

Name:

Section:

SETS WORKSHEET

- 1 (a) $\mathcal{E} = \{x : x \text{ is an integer } 10 \leq x \leq 40\}$
 $P = \{x : x \text{ is a multiple of } 6\}$
 $Q = \{x : x \text{ is a square number}\}$

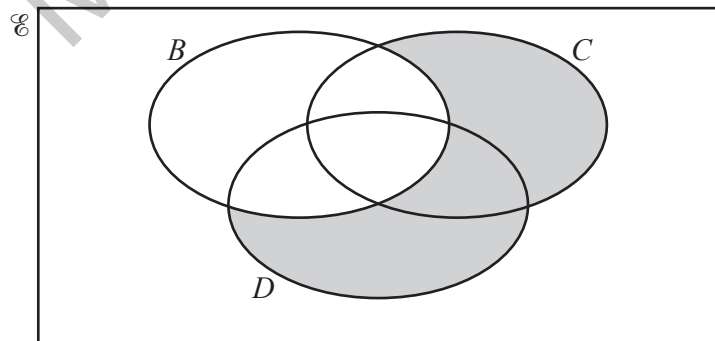
(i) Write down the elements of $P \cup Q$.

..... [1]

(ii) Find $n(P' \cap Q)$.

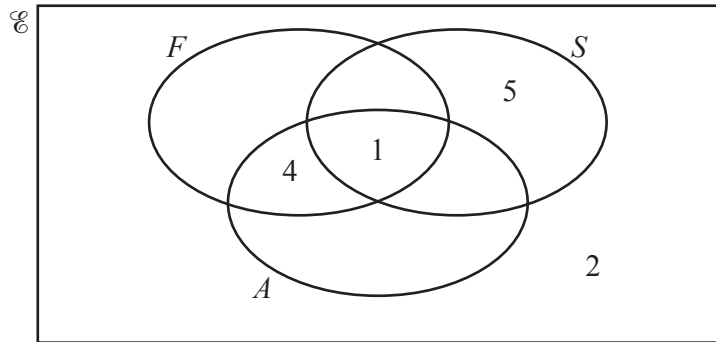
..... [1]

(b) Use set notation to describe the shaded region in the Venn diagram.



..... [1]

- (c) In a college, students can study French (F), Spanish (S) and Arabic (A). A group of 25 students are asked which languages they study. Some of the results are shown in the Venn diagram.



- (i) All students who study both Arabic and Spanish also study French.
7 students study French only.
8 students study Arabic.

Use this information to complete the Venn diagram.

[2]

- 2 (a) $\mathcal{C} = \{a, b, c, d, e, f, g, h, i, j\}$
 $P = \{a, e, i\}$
 $Q = \{f, g, h, i, j\}$
 $R = \{c, d, e, f, g\}$

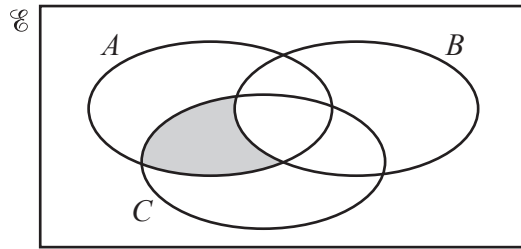
- (i) Find $P \cup Q$.

..... [1]

- (ii) Find $n(P' \cap (Q \cup R))$.

..... [1]

(b)



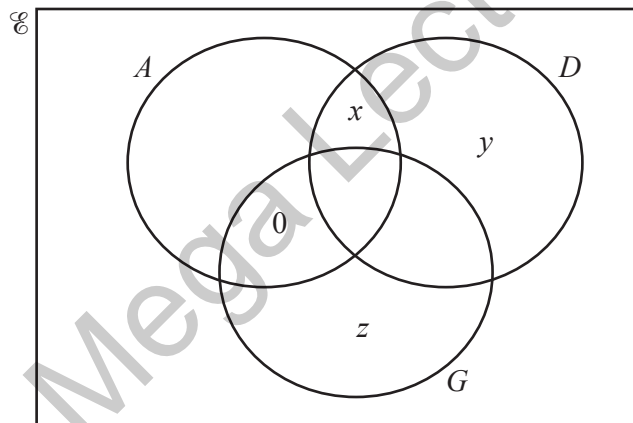
Use set notation to describe the shaded subset in the Venn diagram.

..... [1]

3 40 students can take part in three activities, Art (A), Dancing (D) and Gardening (G).

- 5 do not take part in any of the activities
- 12 do Art only
- 4 do Dancing and Gardening but not Art
- 1 student does all three activities

(a) Complete the Venn diagram.



[2]

(b) On the Venn diagram, the ratio $x : y : z = 1 : 2 : 3$.

Find the value of each of x , y and z .

$x =$

$y =$

$z =$ [3]

(c) One subset in the Venn diagram in **part (a)** has no students.

