IGCSE · Cambridge (CIE) · Maths

45 mins 24 questions

Non-Calculator Questions

Set Notation & Venn Diagrams

Set Notation & Venn Diagrams

Easy (6 questions)	/7
Medium (7 questions)	/19
Hard (8 questions)	/16
Very Hard (3 questions)	/3
Total Marks	**/45**

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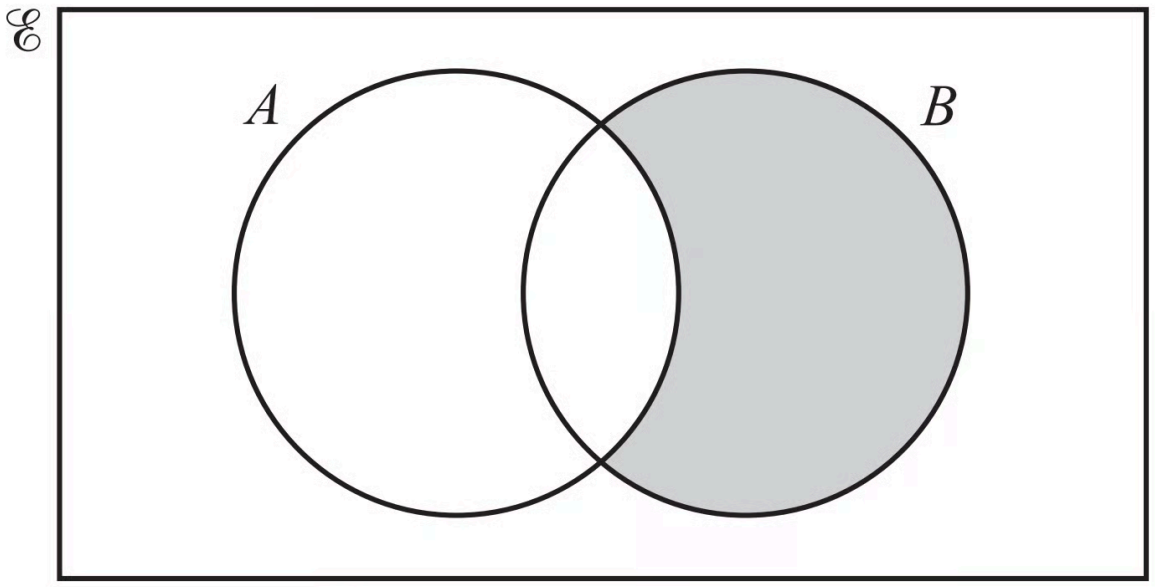
Easy Questions

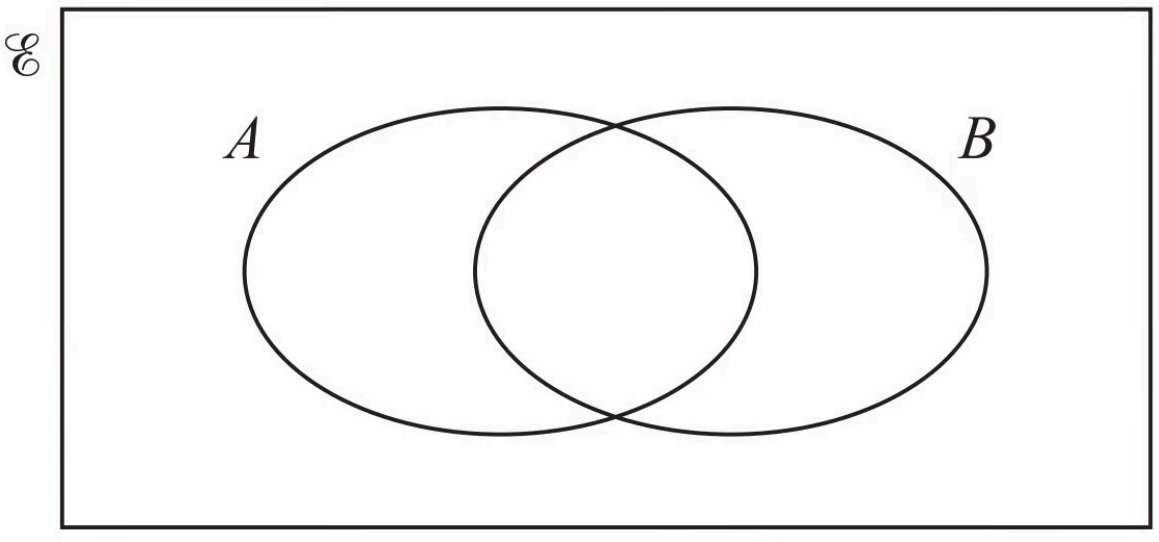
1



Use set notation to describe the shaded region.

(1 mark)

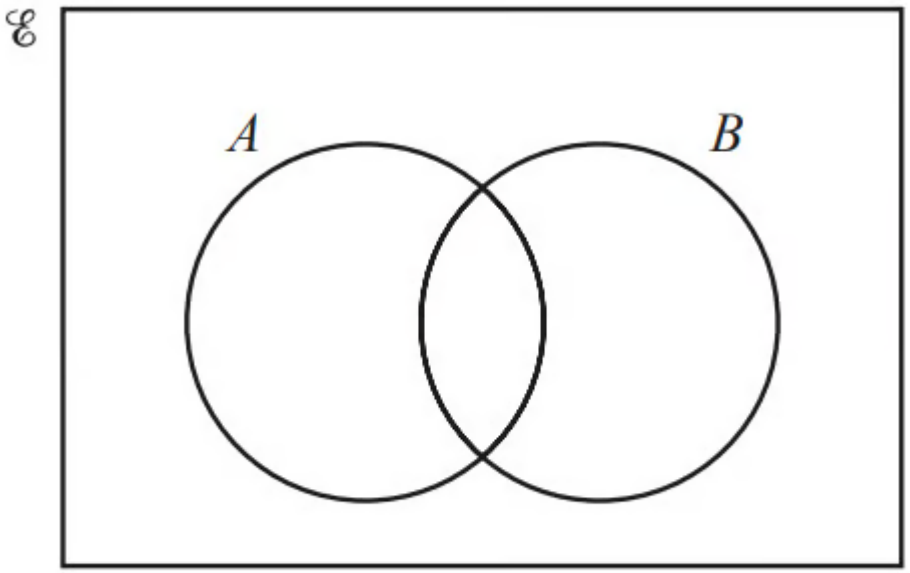
2



On the Venn diagram, shade the region $A \cap B$.

