SET THEORY-1

1.

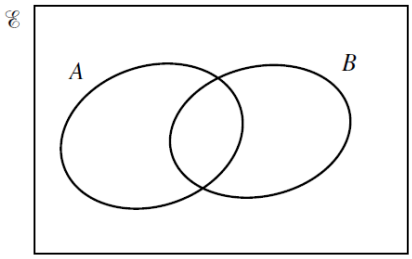


Diagram 1

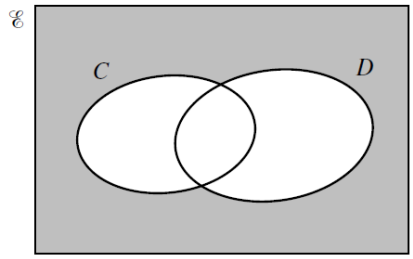


Diagram 2

(a) In Diagram 1, shade the area which represents $A \cup B'$. [1]

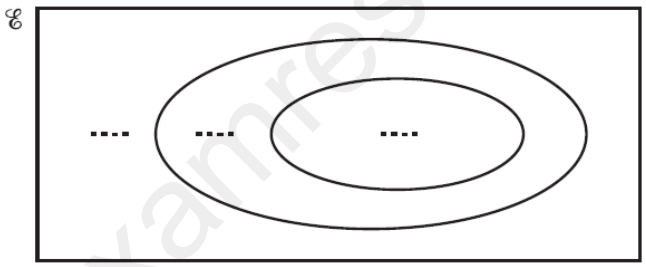
(b) Describe in set notation the shaded area in Diagram 2.

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

2.

$n(A) = 18$, $n(B) = 11$ 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]

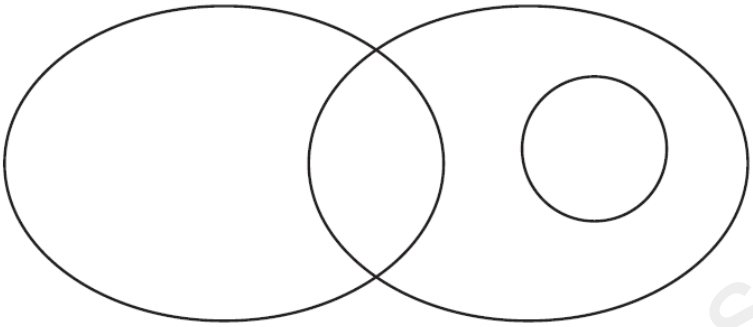
(b) Draw another Venn diagram to show the sets A and B where $n(A \cup B) = 29$.
Write down the number of elements in each region.

[2]

3.

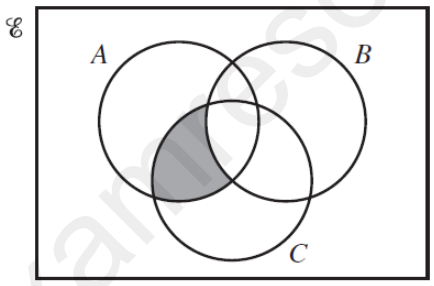
$Q = \{2, 4, 6, 8, 10\}$ and $R = \{5, 10, 15, 20\}$.
$15 \in P$, $n(P) = 1$ and $P \cap Q = \varnothing$.

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



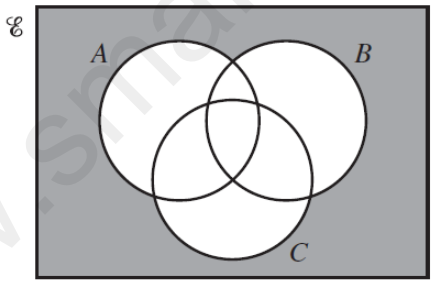
[3]

4

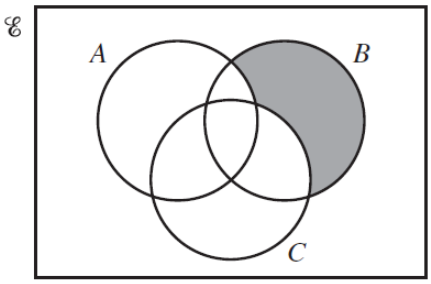


The shaded area in the diagram shows the set $(A \cap C) \cap B'$.

