Question 1

(i) Complete the Venn diagram.

(ii) List the elements of each of the following sets:

$A \cap B =$	$\{2, 4, 6\}$
$B \setminus (A \cap C) =$	$\{2, 6, 8, 10\}$
$(B \setminus A) \cup (B \setminus C) =$	$\{2, 6, 8, 10\}$
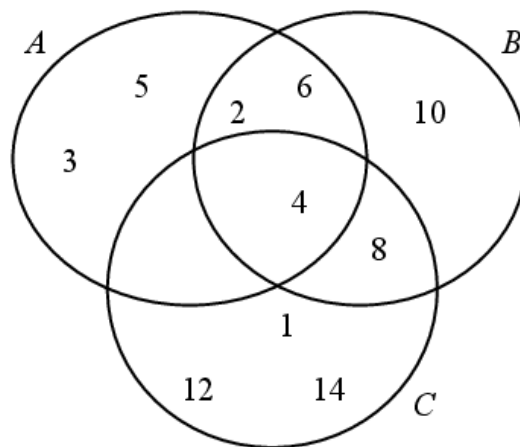
(iii) Write down a null set, in terms of A, B, and C.
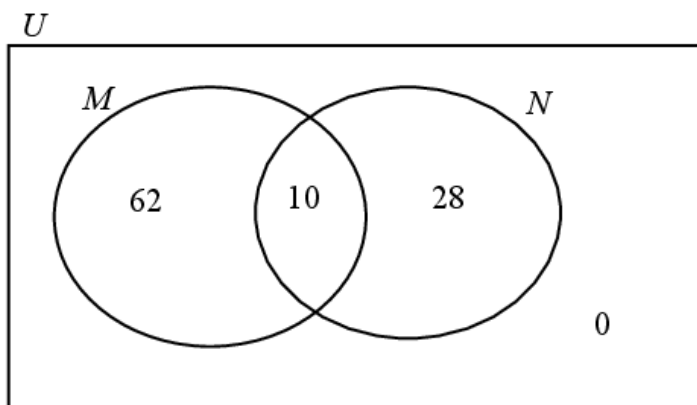
$(A \cap C) \setminus B$ *or equivalent.*

Question 2

(b) In a table quiz, 100 questions were asked. Team M answered 72 questions correctly. Team N answered 38 questions correctly.

(i) Find, with the aid of the Venn diagram, the minimum number of questions answered correctly by both teams.

$72 + 38 = 110$.
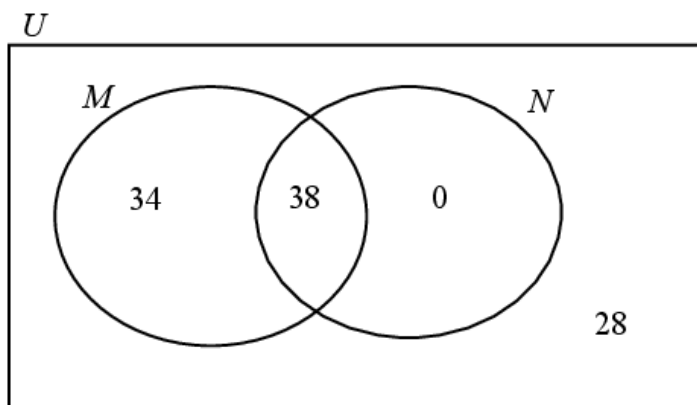$110 - 100 = 10$.
Minimum $= 10$

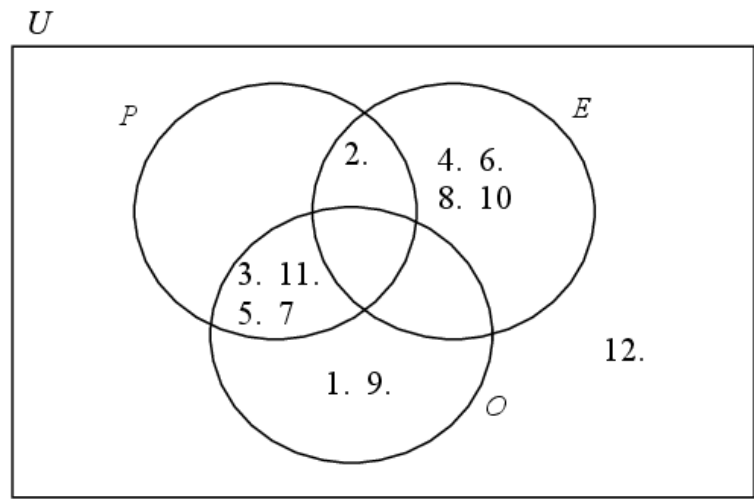*To make* $\#(M \cap N)$ *as small as possible, make* $\#(M \cup N)' = 0$.

