Write your name, centre number and candidate number in the boxes below.

| Surname | Other names |
|---|---|
| | |

Centre number | | | | | |

Candidate number | | | | |

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# Sets and Venn diagrams

Time allowed: 40 minutes

**Subject code** **0580**

# Mathematics

## Questions from Paper 1, Paper 2 and Paper 3

**You must have:** a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
**You may use a calculator.**

Total marks

**/ 34**

### Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

### Information

- This paper has 10 questions worth 34 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

### Advice

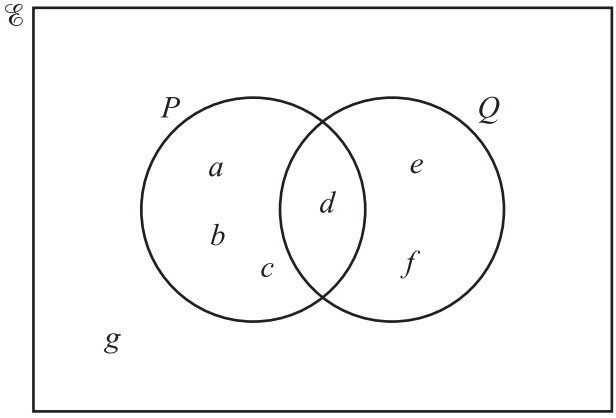
- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

**1**




The Venn diagram shows the elements of the sets $\mathscr{E}$, $P$ and $Q$.

Complete the statements.

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

**(b)** $n(P \cup Q) =$ ..... [1]

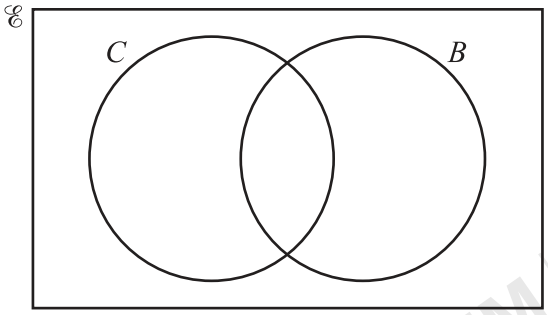
(a) Set notation and Venn diagrams (b) Set notation and Venn diagrams Click for more variations

**2** There are 50 families in a village.

$C =$ {families who own a car}
$B =$ {families who own a bicycle}

23 families own a car.
10 families own a car and a bicycle.
6 families own no cars and no bicycles.

**(a)** Complete the Venn diagram.




[2]

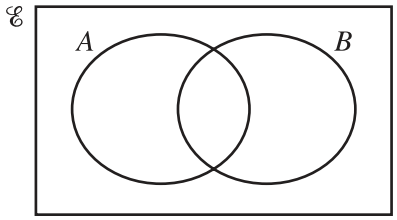
**(b)** Find $n(C \cup B)$.

..... [1]

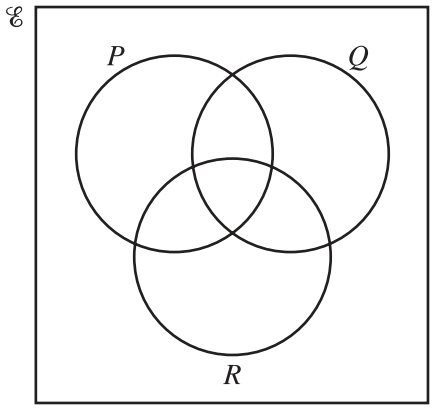
(a) Set notation and Venn diagrams (b) Set notation and Venn diagrams Click for more variations

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**3** Shade the required region in each of the Venn diagrams.




