IGCSE 0580 PAST PAPER 2 EXTENDED:

SET THEORY AND VENN DIAGRAM

2002 - 2010

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1 Three sets A, B and K are such that $A \subset K$, $B \subset K$ and $A \cap B = \emptyset$.
Draw a Venn diagram to show this information.

[2]

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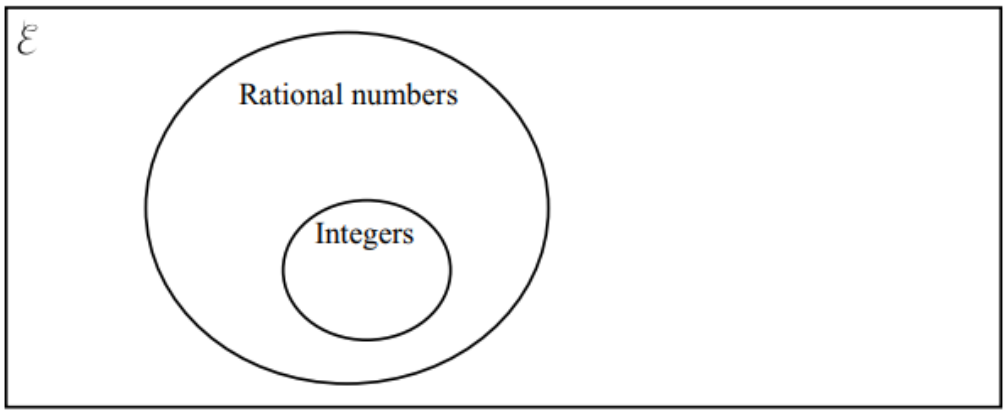
2 Write each of these four numbers in the correct place in the Venn Diagram below.

$$2.6, \quad \frac{4}{17}, \quad \sqrt{12}, \quad \sqrt{\frac{112}{7}}$$



[4]

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3 $\mathscr{E} = \{-2\frac{1}{2}, \ -1, \ \sqrt{2}, \ 3.5, \ \sqrt{30}, \ \sqrt{36}\}$
$X = \{\text{integers}\}$
$Y = \{\text{irrational numbers}\}$
List the members of

(a) X,

Answer (*a*) $X = \{$ .....$\}$ [1]

(b) Y.

Answer (*b*) $Y = \{$ .....$\}$ [1]

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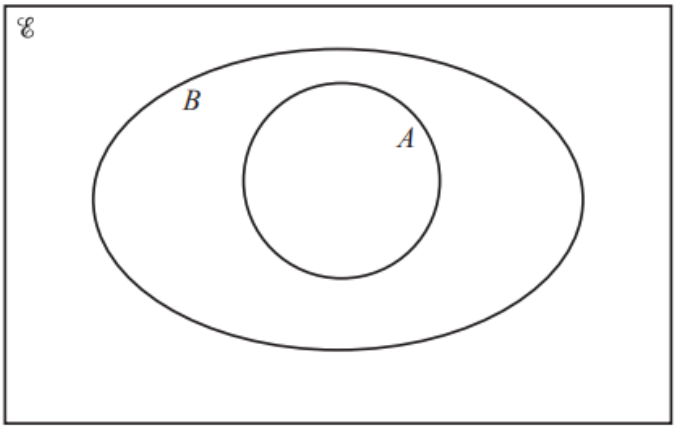
4

$\mathscr{E}$ = {40, 41, 42, 43, 44, 45, 46, 47, 48, 49}
A = {prime numbers}
B = {odd numbers}

(a) Place the 10 numbers in the correct places on the Venn diagram.



[2]

(b) State the value of $n(B \cap A')$.

Answer(b) ..... [1]

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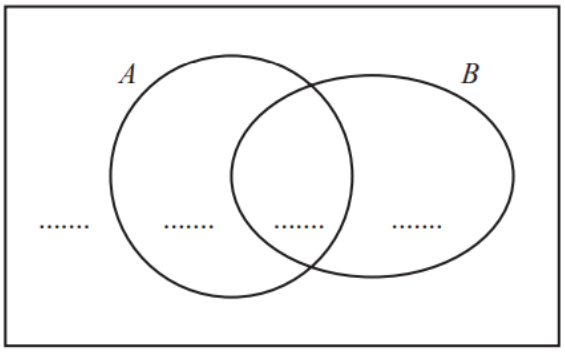
5

$n(\mathscr{E}) = 21$, $n(A \cup B) = 19$, $n(A \cap B') = 8$ and $n(A) = 12$.
Complete the Venn diagram to show this information.