(1 mark)

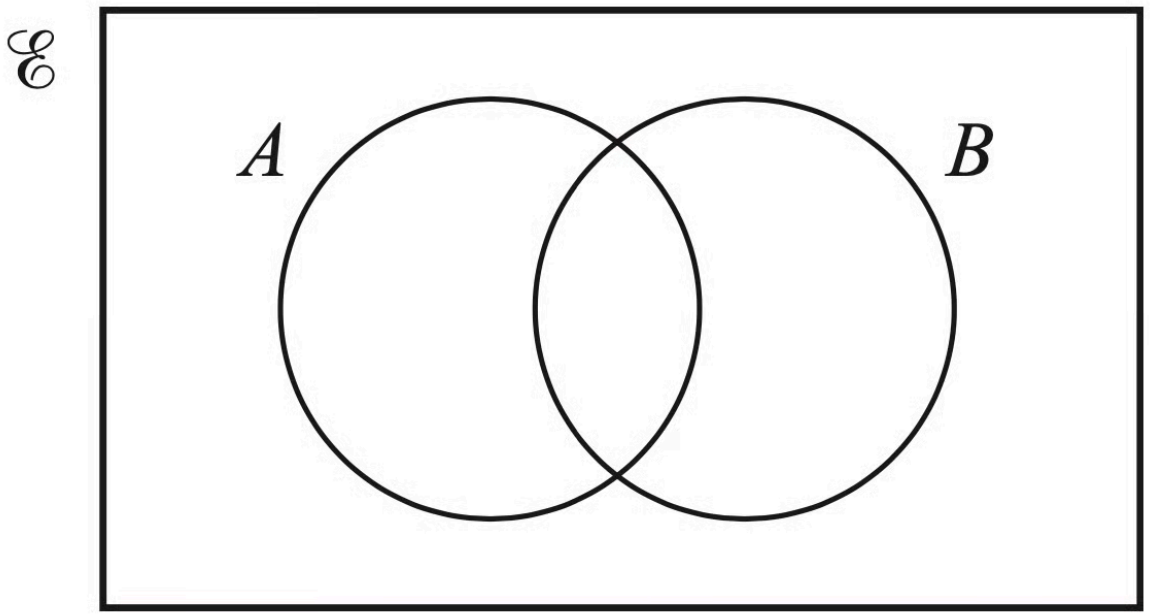
3 Shade the region $A' \cup B$ in the Venn diagram below.



$A' \cup B$

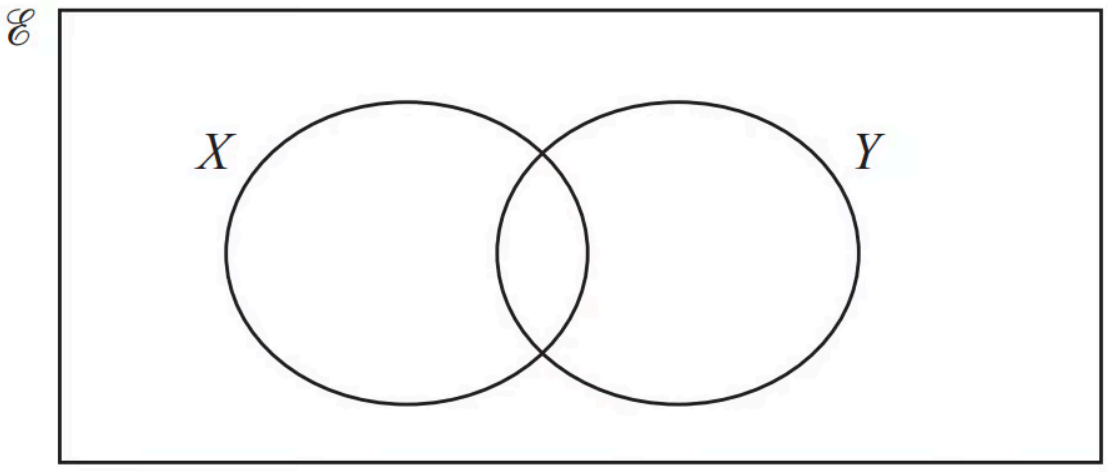
(1 mark)

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



(1 mark)

5 In the Venn diagram, shade $X' \cap Y$.



(1 mark)

6 $\mathscr{E}$ = {20, 21, 22, 23, 24, 25, 26, 27, 28, 29}

A = {odd numbers}

B = {multiples of 3}

List the members of the set

i) $A \cap B$

[1]

ii) $A \cup B$

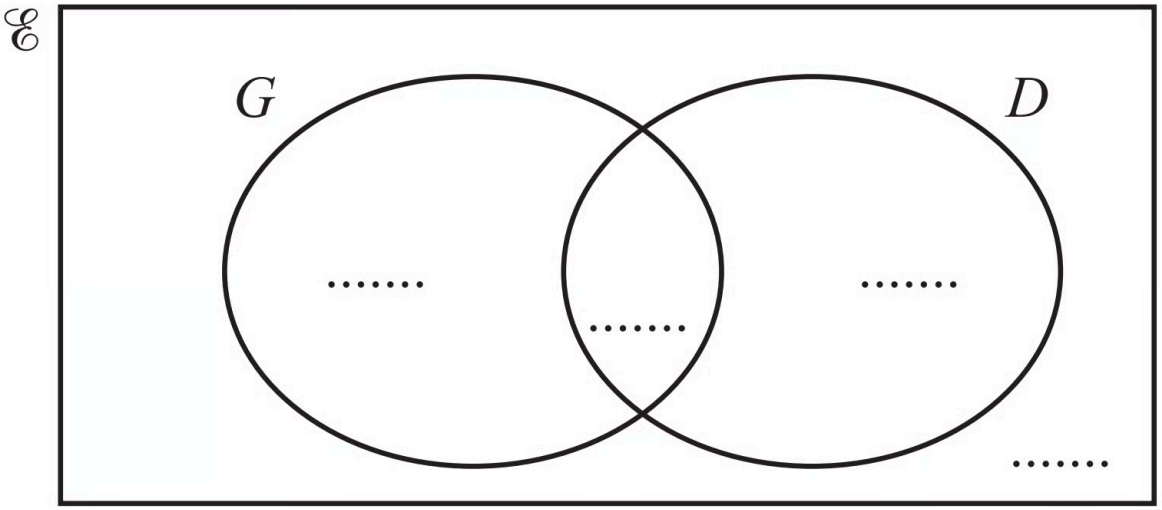
[1]