$A'$

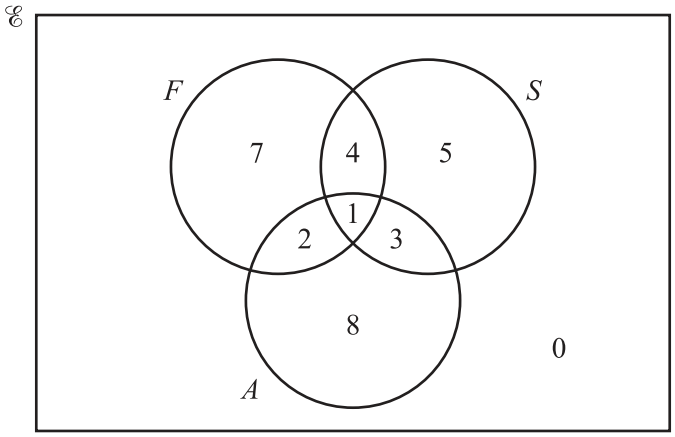



$(P \cap R) \cup Q$

[2]

Set notation and Venn diagrams Click for more variations

**4** The Venn diagram shows the number of students who study French ($F$), Spanish ($S$) and Arabic ($A$).




**(a)** Find $n(A \cup (F \cap S))$.

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

**(b)** On the Venn diagram, shade the region $F' \cap S$. [1]

(a) Set theory (b) Set notation and Venn diagrams Click for more variations

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**5** $\mathscr{E} = \{x: 1 \leqslant x \leqslant 20\}$
$E = \{\text{even numbers}\}$
$M = \{\text{multiples of 5}\}$

**(a)** Find $\text{n}(M)$.

..... [1]

**(b)** Find the elements in the set $E \cap M$.

..... [1]

**(c)** $y \notin E$.

Write down a possible value of $y$.

..... [1]

(a) Set notation and Venn diagrams (b) Set notation and Venn diagrams (c) Set notation and Venn diagrams

Click for more variations

**6** $\mathscr{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
$P = \{\text{odd numbers}\}$
$Q = \{\text{multiples of 3}\}$
$R = \{\text{square numbers}\}$

**(a)** Find $P \cap Q \cap R$.

{ ..... } [1]

**(b)** **(i)** Find $Q \cup R$.

{ ..... } [1]

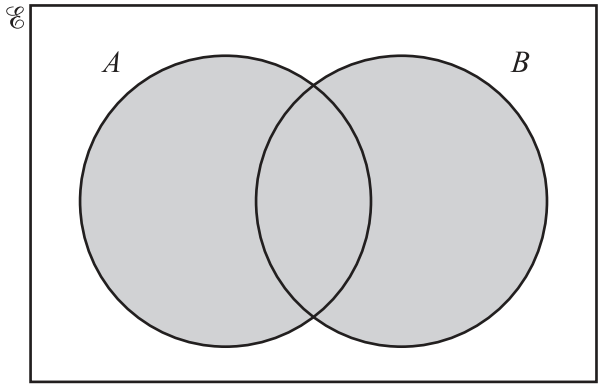
**(ii)** Find $\text{n}\left(P \cap (Q \cup R)'\right)$.

..... [1]

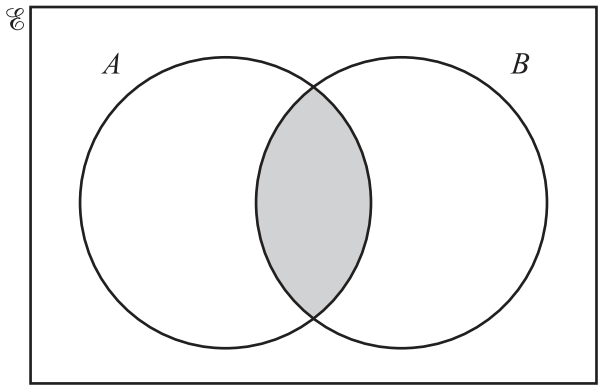
(a) Set theory (b)(i) Set notation and Venn diagrams (b)(ii) Set theory Click for more variations

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**7** **(a)** Use set notation to describe the shaded region in each Venn diagram.




.....

