

Another word for a collection is a set.

The objects in a set are called elements

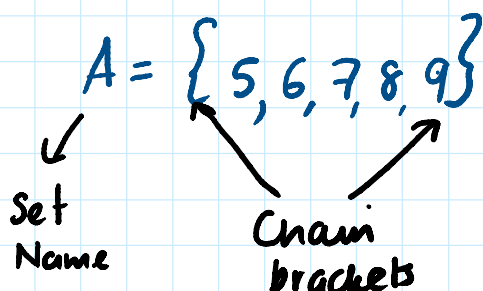
Symbol for element \in

Listing elements in a set

We list the elements in chain brackets $\{ \}$ and separate each element with a comma.

We use a Capital Letter to name the set.

Eg 1) If A is the set of natural numbers \mathbb{N} greater than 4 and less than 10. List all the elements in set A .



How many elements in set A ?

5 elements

$\#A$ cardinal number.

NOTE: In any set the element is listed ONLY ONCE.

Eg 2) The set B is the vowels in the English language. Write down the list of elements in set B .

$$B = \{a, e, i, o, u\} \quad \#B = 5.$$

Eg 3) Set C is the letters in the word SCIENCE
(write out the list of elements in set C)

Q3) Set C is the letters on the word SCIENCE

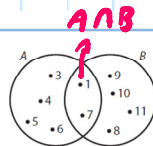
Write out the list of elements in set C.

$$C = \{S, C, I, E, N\} \quad \# C = 5$$

Exercise 3.1

1. From the given Venn diagram, list the elements of each of these sets:

- (i) A (ii) B
(iii) $A \cap B$ (iv) $A \cup B$



i) $A = \{3, 4, 5, 6, 7\}$

ii) $B = \{1, 7, 8, 9, 10, 11\}$

iii) $A \cap B = \{1, 7\}$

iv) $A \cup B = \{1, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$



T&T2 3.1
Set...



T&T2 3.1
Set...

Section 3.1 Revision of set terminology

Example 1

In a class of 30 pupils, 17 study German, 16 study Spanish and 5 study both German and Spanish.

Represent this information on a Venn diagram.

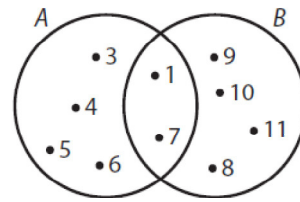
Use the Venn diagram to write down the number of pupils who study

- (i) German only (ii) Spanish only (iii) neither German nor Spanish

Exercise 3.1

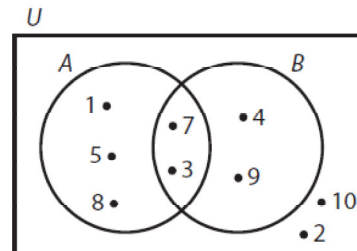
1. From the given Venn diagram, list the elements of each of these sets:

- (i) A (ii) B
(iii) $A \cap B$ (iv) $A \cup B$



2. Using the Venn diagram on the right, list the elements of the following sets:

- (i) A (ii) $A \cap B$ (iii) A'
(iv) B' (v) $(A \cup B)'$ (vi) $A' \cap B$



- i) $A = \{1, 3, 5, 7, 8\}$
ii) $A \cap B = \{7, 3\}$
iii) $A' = \{2, 4, 9, 10\}$
Everything outside set A

- iv) $B' = \{1, 2, 5, 8, 10\}$
v) $(A \cup B)' = \{2, 10\}$
vi) $A' \cap B = \{4, 9\}$

3. In the given Venn diagram, each dot represents an element.

*# cardinal number
number of elements in a set*

Write down

(i) $\#A = 7$

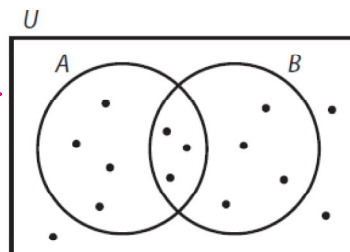
(ii) $\#B = 7$

(iii) $\#U = 14$

(iv) $\#(A \cup B) = 11$

(v) $\#(A \cap B) = 3$

(vi) $\#(A \cup B)' = 3$



4. Draw a Venn diagram to illustrate this information:

$\#(A) = 15, \#(B) = 14$ and $\#(A \cap B) = 7$

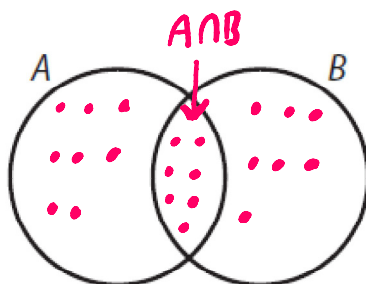
Find $\#(A \cup B)$.

$\#A \ 15 - 7 = 8$

$\#B \ 14 - 7 = 7$

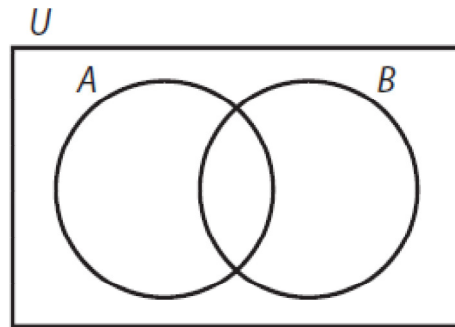
$\#(A \cup B) =$

$8 + 7 + 7 = 22$



5. Given $U = \{1, 2, 3, \dots, 12\}$
 $A = \{1, 2, 3, 4, 5, 6\}$
 $B = \{3, 5, 7, 9, 11\}$

Make a copy of the given Venn diagram and fill in the given information.