(2 marks)

Medium Questions

1 In a class of 40 students:

- 28 wear glasses (G)
- 13 have driving lessons (D)
- 4 do not wear glasses and do not have driving lessons.



i) Complete the Venn diagram.

[2]

ii) Use set notation to describe the region that contains a total of 32 students.

[1]

(3 marks)

2 $\mathscr{E} = \{0, 1, 2, 3, 4, 5, 6\}$ $A = \{0, 2, 4, 5, 6\}$ $B = \{1, 2, 5\}$

Complete each of the following statements.

$A \cap B = \{.....\}$

$n(B) = ...$

$\{0, 4, 6\} = ... \cap .....$

$\{2, 4\} ..... A$

(4 marks)

3 $M = \{x: x \text{ is an integer and } 2 \leq x < 6\}$

i) Find $n(M)$.

[1]

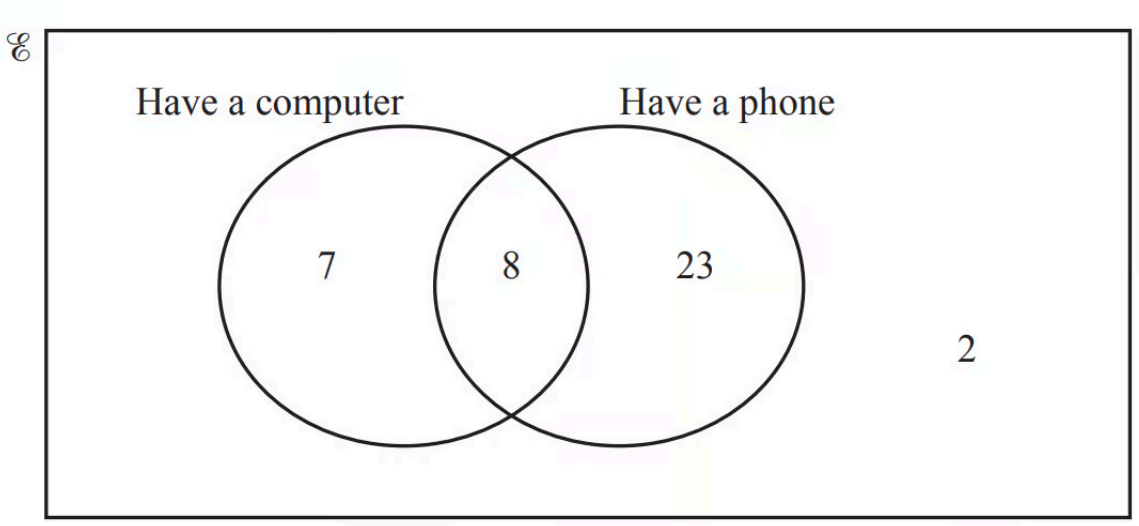
ii) Write down a set N where $N \subseteq M$ and $N \neq \varnothing$.

{..... } [1]

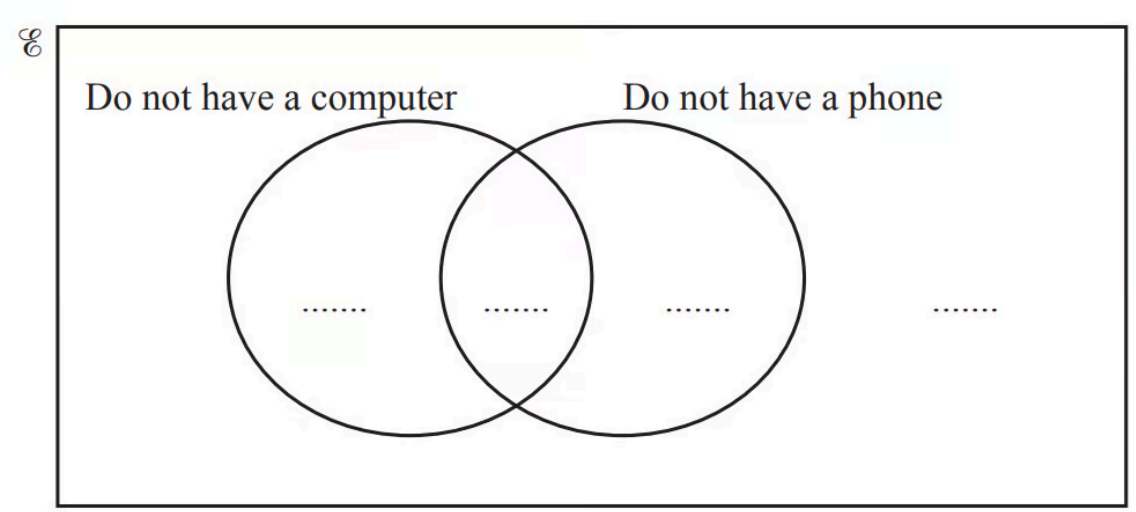
(2 marks)

4 40 children were asked if they have a computer or a phone or both. The Venn diagram

shows the results.



Complete the Venn diagram.



(2 marks)

5 (a) $C = \{x : x \text{ is an integer and } 5 < x < 12\}$ $D = \{5, 10\}$

Select the correct statement from the list below.

