| Surname | |
|---|---|
| Other Names | |
| Candidate's Signature | |

# GCSE 9 - 1 Questions

## Venn Diagrams

## Calculator Allowed

**INSTRUCTIONS TO CANDIDATES**

Write your name in the space provided.

Write your answers in the spaces provided in this question paper.

Answer ALL questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
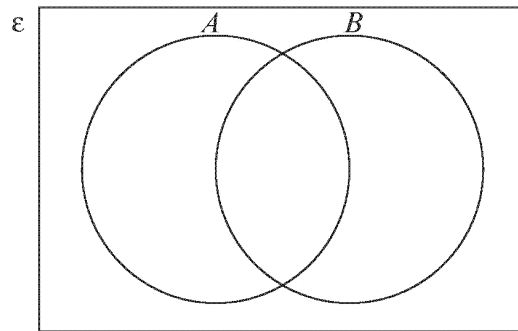
You should have a ruler, compass and protractor where required.

**Total Marks :**

1) On each Venn Diagram, shade the appropriate region to represent the information given in the question.

(a)  $A \cup B$  [1]

$\varepsilon$ $A$ $B$

(b)  $(A \cap B)'$  [1]

$\varepsilon$ $A$ $B$

(c)  $A' \cup B$  [1]

$\varepsilon$ $A$ $B$

**2)** On each Venn diagram, shade the appropriate region to represent the information given in each part of the question.
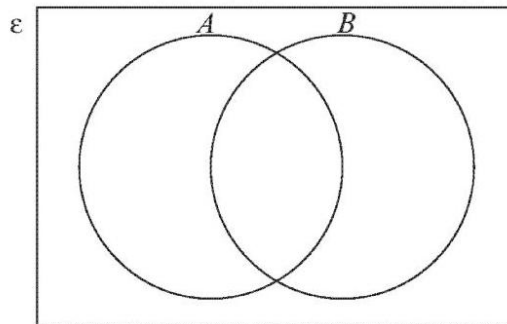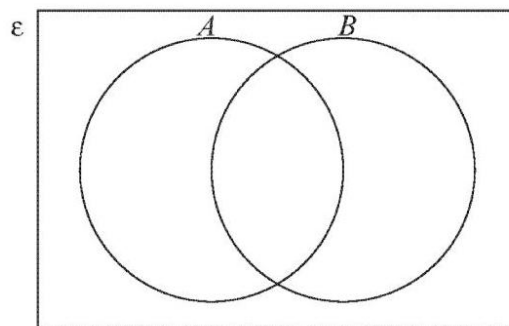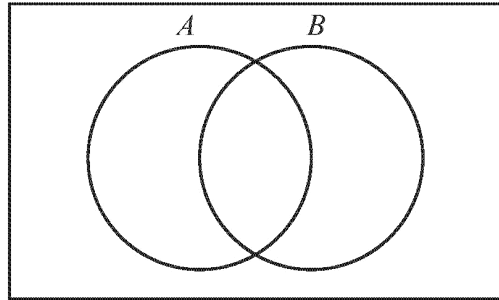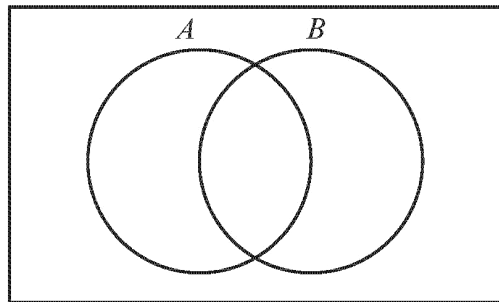
(a)    $A \cap B$



[1]

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



[1]

(c)    $A \cup B'$
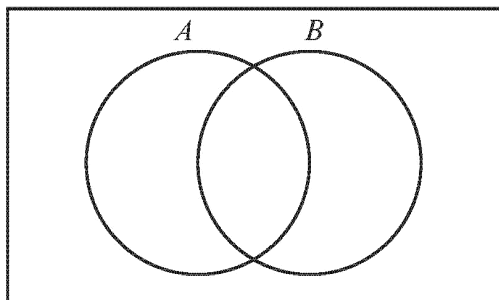


[1]