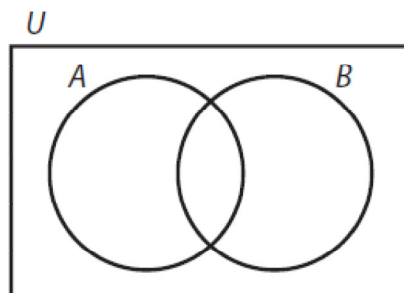


6. Copy the given Venn diagram and fill in the four regions, given that

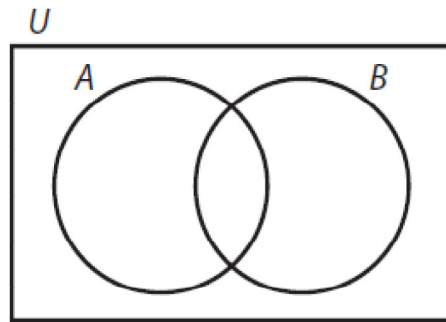
$$\#U = 42, \#A = 21, \#B = 18 \text{ and } \#(A \cap B) = 6$$

Now write down

- (i) $\#(A \cup B)$ (ii) B' (iii) $\#(A \cup B)'$

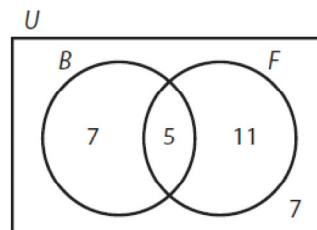


7. Copy this Venn diagram and shade in the region that represents $A' \cap B$.

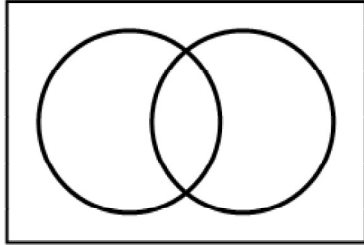


8. In the given Venn diagram,
 U is the set of pupils in the class
 B is the set of pupils who play basketball
 F is the set of pupils who play football.

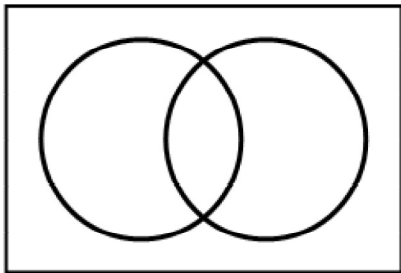
- How many pupils play both games?
- How many pupils are there in the class?
- How many pupils play football only?
- How many pupils play neither of the two games?



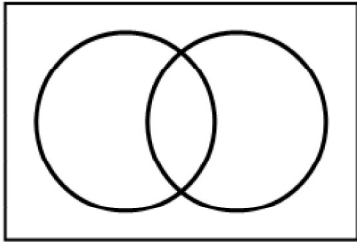
- 9.** In a class of 32 girls, 16 play hockey and 12 play tennis.
If 10 girls play neither of these games, represent this information on a Venn diagram.
Use the Venn diagram to write down
- (i) the number of girls who play both games
 - (ii) the number of girls who play hockey but not tennis.



- 10.** In a survey of 40 households, 22 had a dog and 16 had a cat.
If 8 households had both a cat and a dog, represent this information on a Venn diagram
and write down how many households had neither.

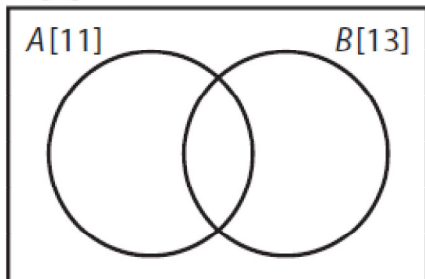


- 11.** All 32 pupils in a class study French (F) or German (G).
24 study French and 18 study German.
If $\#(F \cap G) = x$, write an equation in x and solve it to find its value.

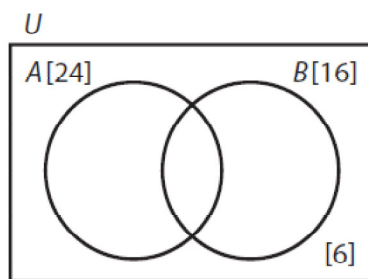


- 12.** Given that $\#(U) = 18$, $\#(A) = 11$ and $\#(B) = 13$, find
- the least value of $\#(A \cap B)$
 - the greatest value of $\#(A \cup B)$
 - the greatest value of $\#(A \cap B)$

$$\#[U] = 18$$



- 13.** In the given Venn diagram,
 $\#(A) = 24$, $\#(B) = 16$ and $\#(A \cup B)' = 6$.
 Use this diagram to find
- the greatest value of $\#(A \cap B)$
 - the greatest value of $\#(U)$
 - the least value of $\#(U)$



Answers

Exercise 3.1

- $\{1, 3, 4, 5, 6, 7\}$
 - $\{1, 7, 8, 9, 10, 11\}$
 - $\{1, 7\}$
 - $\{1, 3, 4, 5, 6, 7, 8, 9, 10, 11\}$
- $\{1, 3, 5, 7, 8\}$
 - $\{3, 7\}$
 - $\{2, 4, 9, 10\}$
 - $\{1, 2, 5, 8, 10\}$
 - $\{2, 10\}$
 - $\{4, 9\}$
- 7
 - 7
 - 14
 - 11
 - 3
 - 3
- 22
- 33
 - 24
 - 9
- 5
 - 30
 - 11
 - 7
- 6
 - 10
- 10
- $32 = 24 + 18 - x; x = 10$
- 6
 - 18
 - 11
- 16
 - 46
 - 30