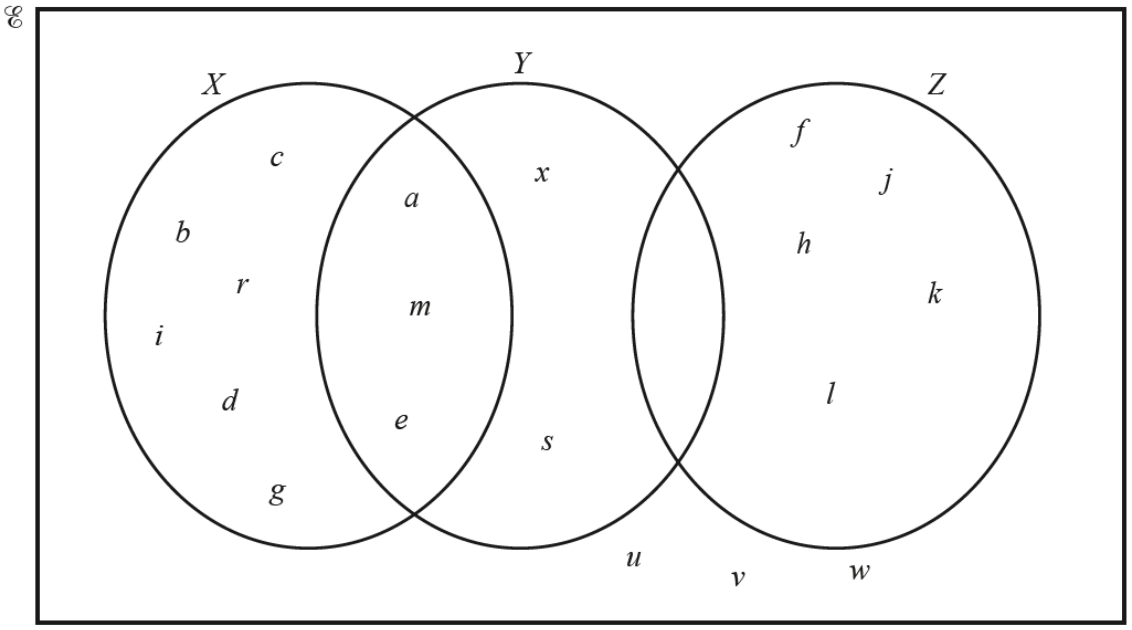
$D = \varnothing$ $C \cap D = \{10\}$ $6 \in D$ $D \subseteq C$

(1 mark)

(b) Find $\mathrm{n}(C \cup D)$.

(1 mark)

6



Use set notation to complete the statements for the Venn diagram above.

i) c X

[1]

ii) ..... = $\{a, m, e\}$

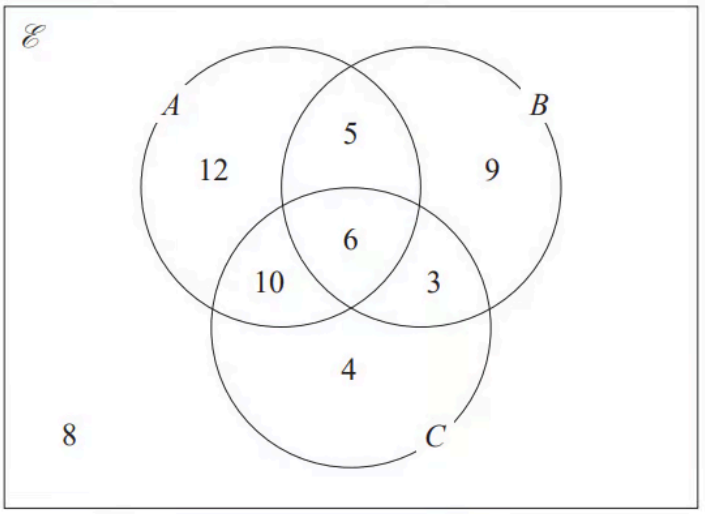
[1]

iii) $Y \cap Z$ = ...

[1]

(3 marks)

7 The Venn diagram shows a universal set, $\mathscr{E}$ and sets A, B and C.



12, 5, 9, 10, 6, 3, 4 and 8 represent the **numbers** of elements.

Find

i) $n(A \cup B)$

[1]

ii) $n(A' \cap B')$

[1]

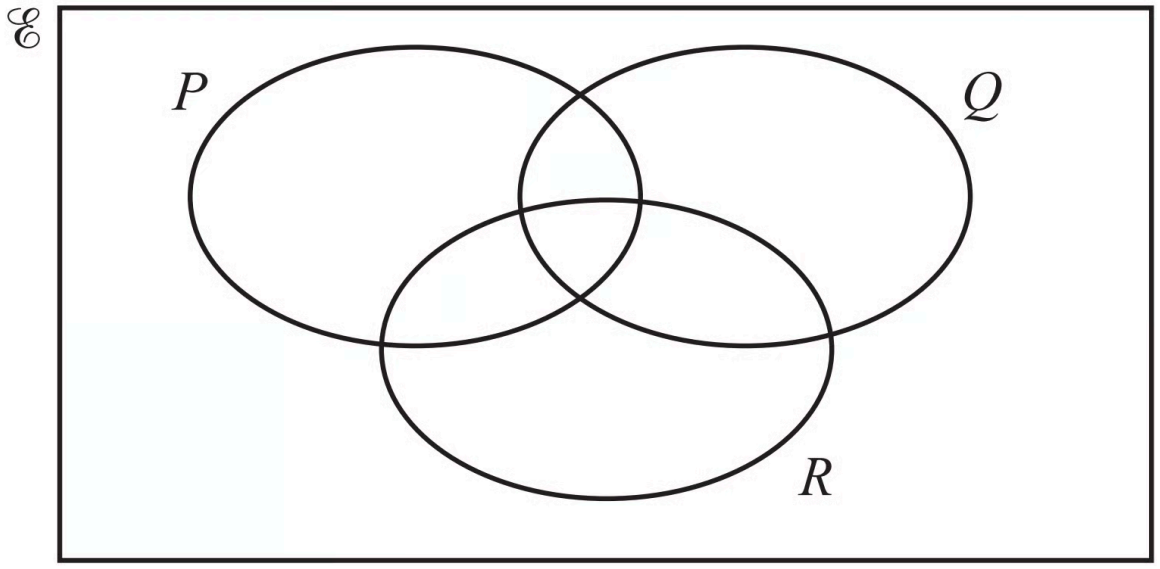
iii) $n([A \cap B] \cup C)$

[1]