Answer $\mathscr{E}$

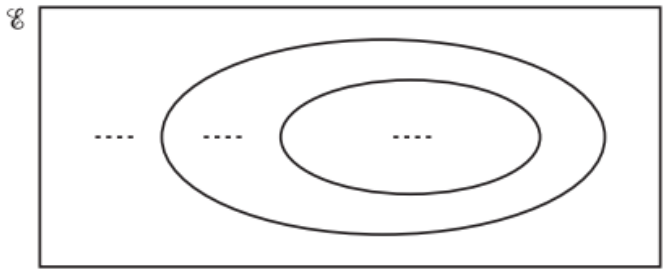


[3]

0580/02, 0581/02 Jun 05

6 $n(A) = 18$, $n(B) = 11$ and $n(A \cup B)' = 0$.

(a) Label the Venn diagram to show the sets A and B where $n(A \cup B) = 18$.
Write down the number of elements in each region.



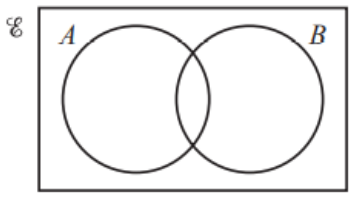
[2]

(b) Draw another Venn diagram to show the sets A and B where $n(A \cup B) = 29$.
Write down the number of elements in each region.

[2]

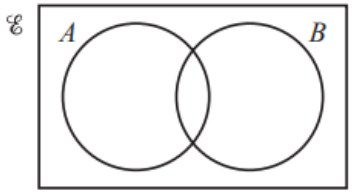
7

(a) Shade the region $A \cap B$.



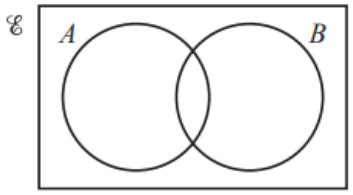
[1]

(b) Shade the region $(A \cup B)'$.



[1]

(c) Shade the complement of set B.



[1]

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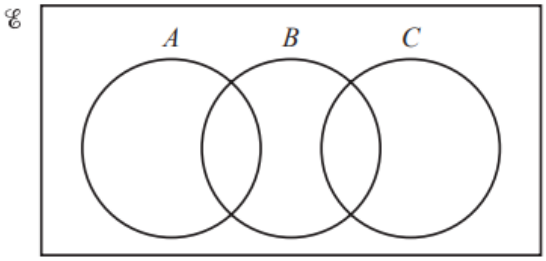
8

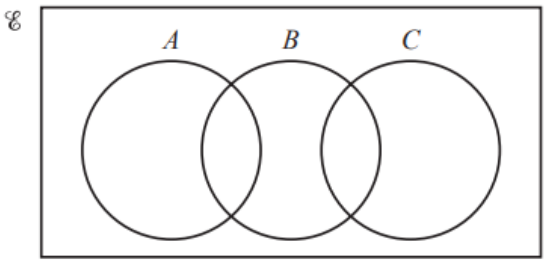
On the Venn diagrams shade the regions

(a) $A' \cap C'$,



[1]

(b) $(A \cup C) \cap B$.



[1]

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9 A and B are sets.
Write the following sets in their simplest form.

(a) $A \cap A'$.

Answer(a) ..... [1]

(b) $A \cup A'$.

Answer(b) ..... [1]

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

Answer(c) ..... [1]

10 $\mathscr{E} = \{1,2,3,4,5,6,7,9,11,16\}$ $P = \{2,3,5,7,11\}$ $S = \{1,4,9,16\}$ $M = \{3,6,9\}$

(a) Draw a Venn diagram to show this information.

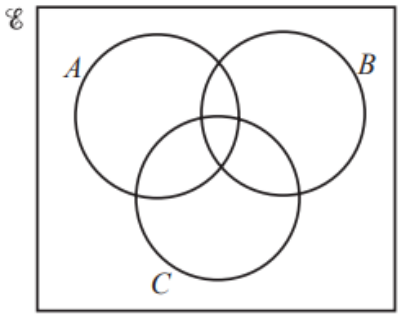
[2]

(b) Write down the value of $n(M' \cap P)$.

