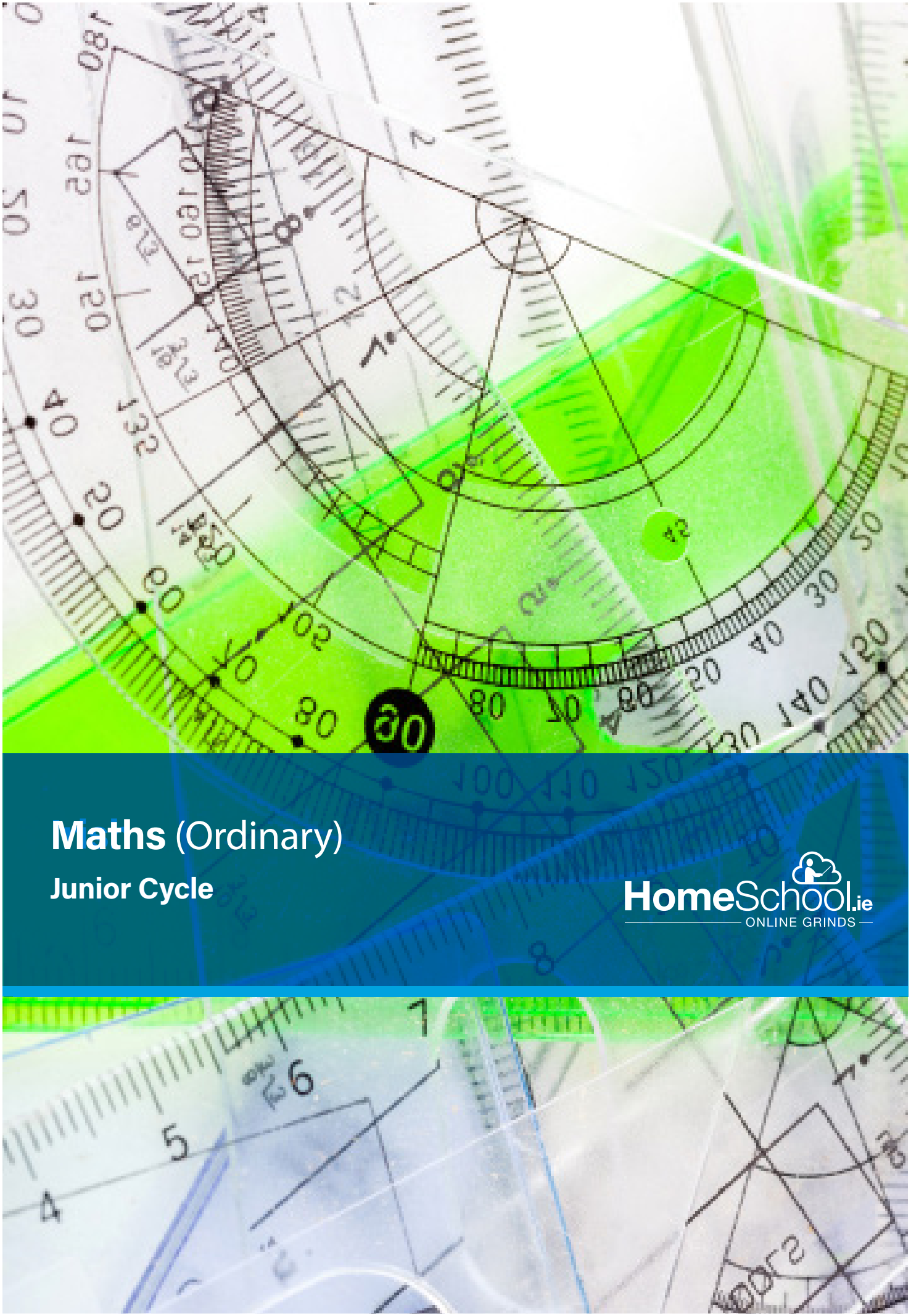


# **Maths** (Ordinary)

## Junior Cycle

HomeSchool.ie
ONLINE GRINDS

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## 1.1 Learning Intentions

**After this week's lesson you will be able to;**

- Define, list and label a set
- Understand terminology and notation use including null set, Ø, subset, , complement, element, ∈, universal set, cardinal number, #, intersection, ∩, union, ∪, set difference, \ .
- Create a 2 set venn diagram

## 1.2 Specification

N.5
A.B.C.D.