(3 marks)

Hard Questions

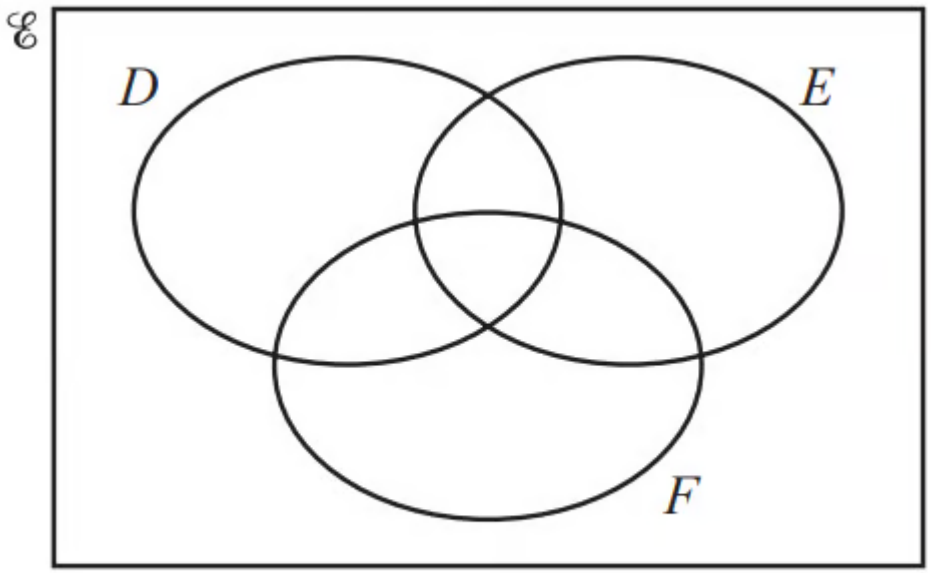
1



Shade the region $P \cup (Q \cap R)'$.

(1 mark)

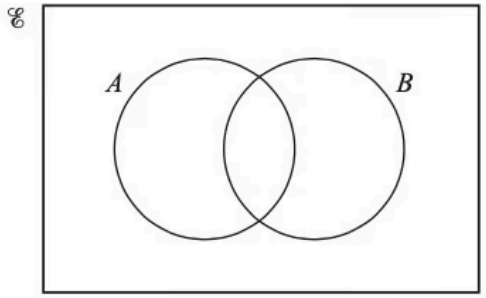
2 Shade the region $(D \cap E)' \cap F$ in the Venn diagram below.



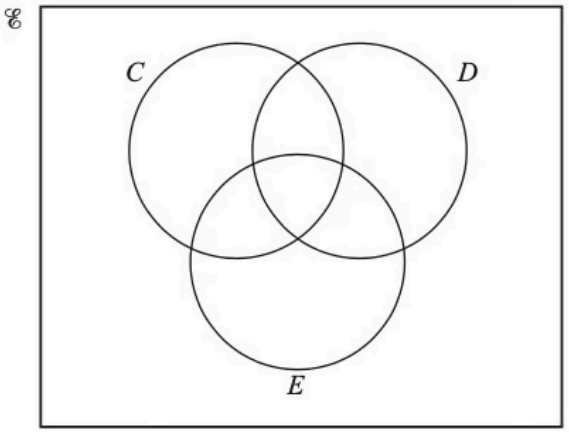
$(D \cap E)' \cap F$.

(1 mark)

3 In each Venn diagram, shade the required region.



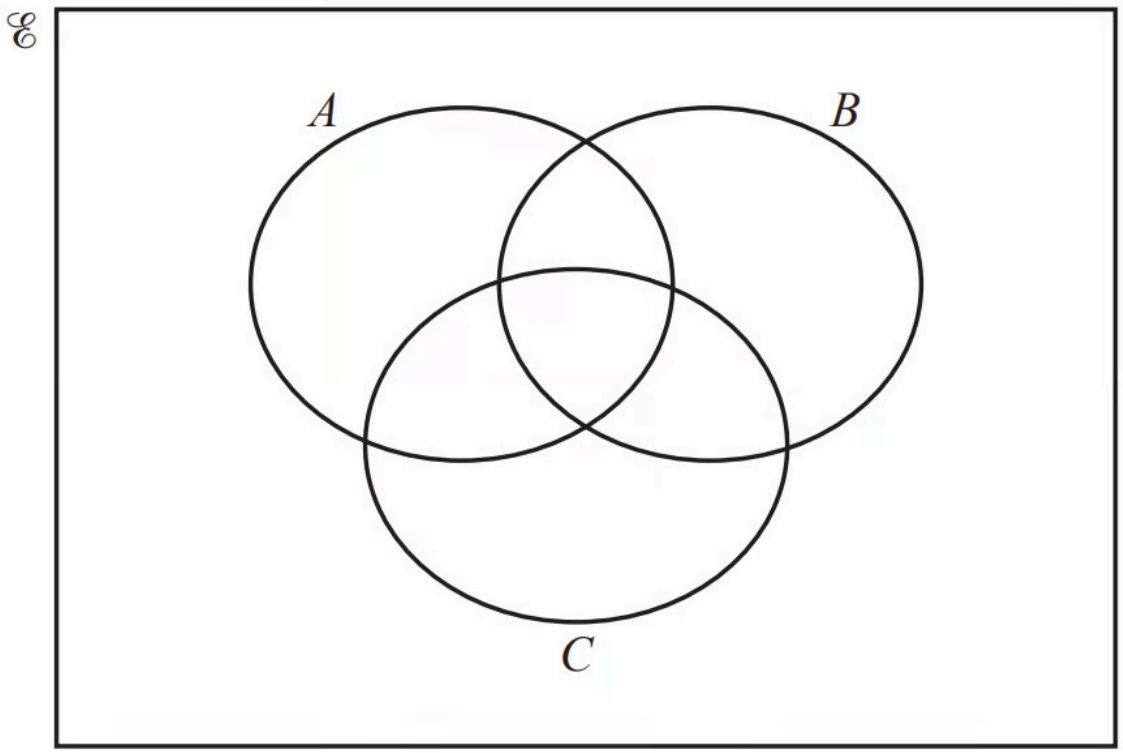
$(A \cup B)'$



$(C \cap D') \cup E$

(2 marks)