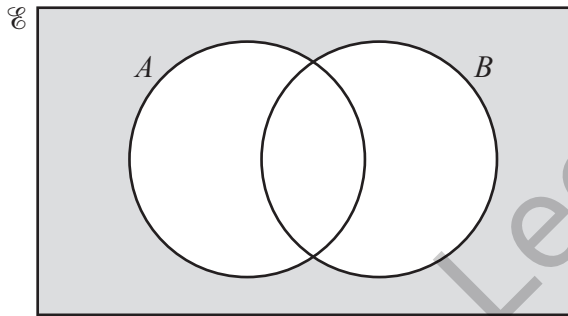
Use set notation to describe this subset.

..... [1]

(d) Find $n((D \cup G) \cap A)$.

..... [1]

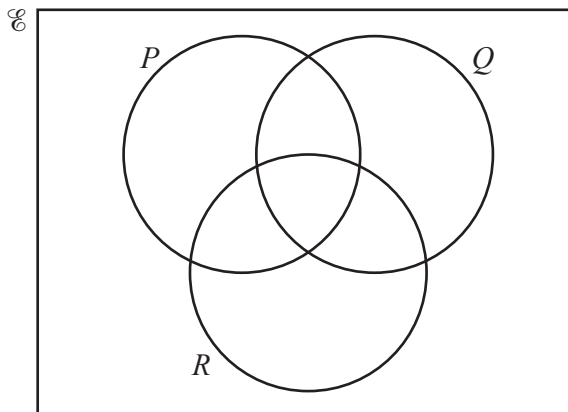
4 (a) Use set notation to describe the subset shaded in the Venn diagram.



..... [1]

- (b) $U = \{ 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 \}$
 $P = \{ x : x \text{ is a factor of } 36 \}$
 $Q = \{ x : x \text{ is a multiple of } 4 \}$
 $R = \{ x : 3 \leq x \leq 6 \}$

(i) Complete the Venn diagram.



[3]

(ii) List the elements of $P \cap (Q \cup R)'$.

..... [1]

(iii) Find $n(P \cup Q)$.

..... [1]

(iv) Use set notation to complete the statement.

..... = \emptyset [1]

5 (a) $P = \{ 1, 2, 3, 4, 5, 6, 7, 8 \}$

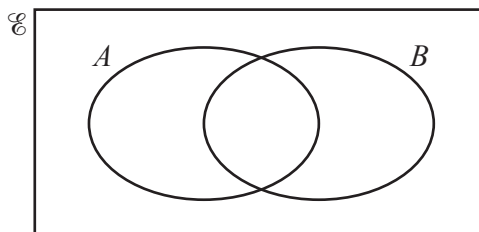
$Q = \{ 1, 3, 5, 7, 9, 11 \}$

Find $n(P \cup Q)$.

..... [1]

(b) $p \in A \cap B$
 $q \in (A \cup B)'$
 $r \in A \cap B'$

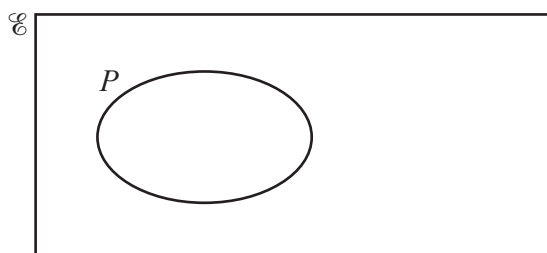
On the Venn diagram below, write each of the letters p , q and r in its appropriate subset.



[3]

- 6 $Q \subset P$
 $P \cap R = \emptyset$

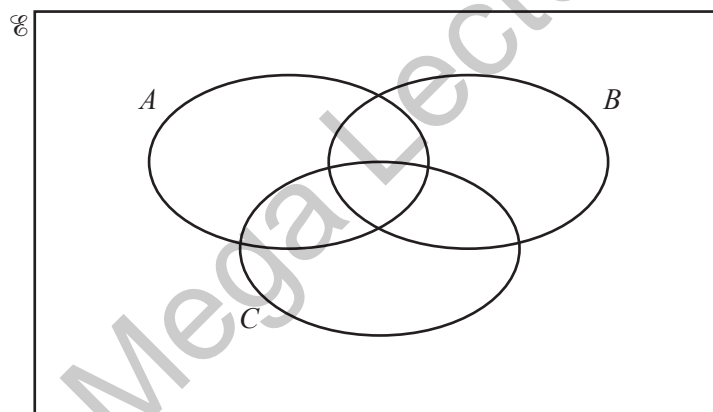
Complete the Venn diagram to show sets Q and R .



[2]

- 7 (a) $U = \{x : x \text{ is an integer } 1 \leq x \leq 16\}$
 $A = \{x : x \text{ is an even number}\}$
 $B = \{x : x \text{ is a square number}\}$
 $C = \{x : x \text{ is a factor of } 100\}$

(i) Complete the Venn diagram.



[3]

(ii) Find $n(A' \cup B)$.

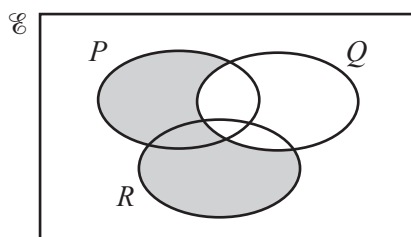
..... [1]

(iii) $p \in A \cap C$

Write down all the possible values of p .

