

# UNIT 1 *Logic*

# Extra Exercises 1.1

1. At a food shop three children each chose one packet of their favourite biscuits. Decide which child chose which type of biscuits.

*Clue 1: Hester chose biscuits with chocolate in them.*

*Clue 2: Ravi does not like jam.*

|        | <i>Choc-Chip Cookies</i> | <i>Jammy Dodgers</i> | <i>Custard Creams</i> |
|--------|--------------------------|----------------------|-----------------------|
| Hester |                          |                      |                       |
| Ravi   |                          |                      |                       |
| Leanne |                          |                      |                       |

2. Jai, James and Jill all have different pets. They have one pet each. Their pets are a hamster, a budgie and a dog. Use these clues to work out who owns which pet.

*Clue 1: Jill's pet has more legs than James' pet.*

*Clue 2: Jai's pet is smaller than Jill's pet.*

|       | <i>Hamster</i> | <i>Budgie</i> | <i>Dog</i> |
|-------|----------------|---------------|------------|
| Jai   |                |               |            |
| James |                |               |            |
| Jill  |                |               |            |

3. Rory, Halim, Alex and Tom each support a different football team. All the teams are listed in the table. Decide who supports which team.

*Rory's team's name does not include the word 'United'.*

*Halim's team does not have an 'l' in its name.*

*Alex's team's name contains the letter 's'.*

*Tom's team's name contains the letter 'c'.*

|       | <i>Manchester United</i> | <i>Newcastle United</i> | <i>Arsenal</i> | <i>Liverpool</i> |
|-------|--------------------------|-------------------------|----------------|------------------|
| Rory  |                          |                         |                |                  |
| Halim |                          |                         |                |                  |
| Alex  |                          |                         |                |                  |
| Tom   |                          |                         |                |                  |

# UNIT 1 *Logic*

## Extra Exercises 1.2

1. Paul gathered information on the cars in a car park, and recorded it in this table.

- (a) How many Ford Escorts were in the car park?
- (b) How many cars were in the car park?
- (c) How many red cars were in the car park?
- (d) How many of the cars in the car park were not red?

|               | <i>Ford Escort</i> | <i>Other Cars</i> |
|---------------|--------------------|-------------------|
| Red           | 12                 | 18                |
| Other colours | 34                 | 182               |

2. There were 500 people at a concert. There were 220 men and the rest were women. As they left the concert, 80 people said they had not enjoyed the concert. Of these people, 42 were men.

- (a) Copy and complete this table.

|               | <i>Men</i> | <i>Women</i> |
|---------------|------------|--------------|
| Enjoy         |            |              |
| Did not enjoy |            |              |

- (b) How many men enjoyed the concert?
- (c) How many women did not enjoy the concert?

3. This table gives information about the numbers of children there are in Years 7, 8 and 9 of a school.

|        | <i>Boys</i> | <i>Girls</i> |
|--------|-------------|--------------|
| Year 7 | 92          | 101          |
| Year 8 |             | 96           |
| Year 9 | 99          |              |

- (a) Copy the table and use this information to fill in the empty boxes.
  - *There are 286 boys in Years 7, 8 and 9.*
  - *There are 571 pupils in Years 7, 8 and 9.*
- (b) How many pupils are there in Year 7?
- (c) How many girls are there in Years 7, 8 and 9?
- (d) In which year are there more boys than girls?

## UNIT 1 *Logic*

## Extra Exercises 1.3

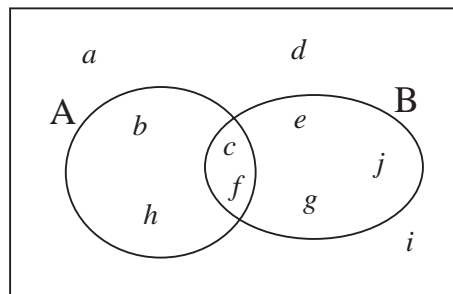
1. Draw a Venn diagram for the sets listed below:

$$A = \{7, 9, 11, 13\}$$

$$B = \{3, 5, 7, 9\}$$

Include all the whole numbers from 1 to 15 in your diagram.

2. This Venn diagram illustrates the sets A and B.



- Which letters are in set A?
  - Which letters are in set B?
  - Which letters are in set A, but not in set B?
  - Which letters are not in set A or set B?
  - Which letters are in both set A and set B?
3. The numbers 1 to 16 are sorted into sets:
- A : Multiples of 4
- B : Even numbers
- Which numbers are in A?
  - Are there any numbers in A that are also in B?
  - Draw a Venn diagram to show these two sets.