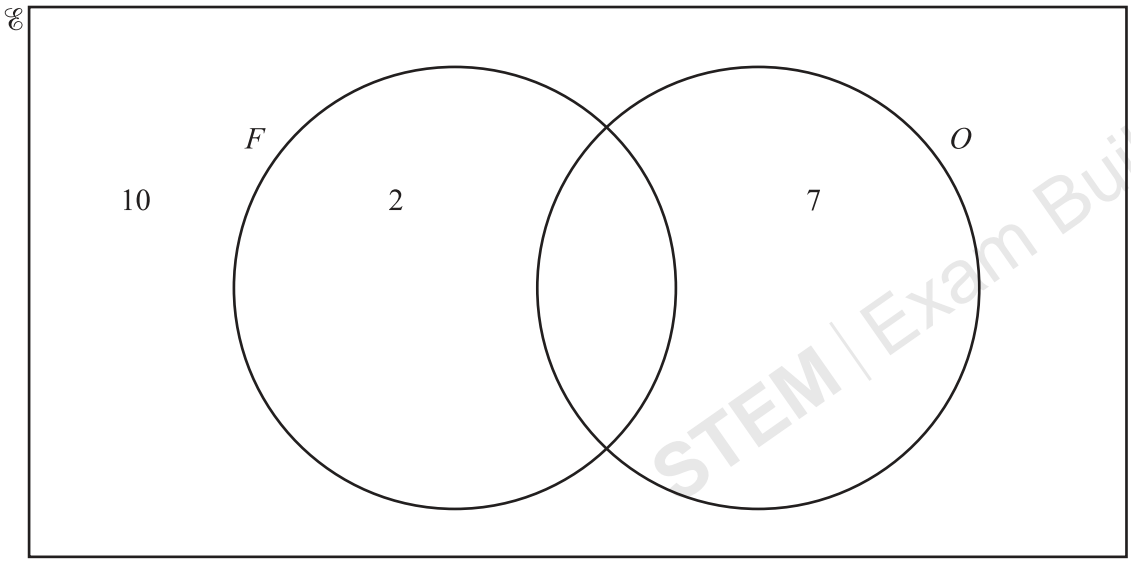



.....

[2]

**(b)** $\mathscr{E} = \{x : x \text{ is a natural number} \leqslant 15\}$
$F = \{x : x \text{ is a factor of } 12\}$
$O = \{x : x \text{ is an odd number}\}$

**(i)** Complete the Venn diagram to show the elements of these sets.




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[2]

**(ii)** Write down one number that is in set $O$, but not in set $F$.

..... [1]

**(iii)** Find $\mathrm{n}(F \cup O)$.

..... [1]

**(iv)** A number is chosen at random from $\mathscr{E}$.

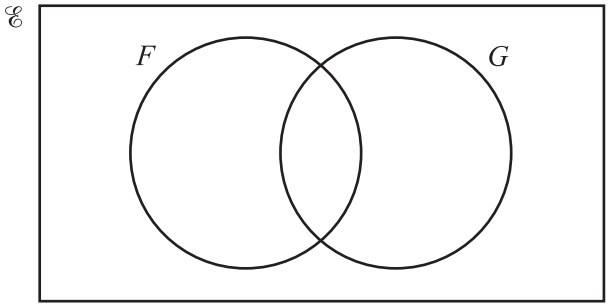
Work out the probability that this number is in set $O$.

..... [1]

(a) Set notation and Venn diagrams (b)(i) Set notation and Venn diagrams (b)(ii) Set notation and Venn diagrams (b)(iii) Set notation and Venn diagrams (b)(iv) Basic probability Click for more variations

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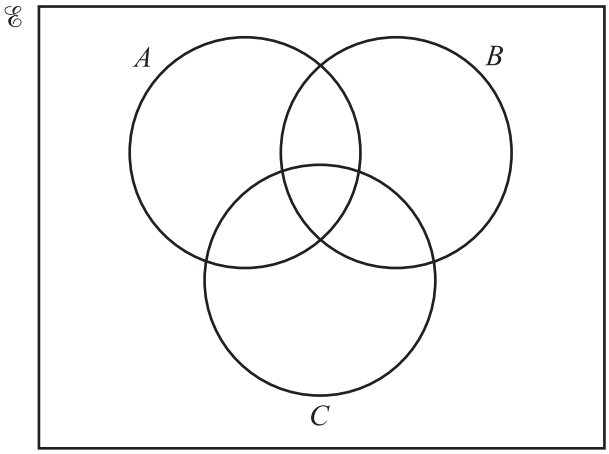
**8** **(a)** In this Venn diagram, shade the region $F \cup G'$.




