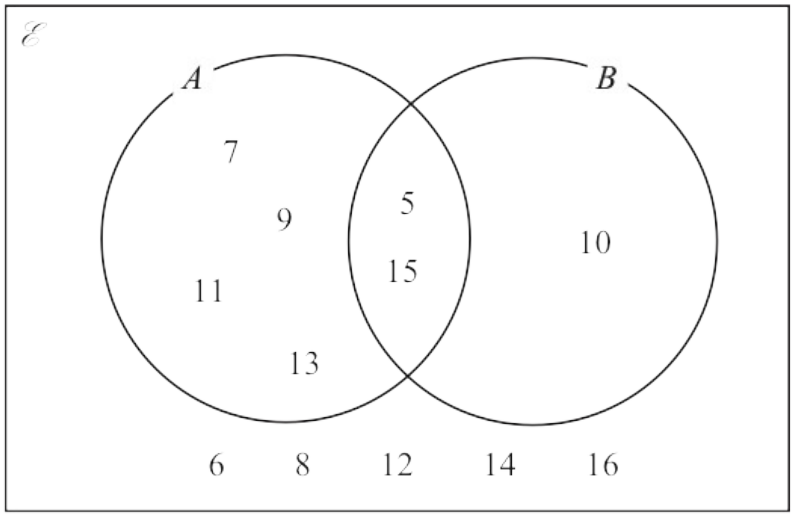
A = {odd numbers}
B = {multiples of 5}

Complete the Venn diagram for this information.



(Total for Question 15 is 3 marks)

15 Here is a Venn diagram.



List the members of the set

(a) A

.....

(1)

(b) $A \cap B$

.....

(1)

(c) $(A \cup B)'$

.....

(1)