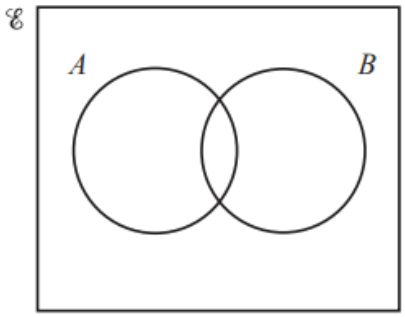
Answer(b) ..... [1]

0580/21/M/J/08

11 Shade the region required in each Venn Diagram.



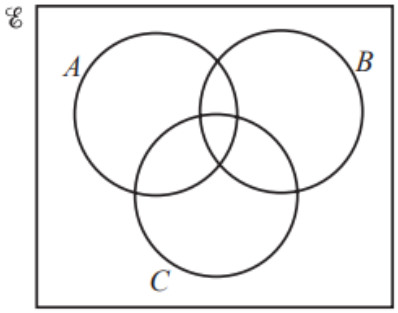
$A \cap B \cap C$



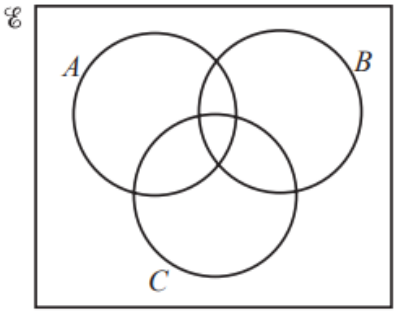
$A \cup B'$ [2]

0580/22/M/J/09

12 Shade the region required in each Venn Diagram.



$A' \cap (B \cap C)$



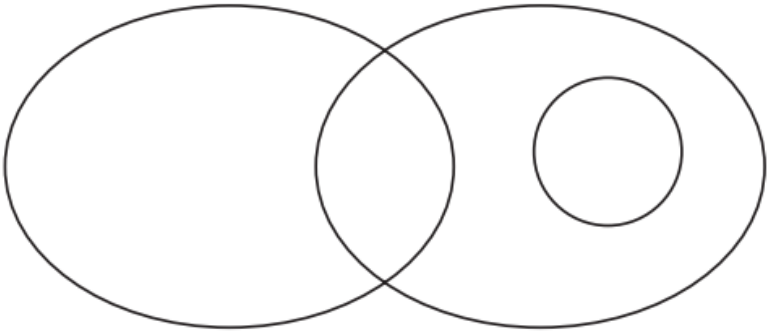
$A' \cap (B \cup C)$

[2]

0580/21/O/N/09

13 $Q = \{2, 4, 6, 8, 10\}$ and $R = \{5, 10, 15, 20\}$.
$15 \in P$, $n(P) = 1$ and $P \cap Q = \emptyset$.

Label each set and complete the Venn diagram to show this information.



[3]

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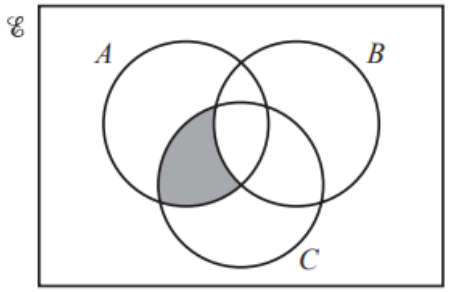
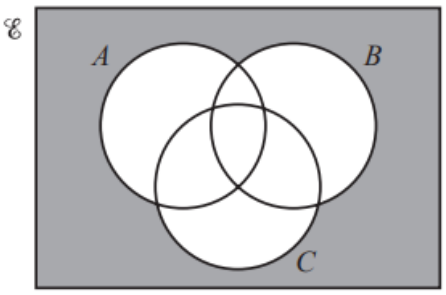


The shaded area in the diagram shows the set $(A \cap C) \cap B'$.

Write down the set shown by the shaded area in each diagram below.