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



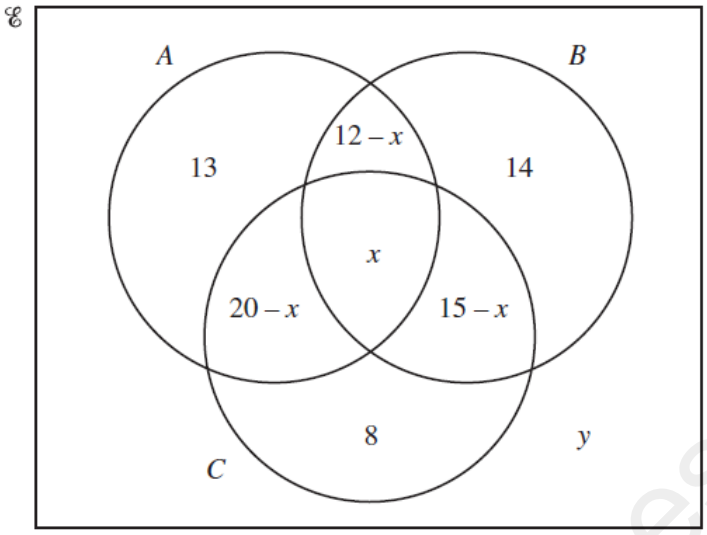
.....



.....

[2]

5.



The Venn diagram shows the number of elements in sets A, B and C.

(a) $n(A \cup B \cup C) = 74$

Find x.

Answer(a) $x =$ ..... [2]

(b) $n(\mathscr{E}) = 100$

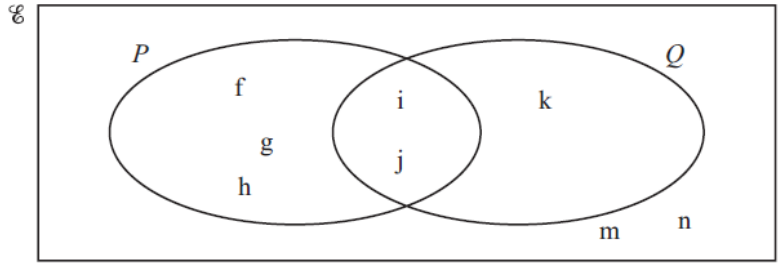
Find y.

Answer(b) $y =$ ..... [1]

(c) Find the value of $n((A \cup B)' \cap C)$.

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

6



(a) Use the information in the Venn diagram to complete the following.

(i) $P \cap Q = \{.....\}$ [1]

(ii) $P' \cup Q = \{.....\}$ [1]

(iii) $n(P \cup Q)' = ...$ [1]

(b) A letter is chosen at random from the set Q.

Find the probability that it is also in the set P.

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

(c) On the Venn diagram shade the region $P' \cap Q$. [1]

(d) Use a set notation symbol to complete the statement.

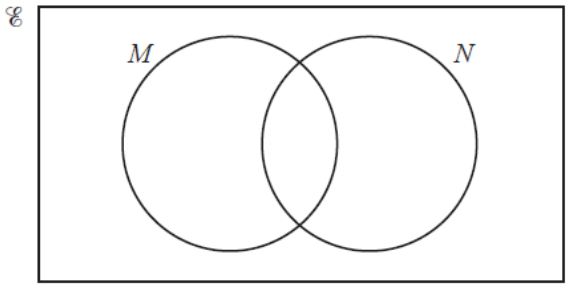
{f, g, h} ..... P

[1]

7

(a) You may use this Venn diagram to help you answer **part (a)**.

$\mathscr{E} = \{x : 1 \leqslant x \leqslant 12, x \text{ is an integer}\}$
$M = \{\text{odd numbers}\}$
$N = \{\text{multiples of 3}\}$



(i) Find n(N).

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

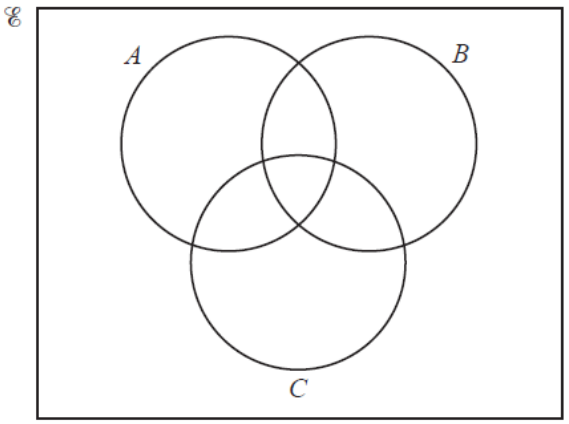
(ii) Write down the set $M \cap N$.