(ii) Find, with the aid of the Venn diagram, the maximum number of questions answered correctly by both teams.

Maximum $= 38$

To make $M \cap N$ *as big as possible, make the smaller set a subset of the larger set.*
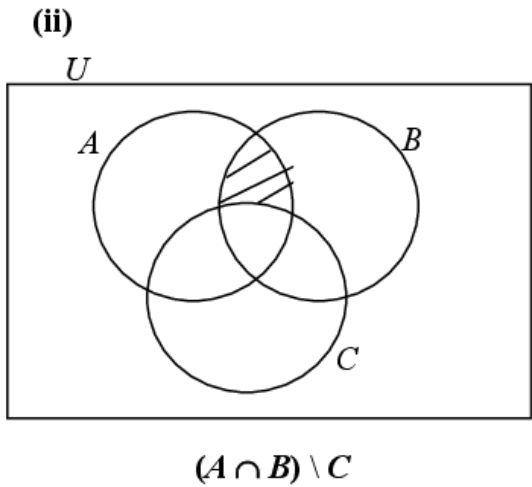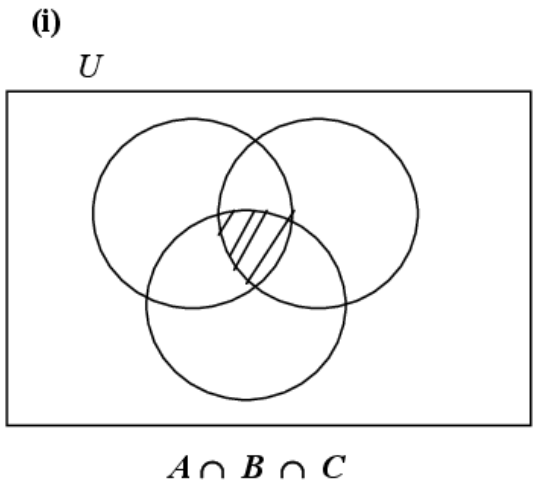
Question 3

U

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           P                                      E
                          2.        4. 6.
                                    8. 10