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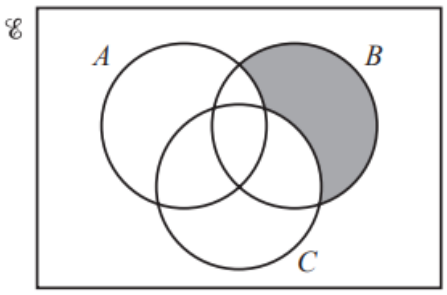
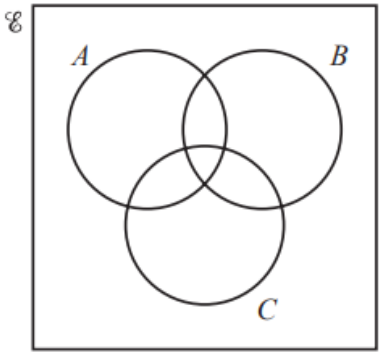


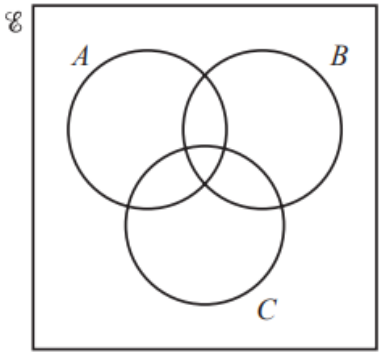
.....

[2]

15 Shade the required regions in the Venn diagrams below.



$(A \cup B)' \cap C$



$(A \cap B) \cup C$

[2]

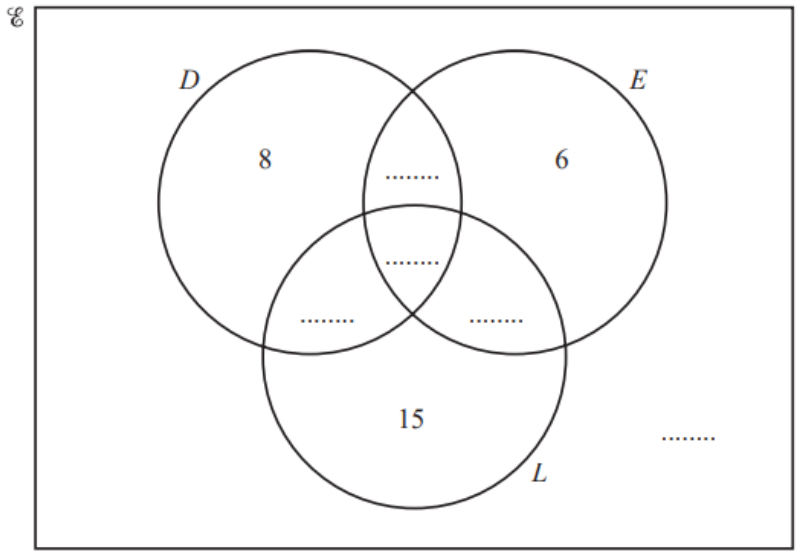
16 In a survey of 60 cars, 25 use diesel, 20 use liquid hydrogen and 22 use electricity.

No cars use all three fuels and 14 cars use both diesel and electricity.

There are 8 cars which use diesel only, 15 cars which use liquid hydrogen only and 6 cars which use electricity only.

In the Venn diagram below

$\mathscr{E}$ = {cars in the survey},
D = {cars which use diesel},
L = {cars which use liquid hydrogen},
E = {cars which use electricity}.



(a) Use the information above to fill in the five missing numbers in the Venn diagram. [4]

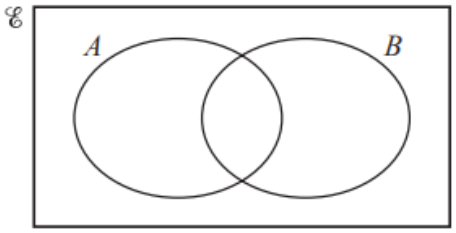
(b) Find the number of cars which use diesel but not electricity.

Answer(b) ..... [1]

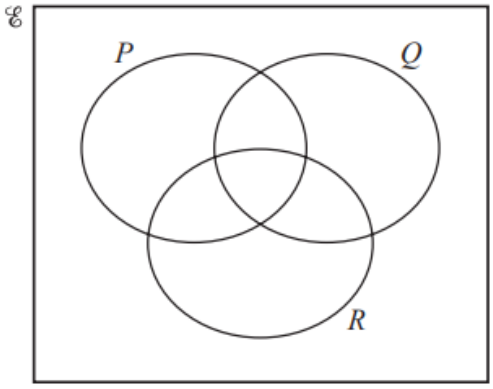
(c) Find $n(D' \cap (E \cup L))$.

Answer(c) ..... [1]

17 Shade the required region on each Venn diagram.



$A \cap B'$



$(P \cup Q) \cap R'$

[2]