## 1.2 Specification

### Introduction

The Junior Cycle is a three-year long cycle which has five different strands to focus on:

**Topic: Numbers**
Sets/Number systems/Indices, surds & roots/Applied arithmetic/Distance, speed & time

**Topic: Geometry and trigonometry**
Trigonometry/Co-ordinate Geometry/Area & volume/Geometry/Transformations

**Topic: Algebra and functions**
Algebra/Functions/Patterns

**Topic: Statistics and probability**
Fundamental principle of counting and Probability/Statistics

### The Assessment

The assessment for the cycle is made up of ;

- Two-hour long exam worth 90% of your result at the end of 3rd year.
- Two CBA's must be completed and assessed by a teacher
- Further 10% relates to CBA 2 and assessment task.

**Subject : Junior Cycle Maths**

Teacher : Ms O'Dell

LESSON 1

# Sets

**1.4 Exercise**

# Tell me everything you know about the number 17

## Definitions

- Natural Numbers (N) - Any positive whole number
- Integers (Z) – Any positive or negative whole number
- Multiples – The different numbers one number divided into(example; multiples of 2 are 2, 4, 6, 8..., because 2 divides into all of those numbers)
- Factors – Numbers that divide evenly into another number
- Inclusive – To include (example: the numbers 1 to 5 inclusive will include 1 and 5)

**Sets**

A set is a collection of people objects or numbers that have a common characteristic.

**Sets in numbers**

Usually, we are asked to deal with groups of people or sets of numbers
For example) Set A is the days of the week
Or
For example) Set B is the even numbers from 1 – 10

**How would we list these as sets?**

Set A =
Set B =

**Elements**

Set A is all the odd numbers from 1 – 10 inclusive,
and set B is all Prime numbers from 1 – 10 inclusive

**Here we would write:**

A = {1, 3, 5, 7, 9}
B = { 2, 3, 5, 7}
The numbers in the sets are called elements!
**Draw the symbol for 'Element' and 'Not and element' below:**

| Element: | Not an Element: |
|---|---|

**1.5 Exercise**

**Can you answer the following questions using true/false:**

Is 2 Є {1, 2, 3, 4}?
Is T Є {T, E, A}?

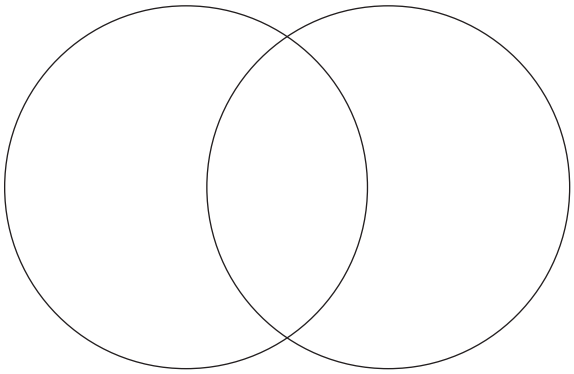
**Can you answer the following questions using the 'element' symbol or the 'not an element' symbol:**

2 _____ {Prime numbers less than 10}
17 _____ {Composite numbers between 10 and 20 inclusive}

**Venn Diagrams**

These are visual diagrams representing information. Each circle represents a set.

When someone is part of more than one set we create an overlap to allow them be in both circles.



## 1.5 Exercise

**Can you answer the following questions using true/false:**

Is 2 Є {1, 2, 3, 4}?

Is T Є {T, E, A}?

**Can you answer the following questions using the 'element' symbol or the 'not an element' symbol:**

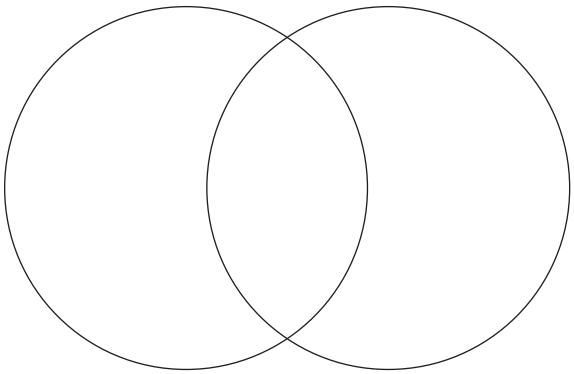
2 _____ {Prime numbers less than 10}

17 _____ {Composite numbers between 10 and 20 inclusive}

**Venn Diagrams**

These are visual diagrams representing information. Each circle represents a set.

When someone is part of more than one set we create an overlap to allow them be in both circles.