                    3. 11.
                    5. 7
                                                    12.
                          1. 9.
                                          O
```

(b) Name any set on this diagram (after part **(a)** has been completed) that is a null set.

> P\(E∪O), P∩E∩O, E∩O, (E∩O)\P

(c) If a number is drawn at random from **set P**, what is the probability that it is even?

$$\frac{1}{5}$$

Question 4

(i)

U

A ∩ B ∩ C

(ii)

U

A   B

C

(A ∩ B) \ C

(b) The box on the right contains six statements,
(**note**: P', is the complement of a set P).

A number of the statements are incorrect.
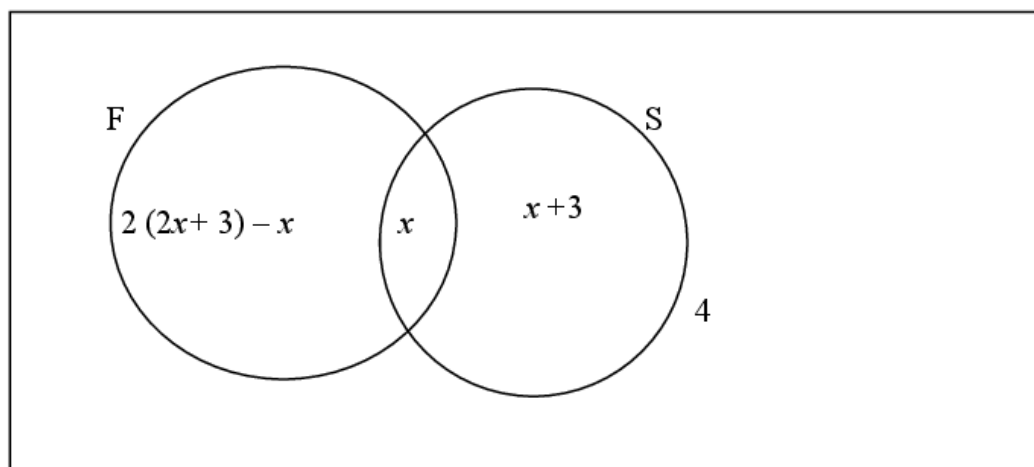
Write down one <u>incorrect</u> statement.

(iv) A\B = B\A   or   (iii) (A\B)\C = A\(B\C)

Draw a diagram **or** give an example to explain your choice.

Diagram or explanation

Find how many had been to both countries.

F $2\,(2x+3)-x$ x $x+3$ S   4

$2\,(2x+3)- x + x + x+ 3 = 34 \Rightarrow x = 5$

Question 5

(a) Represent the information in a Venn diagram.
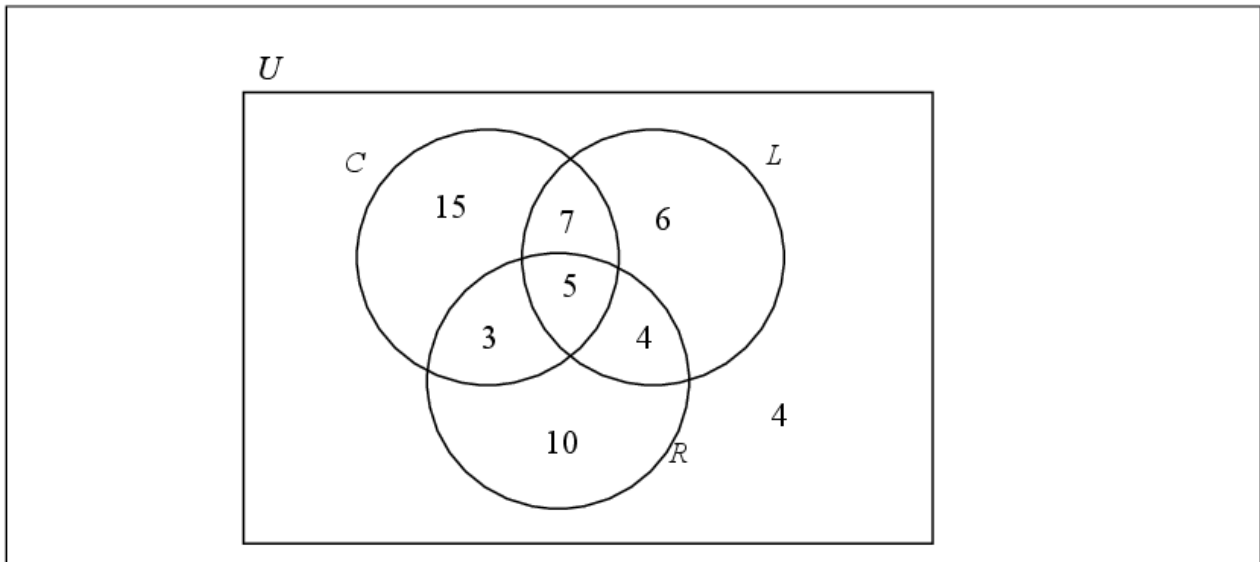
(b) If one person is chosen at random, what is the probability that the person chosen did not vote in any of the three elections?

$$\text{Probability person did not vote} \quad = \quad \frac{4}{54} \quad \text{or} \quad \frac{2}{27}$$

(c) If one person is chosen at random, what is the probability that the person chosen voted for at least two different parties?

$$\text{Probability person voted for at least two parties} \quad = \quad \frac{3+5+7+4}{54} = \frac{19}{54}$$

(d) If one person is chosen at random, what is the probability that the person chosen voted for the same party in all three elections?

$$\text{Probability person voted for the same party} \quad = \quad \frac{15+6+10}{54} = \frac{31}{54}$$