..... [1]

- 8 (a) Use set notation to describe the shaded region in the Venn diagram.



..... [1]

- (b) $U = \{x : x \text{ is a positive number}\}$
 $A = \{x : 9 < x < 10\}$
 $B = \{x : x \text{ is an irrational number}\}$

Write down an element of $A \cap B$.

..... [2]

- 9 $U = \{0, 1, 2, 3, 4, 5, 6\}$
 $P = \{x : x = 0, 1, 2\}$
 $Q = \{y : y = 0, 2\}$

- (a) List the members of $P \cap Q$.

Answer [1]

- (b) Find $n(P' \cup Q)$.

Answer

(c) $R = \{ z : z = 2x + y, x \in P, y \in Q \}$

List the members of R .

Answer [2]

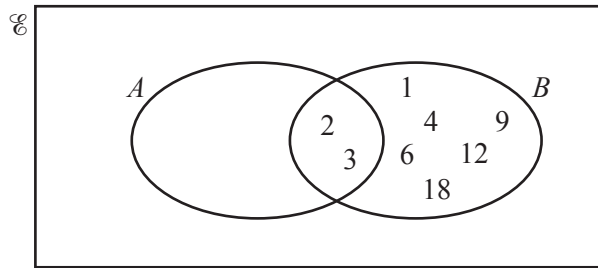
10 In a group of 35 people,

- 22 are wearing spectacles,
- 10 are wearing a hat,
- 6 are wearing spectacles and a hat.

By drawing a Venn diagram, or otherwise, find the number of people who are wearing neither spectacles nor a hat.

Answer [2]

- 11 (a) $\mathcal{E} = \{x : x \text{ is an integer } 1 \leq x \leq 18\}$
 $A = \{x : x \text{ is a prime number}\}$
 $B = \{1, 2, 3, 4, 6, 9, 12, 18\}$



- (i) Complete the Venn diagram to illustrate this information. [1]
(ii) Complete the description of the set B .

Answer $B = \{x : x \text{ is a factor of } \dots\dots\dots\}$ [1]

- (iii) Find $n(A \cup B)$.

Answer [1]

- (iv) List the elements of $A' \cap B$.

Answer [1]

- 12 (a) $\mathcal{E} = \{x : x \text{ is an integer and } 10 \leq x \leq 20\}$
 $A = \{x : x \text{ is an odd number}\}$
 $B = \{x : x \text{ is a multiple of } 5\}$

- (i) Find $n(A \cap B)$.

Answer [1]

- (ii) Find $A' \cup B$.

Answer [1]

- (iii) A number, r , is chosen at random from \mathcal{E} .

Find the probability that $r \in A \cup B$.

Answer [1]

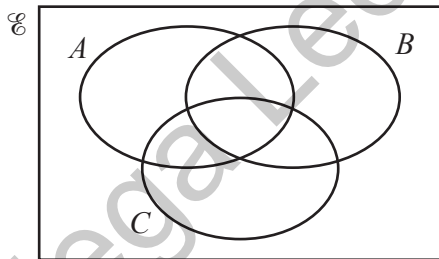
(b) In a survey, 40 people were asked what they had read that day.

- A total of 10 people had read a book
- A total of 24 people had read a newspaper
- 14 people had read neither a book nor a newspaper

(i) By drawing a Venn diagram, or otherwise, find the number of people who had read both a book and a newspaper.

Answer [2]

13 (a) In the Venn diagram, shade the region which represents the subset $(A \cap B') \cup C$.



[1]

(b) In a group of 36 students,

- 23 study Spanish,
- 17 study French,
- 4 study neither Spanish nor French.

By drawing a Venn diagram, or otherwise, find the number of students who study both Spanish and French.

Answer [2]

- 14 (a)** $\mathcal{E} = \{ 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 \}$
 $A = \{ x : x \text{ is a prime number} \}$
 $B = \{ x : x \text{ is an even number} \}$
 $C = \{ x : x \text{ is a multiple of } 5 \}$

(i) List the members of the subsets

(a) $B \cap C$,

Answer [1]

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

Answer [1]

(c) $A \cap B'$.

Answer [1]

(ii) A number q is chosen at random from \mathcal{E} .

Find the probability that $q \in A \cap B'$.

Answer [1]

15 50 students are asked what type of movie they like to watch.
 Of these students,

- 26 like comedy,
- 15 like both action and comedy and
- 8 like neither action nor comedy.

Using a Venn diagram, or otherwise, find the number of students who like action but not comedy.

Answer [2]

- 16 (a) In a group of students
30 play cricket,
38 play football and
9 play neither cricket nor football.

Find the lowest possible number of students in the group.

Answer [2]

- (b) In a group of 25 people,
11 people own both a bicycle and a skateboard,
6 people own neither a bicycle nor a skateboard,
 n people own a bicycle.

Find the smallest and the largest possible values of n .

Answer smallest [1]

largest [1]