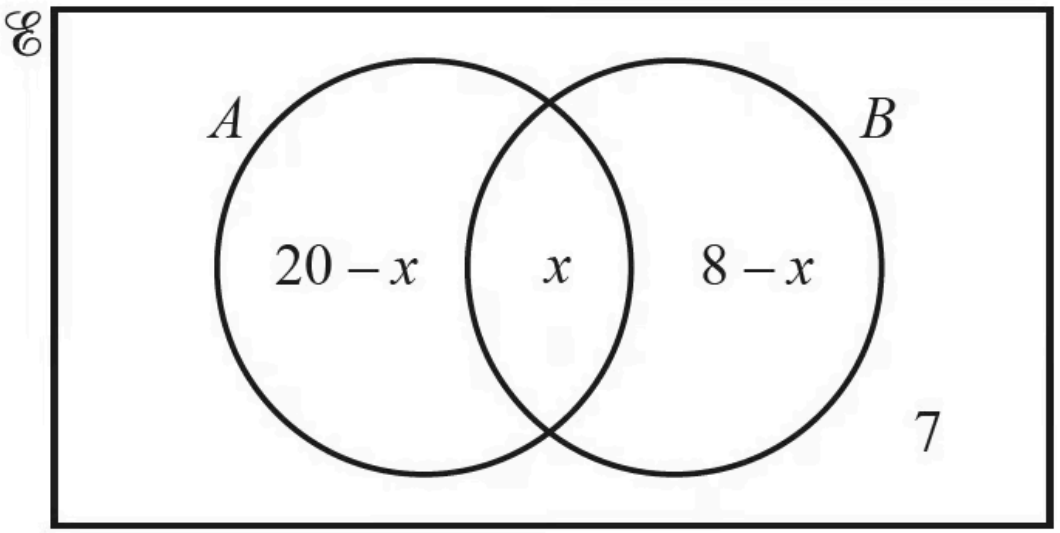
4 In this Venn diagram, shade the region $(A \cup B') \cap C$.



(1 mark)

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

.



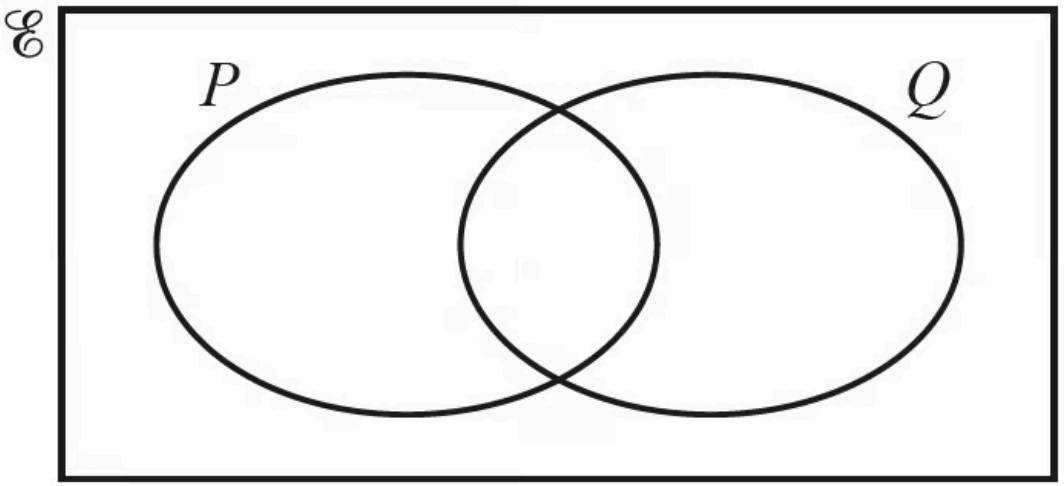
$\mathrm{n}(A \cup B) = 23$

Find the value of x.

$x =$ .....

(3 marks)

6



$n(\mathscr{E}) = 20,\ n = (P)10,\ n(Q) = 13$ and $n(P \cup Q)' = 5$.

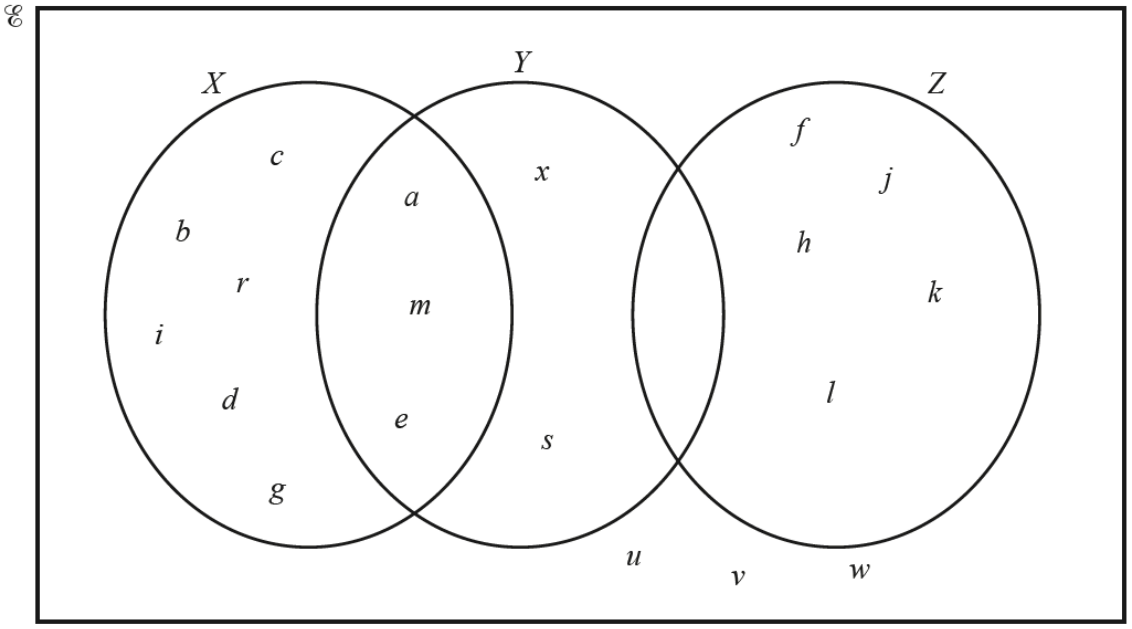
Work out $n(P \cap Q)$.