## 1.6 Exercise

**Question**

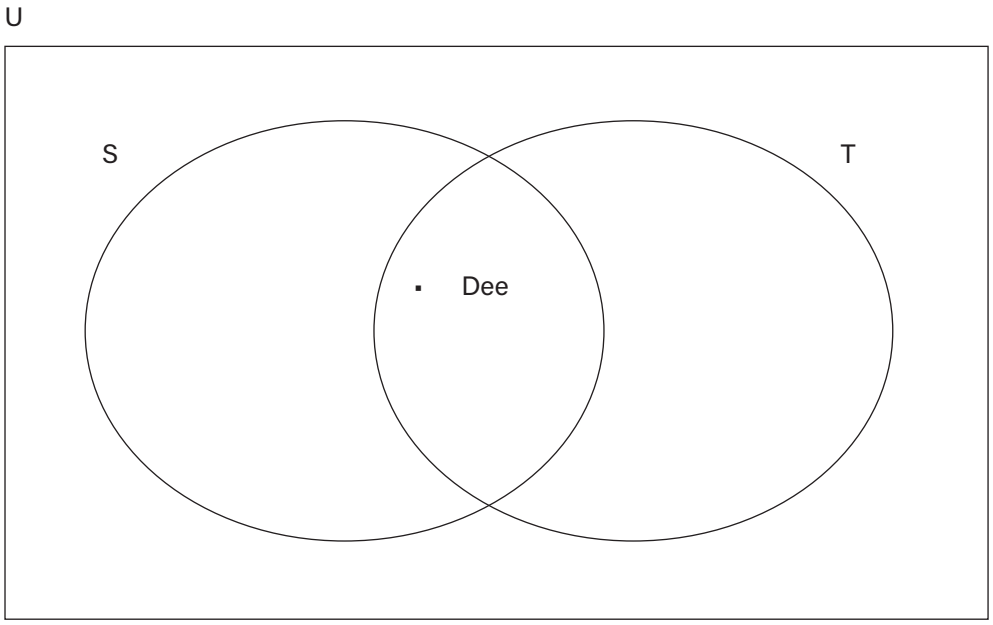
Six students where asked if they liked to play sport or read books.

John, Sarah and Dee said they liked sports.

Michael, John, Dee and Hannah liked to read.

Claire did not like either.

Use the information to complete the Venn Diagram



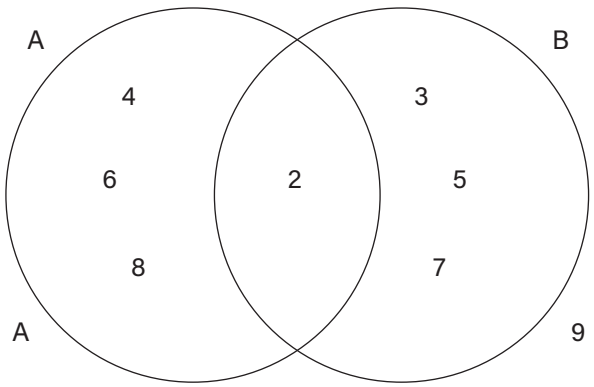

## 1.7 Exercise

**Draw a Venn Diagram when U={1-9}, with set A={2,4,6,8} and set B={2,3,5,7}**

**Symbols and meanings**

## 1.8 Exercise

| Symbol | Word | What it means |
|---|---|---|
| | Element/ Not an element | Is or is not a person, object or number from a set |
| | Intersection | The overlap of a and b |
| | Union | Both sets together |
| | Compliment | Everything except a |
| | A less B | Everything in a, get rid of b |
| | Cardinal number | The number of items in set a |
| | Subset/ Not a subset | Is or is not a part of a set |
| | Not equals to | Not equal to |
| | Null set | A set with nothing in it |




**Questions**

1. Find AnB (name what number(s) are in both A and B)
   {2}

2. Find AuB (name everything are in A and B together)
   {4, 6, 8, 2, 3, 5, 7}

3. Find A' (Name everything except any number in A)
   {3, 5, 7, 1, 9}

4. Find A\B (take all numbers in A but get rid of any that are also in B)
   {4, 6, 8}

5. Find #A (how many numbers are in A)

## 1.9 Exercise

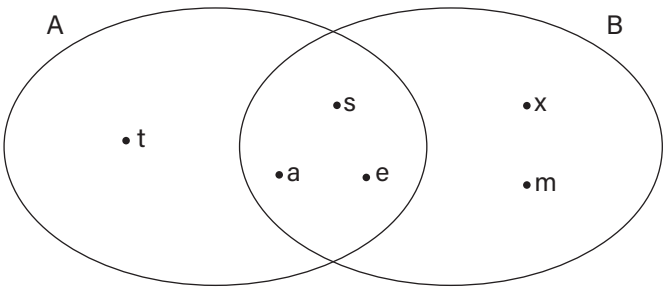
**Using notation to answer questions (2018 P1)**

Six students where asked if they liked to play sport or read books.
John, Sarah and Dee said they liked sports.
Michael, John, Dee and Hannah liked to read.
Claire did not like either.
Use the information to complete the Venn Diagram

**(Suggested maximum time :10 minutes)**

**Question 9**

(a) The wenn diagram below shows the sets A and B.