**3)** Given the following information, complete the Venn diagram shown below.

- $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
- **A** is the set of factors of 24
- **B** is the set of multiples of 3
- **C** is the set of common factors of 30 and 70

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[4]

4) *(a)* Place the whole numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in the correct positions in the Venn diagram. [3]



*(b)* A whole number is selected at random from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Find the probability that the number selected is:

an odd number .................................................................

an odd number that is a factor of 24 .................................................................

not a multiple of 5 and not a factor of 24. ................................................................. [3]

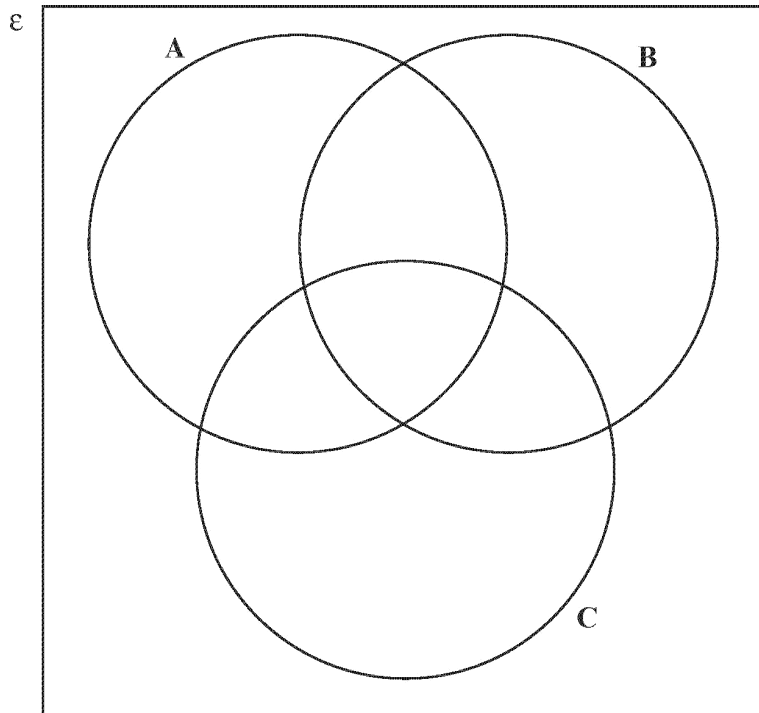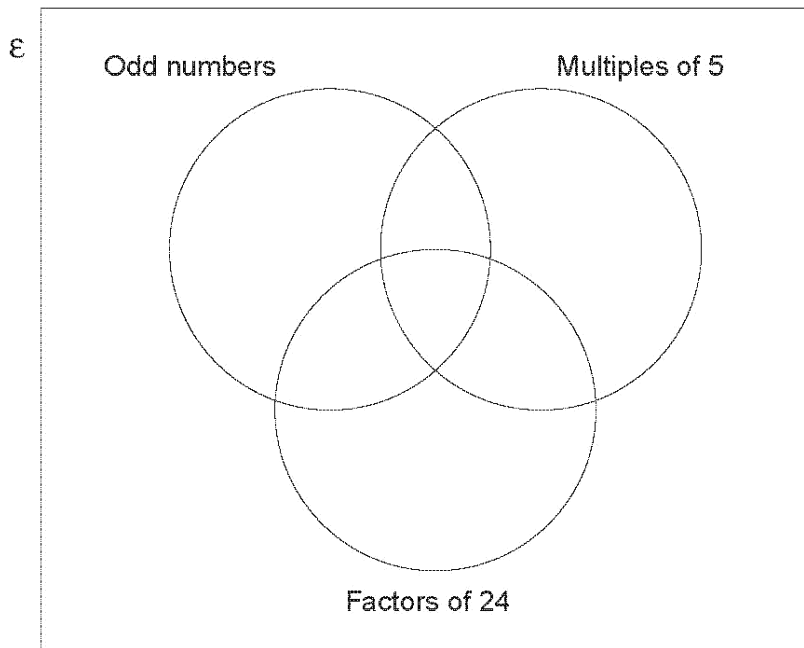5) (a)   Place the whole numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in the correct positions in the Venn
         diagram.                                                                                  [3]
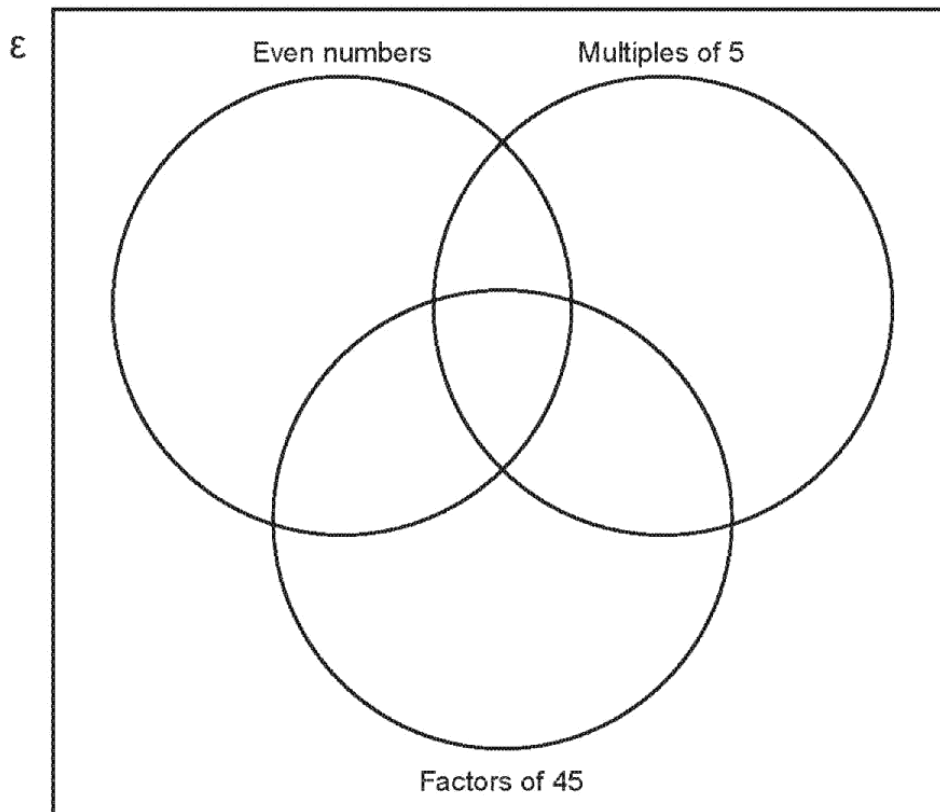
ε   Even numbers          Multiples of 5