# UNIT 1 Logic

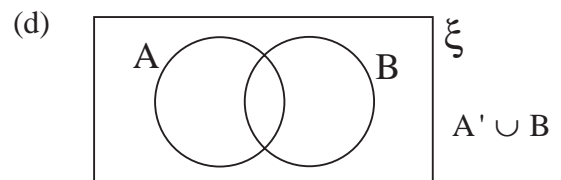
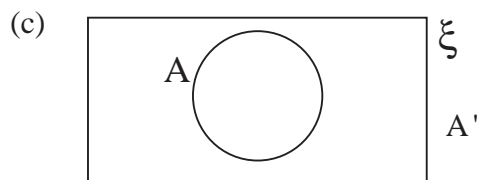
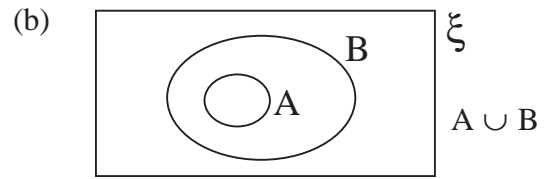
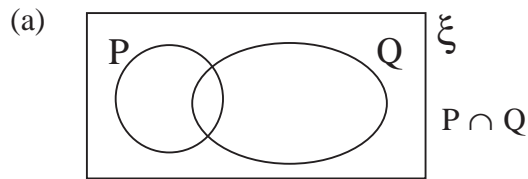
# Extra Exercises 1.4

1. If  $\xi = \{ 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 \}$   
 $A = \{ 21, 28 \}$   
 $B = \{ 21, 24, 27, 30 \}$   
 and  $C = \{ 22, 24, 26, 28, 30 \}$

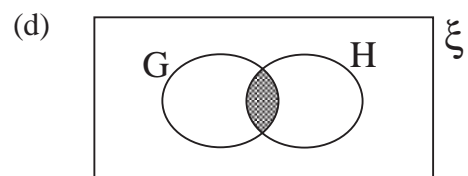
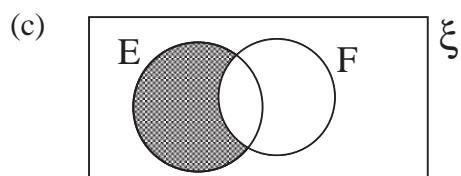
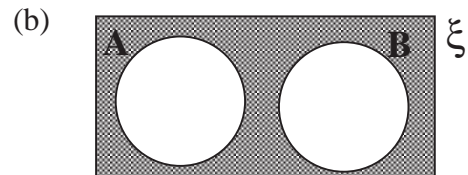
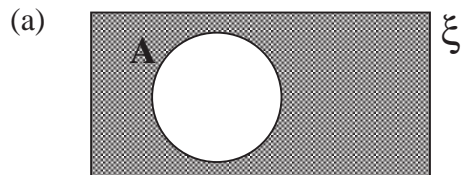
find:

- |                  |                  |
|------------------|------------------|
| (a) $A \cap B$   | (b) $A \cup B$   |
| (c) $A \cap C$   | (d) $A \cup C$   |
| (e) $B \cap C$   | (f) $B \cup C$   |
| (g) $A'$         | (h) $B'$         |
| (i) $A' \cap B'$ | (j) $A' \cup B'$ |

2. On a copy of each diagram, shade the region stated.



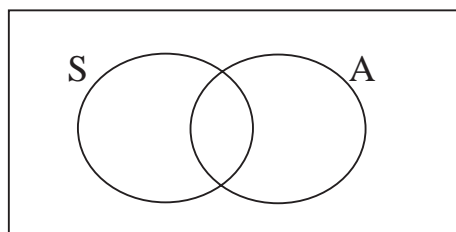
3. Describe each of the shaded regions, using set notation.



## UNIT 1 *Logic*

## Extra Exercises 1.5

1. In a class of 30 children there are 8 children who wear glasses. There are 17 boys in the class. If 5 boys wear glasses, how many girls do not wear glasses?
2. Claire and Laura have 20 CDs in their collection. One of them likes every CD. Claire likes 16 of the CDs and Laura likes 12 of them. How many do they both like?
3. At a school there is an art club (A) and a sports club (S). The diagram represents this.



Make 4 copies of the diagram.

Shade on different diagram the parts that represent:

- (a) pupils who belong to both clubs,
  - (b) pupils who belong to only the art club;
  - (c) pupils who belong to only the sports club;
  - (d) pupils who do not belong to either club.
4. 40 teenagers belong to a youth club. They all play at least one of badminton, darts and pool.
    - 8 teenagers play all three games.
    - 10 teenagers play badminton and darts.
    - 20 teenagers play darts and pool.
    - 12 teenagers play pool and badminton.
    - 30 teenagers play pool.
    - 23 teenagers play darts.
    - (a) How many of the teenagers play *only* badminton?
    - (b) How many of the teenagers play badminton?