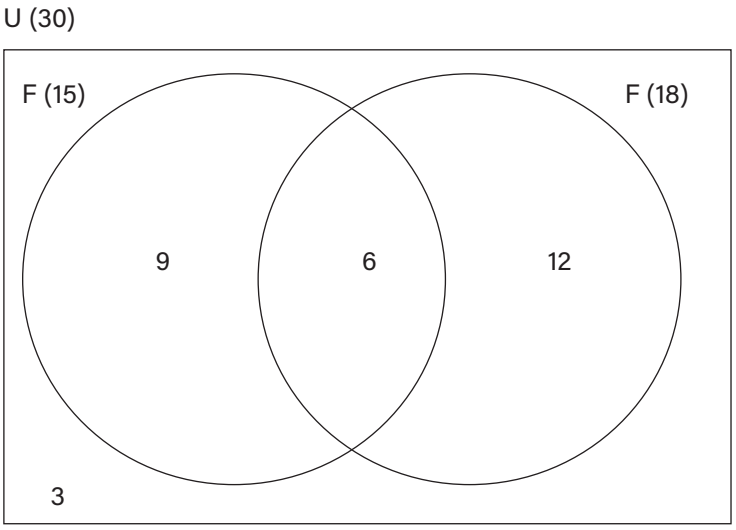
**List the elements of each of the following sets.**

1. A= { }
2. A ∩ B= { }
3. B\A { }

**Other possible questions:**

1. #A
2. #A ∪ B
3. A \ B
4. Is {a, m} a subset(c) of B
5. B′
6. (B \ A)′
7. #(A ∩ B)
8. If you can remove one letter, can you make a null set? How?

## 1.10 Exercise




1. F n G =
2. F u G =
3. F u G)′ =
4. F\G =
5. U\(F u G) =

**1.11 Exercise**

**(Suggested maximum time: 10 minutes)**

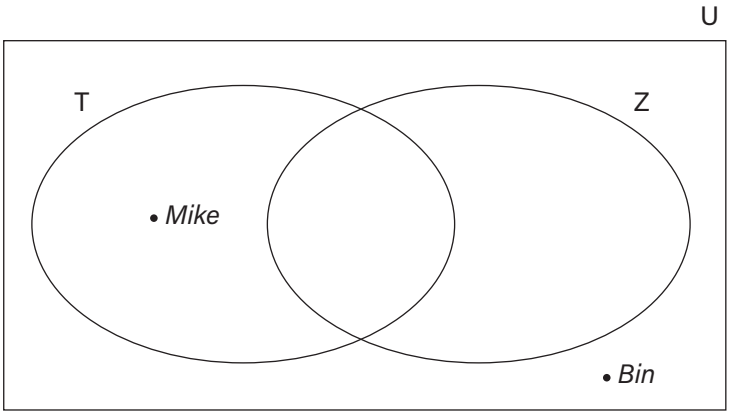



**Exam paper question (2019 P1)**

**Question 9**

A school team orders t-shirts and half zips.
Jill, Mike, Ted, and Gary order **t-shirts** *(T).*
Jill and Alice order **half zips** *(Z).*
Ben and Zena **don't order either.**

a. Complete the Venn diagram below to show this information, where:
***U*** is the whole team (the universal set)
***T*** is the set of people ordering t-shirts
***Z*** is the set of people ordering half zips.




b. In total, how many students are on the team? Answer:

c. Write each term from the following list into the correct space in the table below, to match each description to the correct term in set notation. Z ' is the complement of Z.

Z \ T  T ∩ Z  Z'

| | Description | Set Notation |
|---|---|---|
| 1 | The students who order **both** t-shirts **and** half zips | |
| 2 | The students who order half zips but **not** t-shirts | |
| 3 | The students who do **not** order half zips | |

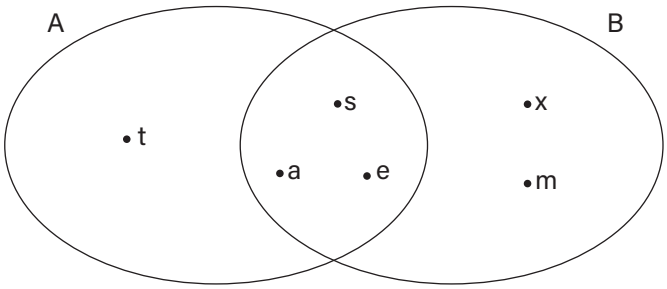
## 1.12 Exercise

**(Suggested maximum time: 10 minutes)**

### Exam paper questions (2018 P1)

**Question 9**

a. The Venn diagram below shows the sets A and B.