Factors of 45

(b)   A whole number is selected at random from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Find the probability that the number selected is                                          [3]

an even number,

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a multiple of 5 that is a factor of 45,

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not a multiple of 5, not a factor of 45 and not an even number.

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6) During a primary school activity day, children could take part in any of three different activites.
80 children played football, 95 children played rounders and 30 children danced.

40 children played football and rounders.
12 children played rounders and danced.
20 children played football and danced.

3 children took part in all three activities.

Draw a Venn diagram to show the above information and find the total number of children who took part in the activity day.

The total number of children who took part in the activity day = ..................................................

[6]

7) *(a)*   A Venn diagram is shown below.
Explain why the circle to represent multiples of 10 is drawn inside the circle to represent multiples of 5.   [1]

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ε

Multiples of 3

Multiples of 10

Multiples of 5
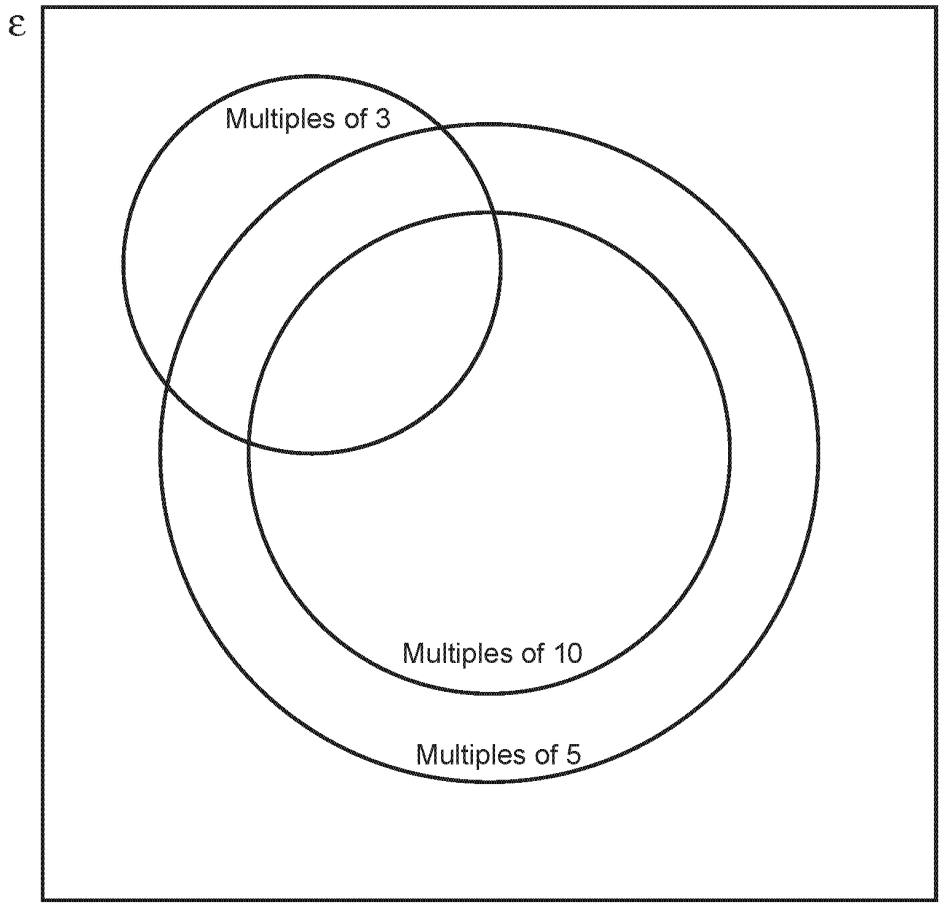
*(b)*   (i)   Place each of the six numbers 30, 32, 33, 35, 40, 45 in the correct position in the Venn diagram.   [3]

(ii)   A number is selected at random from the set  {30, 32, 33, 35, 40, 45}.

Find the probability that the number selected is

a prime number,                         ...............................................................

a multiple of 10 that is also a multiple of 3,   ...............................................................

neither a multiple of 3 nor 10.              ...............................................................   [3]

8) The universal set, Ɛ = {22, 23, 24, 25, 26, 27, 28, 29, 30}.

Within this universal set Ɛ,

- set *A* is the multiples of 2
- set *B* is the multiples of 4
- set *C* is the multiples of 5

(a) Complete the Venn diagram. [3]

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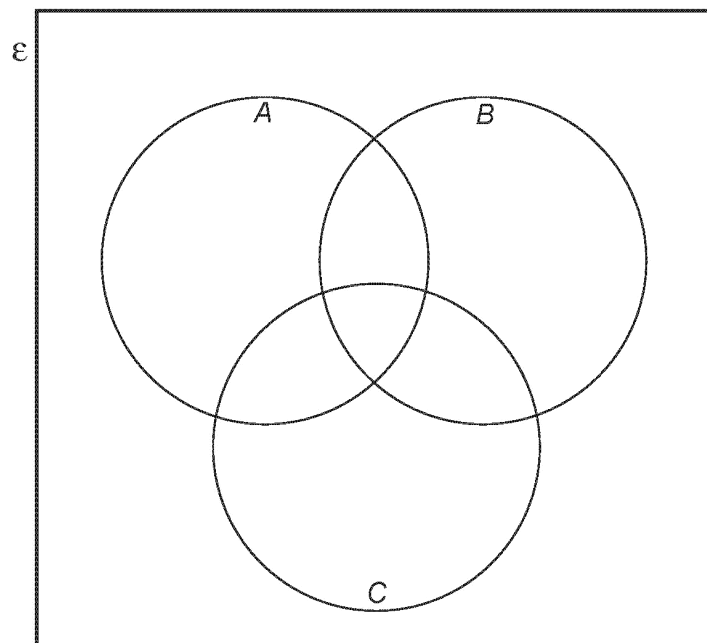
(b) Which one of the following Venn diagrams could also be used to represent the sets $\varepsilon$, $A$, $B$ and $C$?
You must give a reason for your choice. [2]
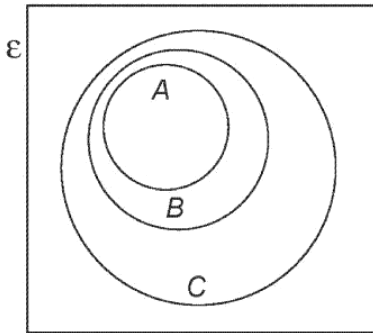
Venn Diagram 1          Venn Diagram 2          Venn Diagram 3
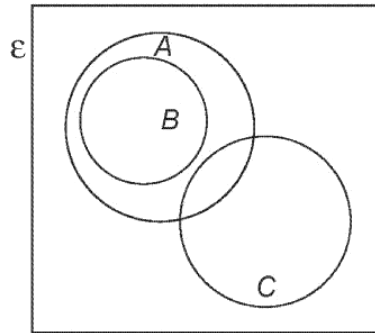