## Extra Exercises 1.1

## Answers

1.

|        | <i>Choc-Chip Cookies</i> | <i>Jammy Dodgers</i> | <i>Custard Creams</i> |
|--------|--------------------------|----------------------|-----------------------|
| Hester | ✓                        | ✗                    | ✗                     |
| Ravi   | ✗                        | ✗                    | ✓                     |
| Leanne | ✗                        | ✓                    | ✗                     |

Hester : *Choc-Chip Cookies*Ravi : *Custard Creams*Leanne : *Jammy Dodgers*

2.

|       | <i>Hamster</i> | <i>Budgie</i> | <i>Dog</i> |
|-------|----------------|---------------|------------|
| Jai   | ✓              | ✗             | ✗          |
| James | ✗              | ✓             | ✗          |
| Jill  | ✗              | ✗             | ✓          |

Jai : *Hamster*James : *Budgie*Jill : *Dog*

3.

|       | <i>Manchester United</i> | <i>Newcastle United</i> | <i>Arsenal</i> | <i>Liverpool</i> |
|-------|--------------------------|-------------------------|----------------|------------------|
| Rory  | ✗                        | ✗                       | ✗              | ✓                |
| Halim | ✓                        | ✗                       | ✗              | ✗                |
| Alex  | ✗                        | ✗                       | ✓              | ✗                |
| Tom   | ✗                        | ✓                       | ✗              | ✗                |

Rory : *Liverpool*Halim : *Manchester United*Alex : *Arsenal*Tom : *Newcastle United*

## Extra Exercises 1.2

## Answers

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1. (a) 46 (b) 246 (c) 30 (d) 216

2. (a)

|               | <i>Men</i> | <i>Women</i> |
|---------------|------------|--------------|
| Enjoy         | 178        | 242          |
| Did not enjoy | 42         | 38           |

(b) 178 men enjoyed the concert.

(c) 38 women did not enjoy the concert.

3. (a)

|        | <i>Boys</i> | <i>Girls</i> |
|--------|-------------|--------------|
| Year 7 | 92          | 101          |
| Year 8 | 95          | 96           |
| Year 9 | 99          | 88           |

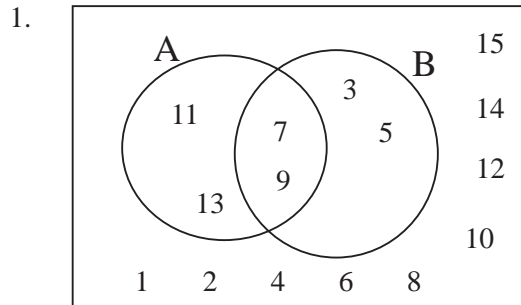
(b) 193 pupils in Year 7.

(c) 285 girls

(d) Year 9

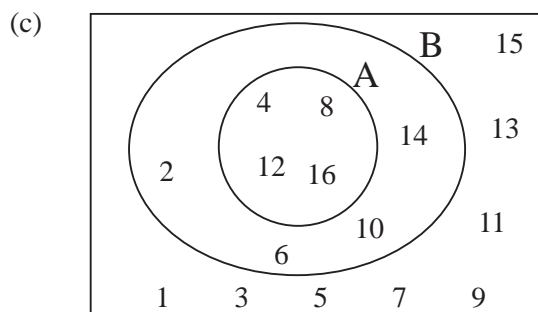
## Extra Exercises 1.3

## Answers



2. (a)  $A = \{b, c, f, h\}$   
 (b)  $B = \{c, e, f, g, j\}$   
 (c)  $\{b, h\}$   
 (d)  $\{a, d, i\}$   
 (e)  $\{c, f\}$

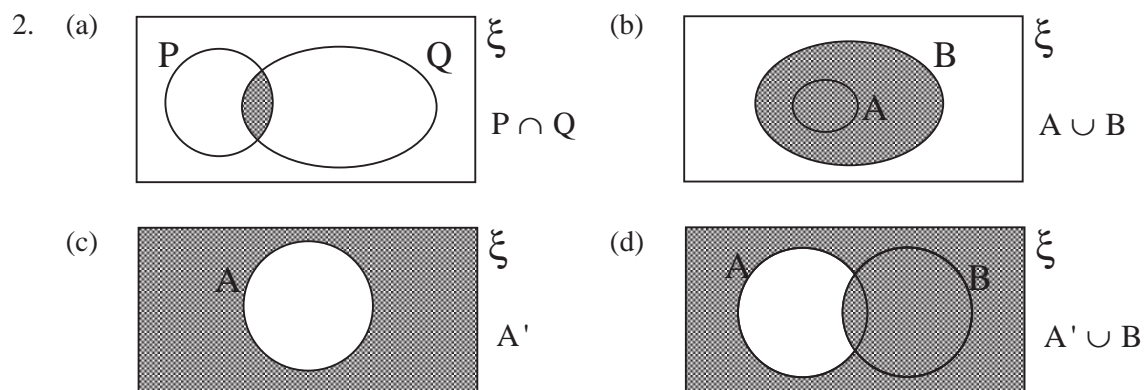
3. (a)  $A = \{4, 8, 12, 16\}$   
 (b) All of them are in B.