**List the elements of each of the following sets.**

1. A= { }

2. A ∩ B= { }

3. B\A { }

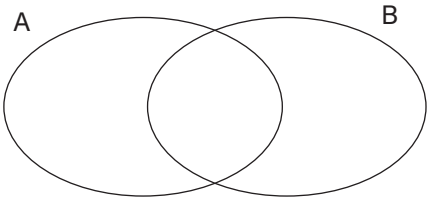
## 1.13 Exercise

**(Suggested maximum time :5 minutes)**

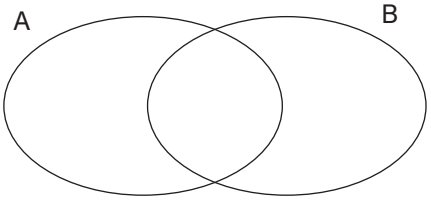
### Exam paper questions (2015 P1)

**Question 2**

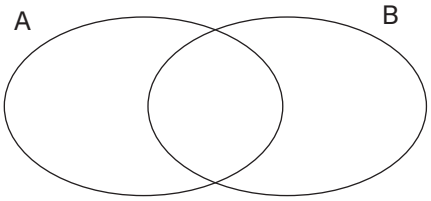
a. On the venn diagram below, **shade in** the region that represents $A \cap B$




b. On the venn diagram below, shade in the region that represents $A \cap B$



c. One the venn diagram, shade in the region that represents $(A \cap B) \setminus (A \cup B)$




d. Put a tick $(\surd)$ in the correct box to show which of the following represens the elements that are ***in A but not in B.***

| B \ A | A + B | A \ B |
|---|---|---|
| ☐ | ☐ | ☐ |

**Homework Task**

**(Suggested maximum time :10 minutes)**

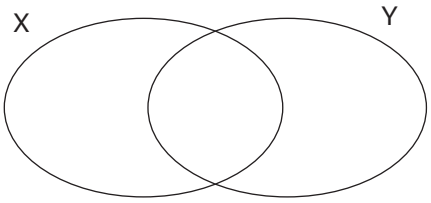
**2017 P1 Q2**

**Question 2**

a. Fill in the venn diagram below, given that:

X = {N, I, C, O, L, A}

Y = {S, O, P, H, I, A}




b. Write down a **subset** of X that has 2 elements, and that is also a subsets of Y.

Answer = { }

c. Write down a **subset** of X that has 2 elements, and that is not a subset of Y.

Answer = { }

The table below shows three statements. Each statement is written in English and in set notation.

d. Complete the table

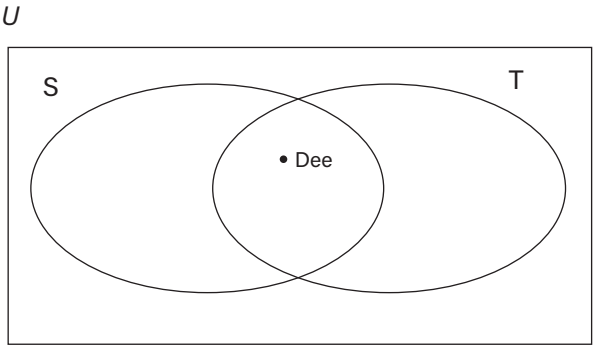
| | **English** | **Set Notation** |
|---|---|---|
| Statement 1 | Letters in both X **and** Y. | X ∩ Y |
| Statement 2 | | X \ Y |
| Statement 3 | Letters in X **or** Y **or both** | |

**2016 P1 Q2**

**Question 2** **(Suggested maximum time: 10 minutes)**

Dee, Maire,Ray, Evan, and Fiona alluse Snapchat *(S)*
Dee, Maire, and Ray use Twitter *(T)*
Zach doesn't use Snapchat or Twitter

a. Use this information to complete the Venn diagram below, where *U* is the universal set.




b. List the elements of each of the following two sets, where *S'* is the complement of the set *S*.

(i) $S \cap T =$

(ii) $S' =$

c. Put a tick ( √ ) in the correct box in each row of the table below, to show whether each statement is true of false.

| **Statement** | Tick **one** only for each statement | |
|---|---|---|
| | **True** | **False** |
| # S = 3 | | |
| Dee ∈ T | | |
| S ∪ T = T ∪ S | | |
| T ⊂ S | | |
| S \ T = { } | | |