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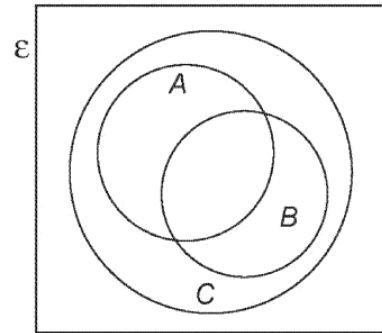
9) At a college, a total of 28 students study one or more of the science subjects: Biology, Chemistry and Physics.
The 28 students form the universal set, Ɛ.
Some parts of the Venn diagram below have already been completed.

It is also known that:
- 5 students study only Biology
- 13 students study Chemistry

(a) Complete the Venn diagram. [3]



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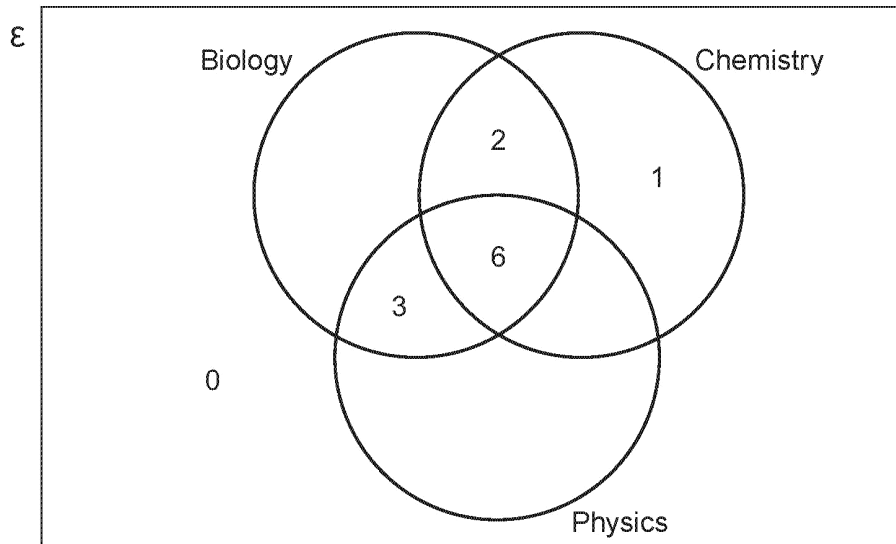
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(b) How many students study Biology and Chemistry but not Physics? [1]

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(c) One of the students is chosen at random.
What is the probability that this student studies Biology? [2]

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10)
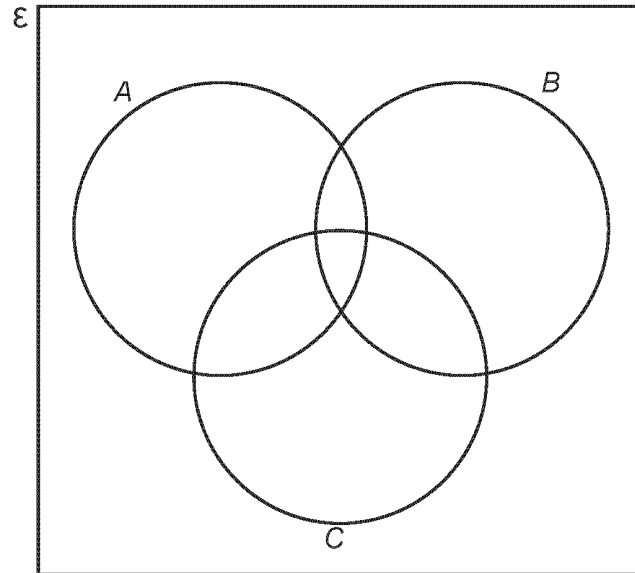