You may use the Venn diagram to help you.

$n(P \cap Q) =$ .....

(2 marks)

7 (a)



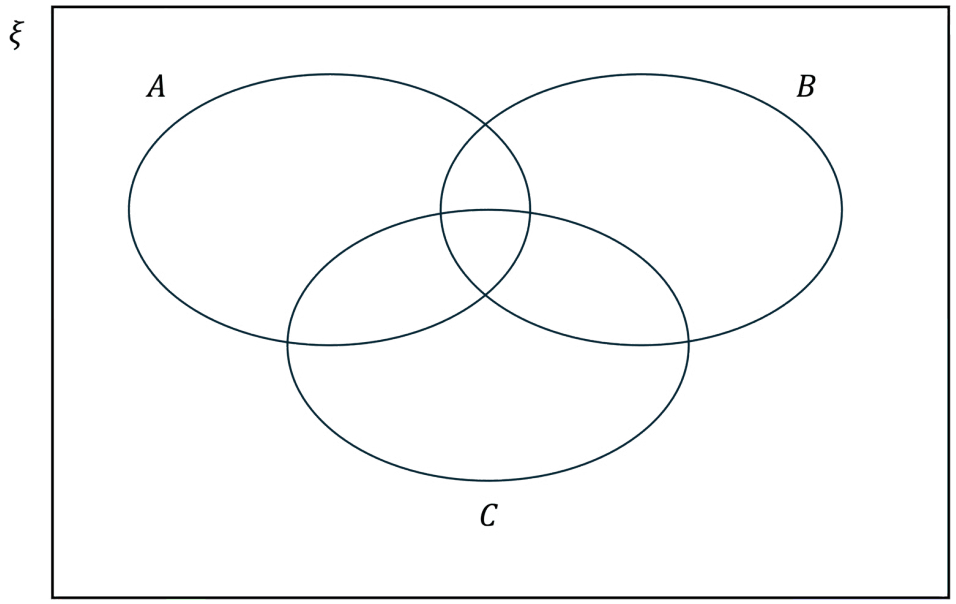
List the elements of $(X \cup Y \cup Z)'$.

(1 mark)

(b) Find $\mathrm{n}(X' \cap Z)$.

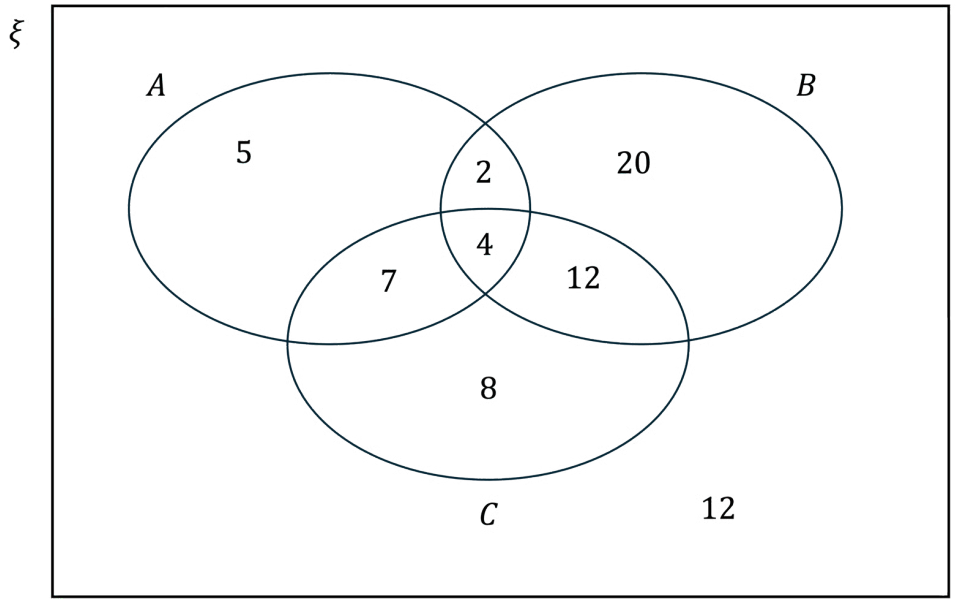
(1 mark)

8 (a) In the Venn diagram, shade $A \cap B'$.



(1 mark)

(b) The Venn diagram shows the number of people surveyed about their membership in the archery (A), basketball (B), or crochet (C) club.



A person is chosen at random.

Find the probability that this person is part of the archery club or basketball club or both.

Leave your answer as a fraction in its simplest form.

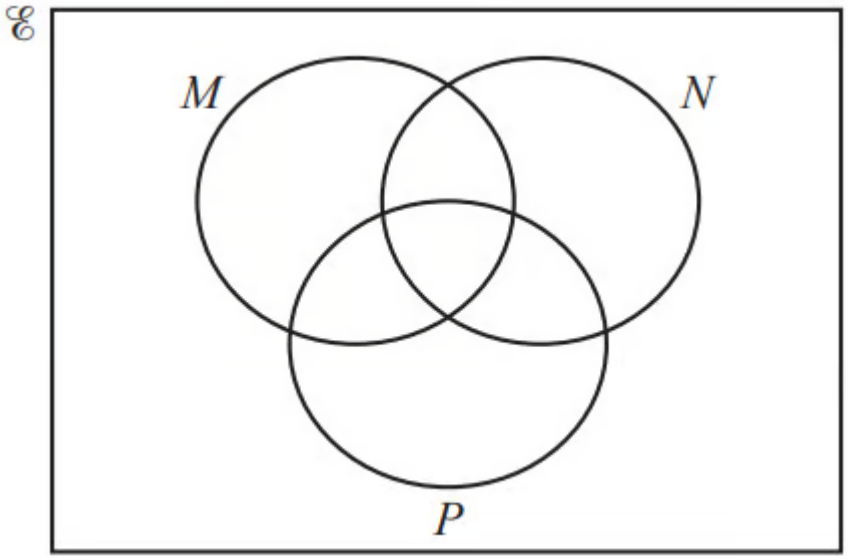
(2 marks)

(c) Find $\mathrm{n}((A \cup C) \cap B')$.