## Extra Exercises 1.4

## Answers

1. (a)  $A \cap B = \{ 21 \}$   
 (b)  $A \cup B = \{ 21, 24, 27, 28, 30 \}$   
 (c)  $A \cap C = \{ 28 \}$   
 (d)  $A \cup C = \{ 21, 22, 24, 26, 28, 30 \}$   
 (e)  $B \cap C = \{ 24 \}$   
 (f)  $B \cup C = \{ 21, 22, 24, 26, 27, 28, 30 \}$   
 (g)  $A' = \{ 22, 23, 24, 25, 26, 27, 29, 30 \}$   
 (h)  $B' = \{ 22, 23, 25, 26, 28, 29 \}$   
 (i)  $A' \cap B' = \{ 22, 23, 25, 26, 29 \}$   
 (j)  $A' \cup B' = \{ 22, 23, 24, 25, 26, 27, 28, 29, 30 \}$



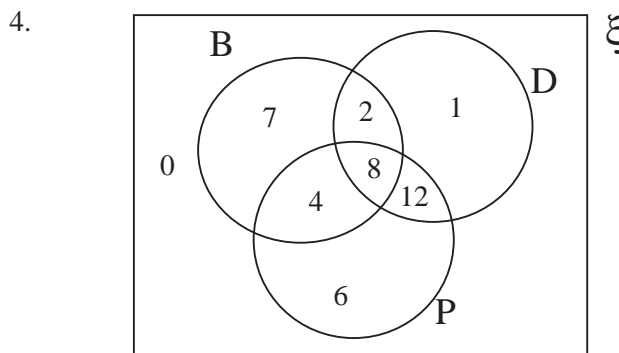
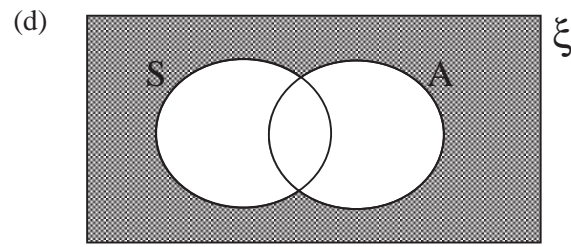
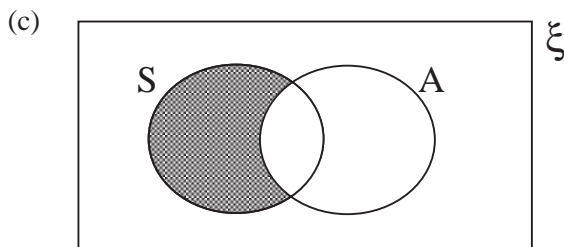
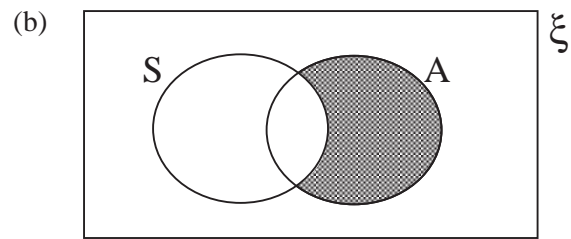
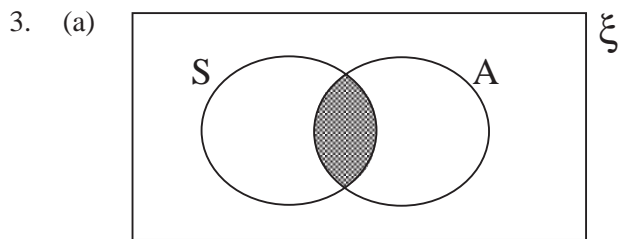
3. (a)  $A'$   
 (b)  $A' \cap B'$   
 (c)  $E \cap F'$   
 (d)  $G \cap H$

# Extra Exercises 1.5

# Answers

1. 10 girls do not wear glasses.

2. They both like 8 of the CDs.



(a) 7

(b) 21