Answer(a)(ii) $M \cap N = \{$ ..... $\}$ [1]

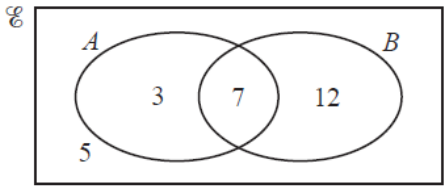
(iii) Write down a set P where $P \subset M$.

Answer(a)(iii) $P = \{$ ..... $\}$ [1]

(b) Shade $(A \cup C) \cap B'$ in the Venn diagram below.



[1]



The Venn diagram shows the numbers of elements in each region.

(a) Find $n(A \cap B')$.

..... [1]

(b) An element is chosen at random.

Find the probability that this element is in set B.

..... [1]

(c) An element is chosen at random from set A.

Find the probability that this element is also a member of set B.

..... [1]

(d) On the Venn diagram, shade the region $(A \cup B)'$. [1]

(a) $\mathscr{E} = \{x: 2 \leqslant x \leqslant 16, x \text{ is an integer}\}$
$M = \{\text{even numbers}\}$
$P = \{\text{prime numbers}\}$

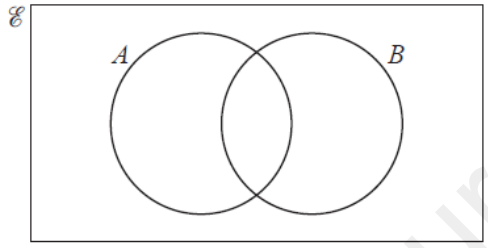
(i) Find n(M).

..... [1]

(ii) Write down the set $(P \cup M)'$.

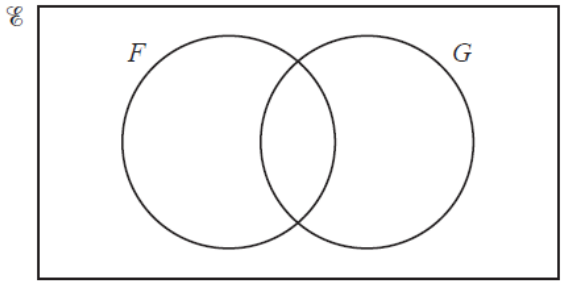
$(P \cup M)' = \{$..... $\}$ [1]

(b) On the Venn diagram, shade $A \cap B'$.



[1]

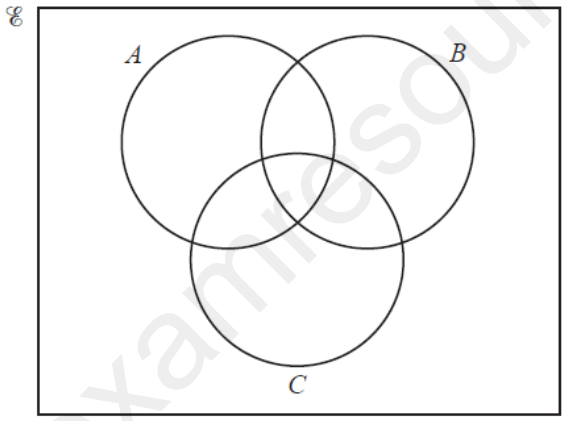
10 **(a)** In this Venn diagram, shade the region $F \cup G'$.



[1]

(b) $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
$A = \{x: x \text{ is an odd number}\}$
$B = \{x: x \text{ is a square number}\}$
$C = \{x: x \text{ is a multiple of } 3\}$

(i) Write all the elements of $\mathscr{E}$ in the Venn diagram below.



[2]

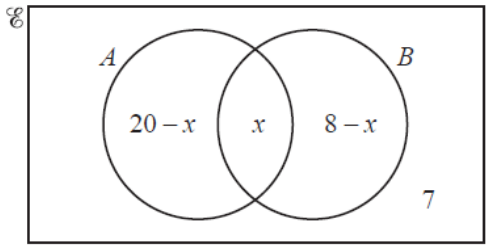
(ii) Another number is included in the set $\mathscr{E}$.
This number is in the region $A' \cap B \cap C$.

Write down a possible value for this number.

..... [1]

11

The Venn diagram shows information about the number of elements in sets A, B and $\mathscr{E}$.



(a) $n(A \cup B) = 23$

Find the value of x.

$x =$ ..... [3]

(b) An element is chosen at random from $\mathscr{E}$.

Find the probability that this element is in $(A \cup B)'$.

..... [2]