(1 mark)

Very Hard Questions

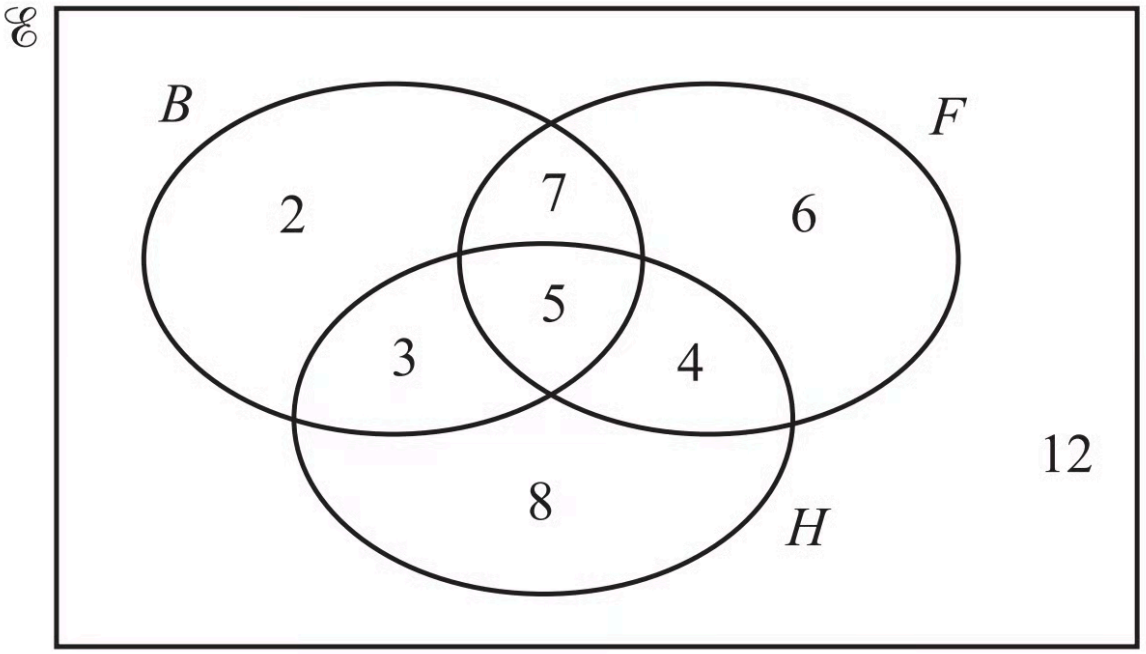
1 In this Venn diagram, shade the region $M' \cup N \cup P$.



(1 mark)

2 This Venn diagram shows information about the number of students who play basketball

(B), football (F) and hockey (H).

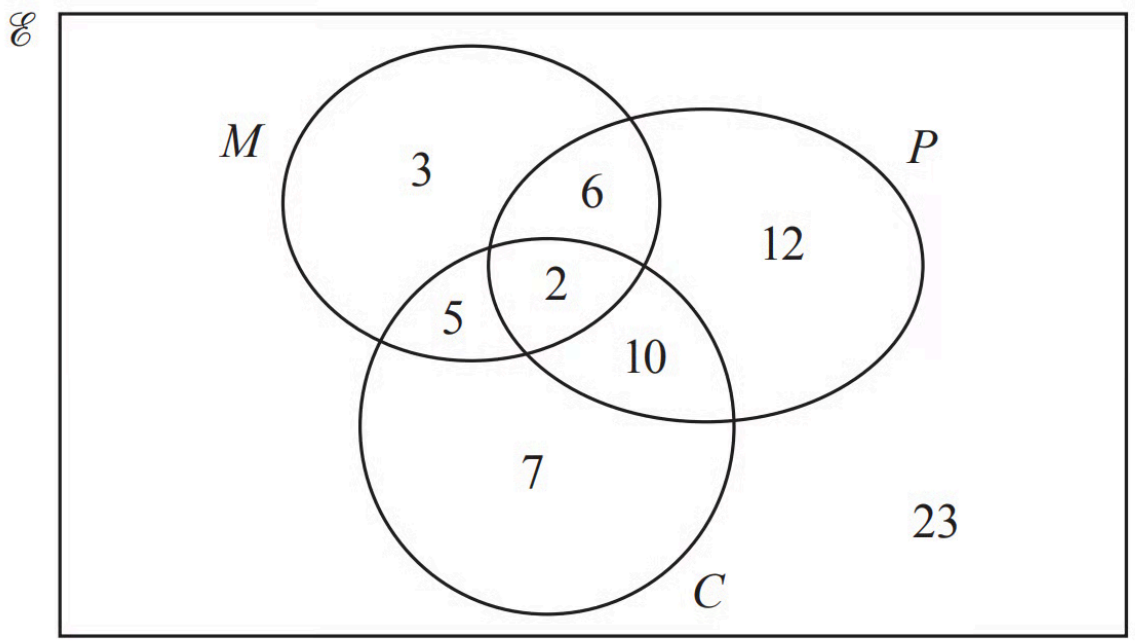


Find $\mathrm{n}((B \cup F) \cap H')$.

(1 mark)

3 The Venn diagram below shows information about the number of gardeners who grow

melons (M), potatoes (P) and carrots (C).



Find $\mathrm{n}((M \cap P) \cup C')$.

(1 mark)