An outline of a Venn diagram is shown above.
You are given the following information.

- $P(A \cup B \cup C)' = 0 \cdot 01$
- $P(A \cap B \cap C) = 0 \cdot 2$
- $P(B \cap C) = 0 \cdot 5$
- $P(A \cap B) = 0 \cdot 3$
- $P(A \cup C) = 0 \cdot 65$

Calculate $P(B)$. [7]

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11) A survey about the cereals that people bought was conducted in a local supermarket on a Saturday afternoon.
95 people bought Brecky Bix, 100 people bought Crispy Flakes and 59 people bought Pop Chocs.

Of these people
- 50 bought Brecky Bix and Crispy Flakes
- 37 bought Brecky Bix and Pop Chocs
- 25 bought Crispy Flakes and Pop Chocs
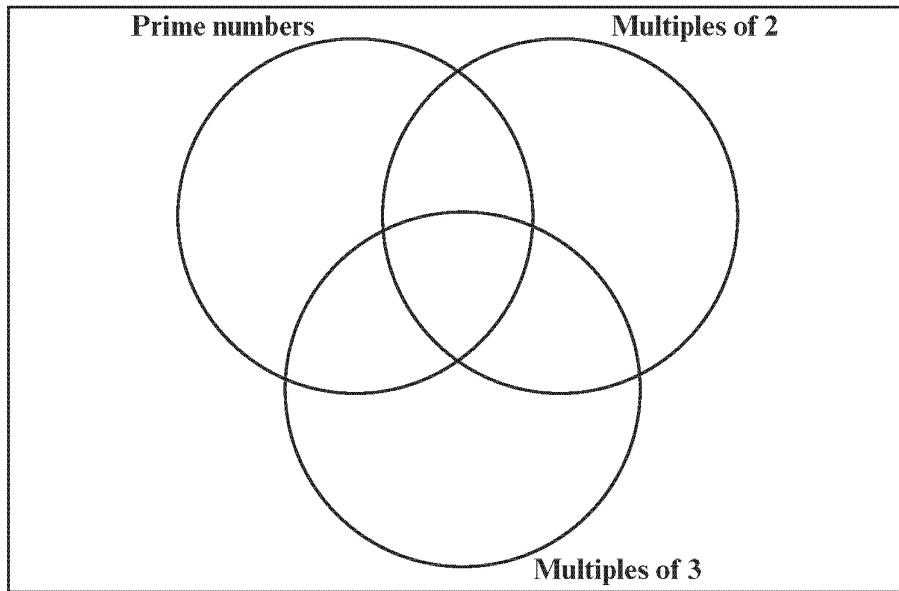- 5 bought Brecky Bix, Crispy Flakes and Pop Chocs

Everyone surveyed bought at least one of these cereals.

How many people took part in this survey?

The number of people that took part in the survey = ..................................................

[6]

12) *(a)*   (i)   Place each of the whole numbers 42, 43, 44, 45, 46, 47, 48, 49, 50 in the correct positions in the Venn diagram.

**Prime numbers**                    **Multiples of 2**

**Multiples of 3**

[3]

(ii)   A whole number is selected at random from the set {42, 43, 44, 45, 46, 47, 48, 49, 50}.

Find the probability that the number selected is

a prime number,                          .......................................................................

not a prime number,                      .......................................................................

a prime number that is also a multiple of 3.   .......................................................................

[3]

*(b)*   A die has previously been used and shown to be fair.
This fair die is thrown a further 60 times; a six is scored on the die on 15 of these throws.
**Giving a reason for your answer,** write down the probability that a six is scored on the next throw.

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[2]