[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.

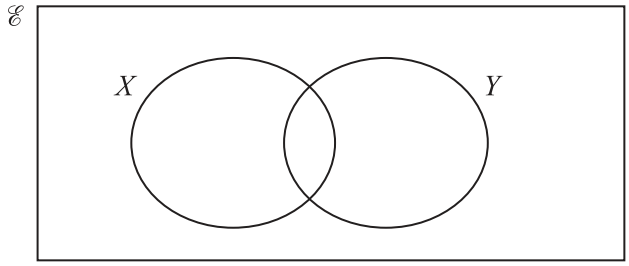
..... [1]

(a) Set notation and Venn diagrams (b)(i) Set notation and Venn diagrams (b)(ii) Set notation and Venn diagrams

Click for more variations

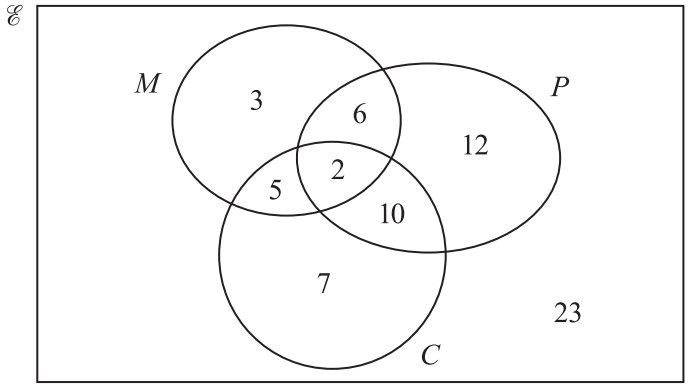
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**9** **(a)** In the Venn diagram, shade $X' \cap Y$.




[1]

**(b)** The Venn diagram below shows information about the number of gardeners who grow melons ($M$), potatoes ($P$) and carrots ($C$).




**(i)** A gardener is chosen at random from the gardeners who grow melons.

Find the probability that this gardener does not grow carrots.

..... [2]

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

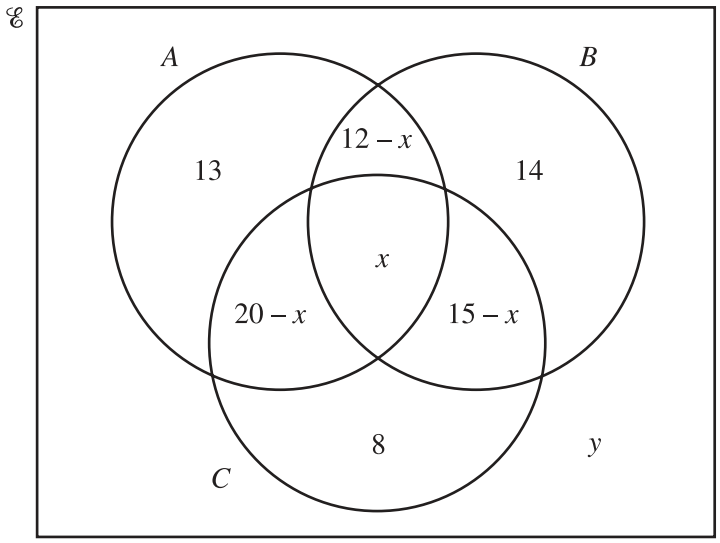
..... [1]

(a) Set notation and Venn diagrams (b)(i) Tree diagrams, tables and Venn diagrams (b)(ii) Set theory

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**10**




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]

(a) Set notation and Venn diagrams (b) Set notation and Venn diagrams (c) Set theory

Click for more variations

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