## Lesson 4

## 4.1 Venn Diagram Backwards

Previously, the questions involving shading on a Venn diagram have given a piece of Set Theory algebra, and asked that the region specified be shaded. However, such questions can be asked the other way round; the shading is given and the algebra describing the region asked for.

## 4.2 Example

On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.







Shade :

Shade :

Shade :



[6 marks]

Often, more than one answer is possible, although there is usually an elegant, simplest answer, which is to be striven for.

## 4.3 Exercise

## Marks Available : 40

## **Question 1**

On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.







Shade :



Shade :

Shade :

Shade :



Shade :

[6 marks]

## **Question 2**

Given that  $D = \{$ Names of days in a week $\}$ What is  $n\{$ Names of days in a week $\}$ 

[ 1 mark ]

## **Question 3**

Let	$S = \{$ Square numbers less than 40 $\}$
	$F = \{ Factors of 32 \}$
	$T = \{$ Triangular numbers less than 40 $\}$

(i) List the elements of set *S* 

[ 1 mark ]

- (ii) List the elements of set F
- (iii) List the elements of set T

[ 1 mark ]

[ 1 mark ]

(iv) Complete the Venn diagram to show the relationship between S, F and T.





- (v) By counting elements, if any, determine :
  - (a) n(F) (d)  $n(S \cup F \cup T)$
  - (**b**)  $n(S \cup F)$  (**e**)  $n(S \cap F \cap T')$
  - (c)  $n(S \cap F)$  (f)  $n((S \cap F) \cup T)$

## **Question 4**

On each of the following diagrams, describe the region that is shaded by using Set Theory symbols.





Shade :



Shade :



Shade :



Shade :



Shade :

[6 marks]

# Question 5

In this question,

$$V = \{\text{vowels}\}$$
$$C = \{\text{consonants}\}$$

Describe in words the set  $V \cup C$ 

[ 1 mark ]

#### **Question 6**

Let  $\varepsilon$  = All positive integers Let A = {The factors of 100} Let B = {The factors of 60}

(i) List the elements of set A

[ 2 marks ]

(ii) List the elements of set B

#### [ 2 marks ]

(iii) For each of the following, decide if the given statement is TRUE or FALSE

( <b>a</b> ) $n(A) = 9$ ( <b>f</b>	$n(A \cap B) > 5$
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- (**b**)  $n(B) \neq 9$  (**g**)  $7 \notin (A \cup B)$
- (**c**)  $3 \in (A \cup B)$  (**h**)  $101 \in A'$
- (**d**)  $3 \in (A \cap B)$  (**i**)  $101 \in (A' \cup B')$
- (e)  $50 \notin B'$  (j)  $12 \in (A \cup B)'$

[10 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk