Lesson 2

GCSE Mathematics

Set Theory I

2.1 Venn Diagrams

Previously, we considered one set at a time.

Today we'll look at two sets at a time.

The interest is in the connections between the two sets.

A Venn Diagram is an excellent way of making clear how the two sets are connected.

2.2 An Example Involving a Venn Diagram

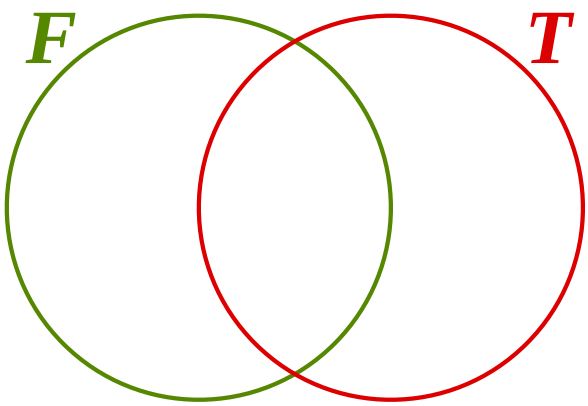
Draw a Venn Diagram to show the relationship between the sets F and T where

F = { The factors of 15 }

T = { The factors of 25 }

F = { _____ , _____ , _____ , _____ }

T = { _____ , _____ , _____ }



Teaching Video : http://www.NumberWonder.co.uk/v9003/2.mp4

[7 marks]

2.3 Exercise

Marks Available : 60 + 20 Bonus

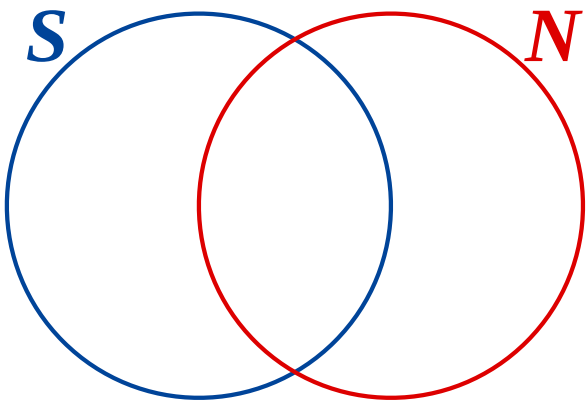
Question 1

Draw a Venn Diagram to show the relationship between the sets *S* and *N* where

S = { The factors of 6 } and N = { The factors of 9 }

S = { _____ , _____ , _____ , _____ }

N = { _____ , _____ , _____ }



[7 marks]

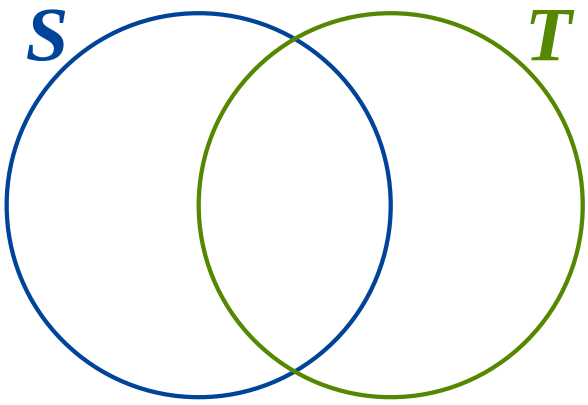
Question 2

Draw a Venn Diagram to show the relationship between the sets *S* and *T* where

S = { The factors of 16 } and *T* = { The factors of 12 }

S = { _____ , _____ , _____ , _____ , _____ }

T = { _____ , _____ , _____ , _____ , _____ , _____ }



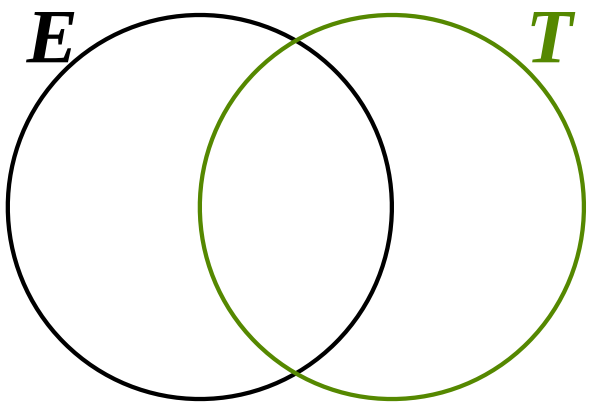
[7 marks]

Question 3

(i) Draw a Venn Diagram to show the relationship between the sets E and T where E = { The factors of 8 } and T = { The factors of 20 }

E = { _____ , _____ , _____ , _____ }

T = { _____ , _____ , _____ , _____ , _____ , _____ }



[7 marks]

(ii) What is the HCF (the highest common factor) of 8 and 20 ?

[1 mark]

(iii) Find this number in your Venn Diagram and draw a cloud around it.

[1 mark]

Question 4

The factors of 210 are

T = { 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 70, 105, 210 }

The ***prime factors*** of 210 are the numbers in the above list which are ***prime***.

What are the four ***prime factors*** of 210 ?

[4 marks]

Question 5

The number 12 has six factors, but only two ***prime factors***.

What are the two ***prime factors*** of 12 ?

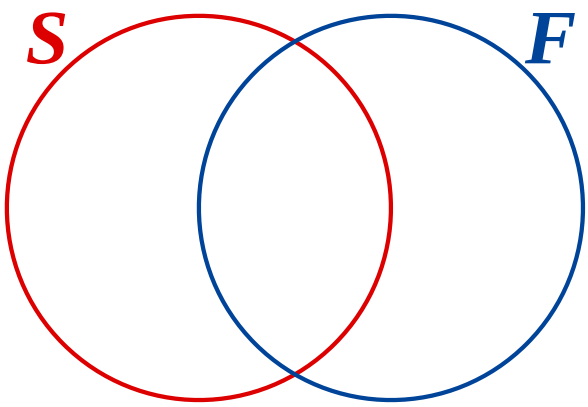
[2 marks]

Question 6

(i) Draw a Venn Diagram show the relationship between the sets *S* and *F* where
S = { The first five multiples of 6 } & *F* = { The first seven multiples of 4 }

S = { _____ , _____ , _____ , _____ , _____ }

F = { _____ , _____ , _____ , _____ , _____ , _____ , _____ }



[7 marks]

(ii) What is the LCM (the lowest common multiple) of 6 and 4 ?

[1 mark]

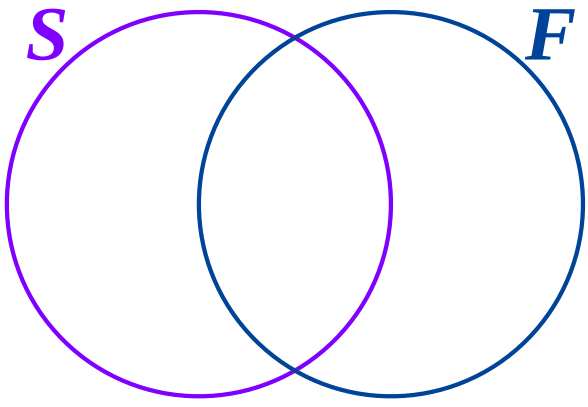
(iii) Find this number in your Venn Diagram and draw a cloud around it.

[1 mark]

Question 7

On a Venn Diagram show the relationship between the sets *S* and *F* where

S = { △ , × , O , □ }
F = { ◇ , □ , π , × }



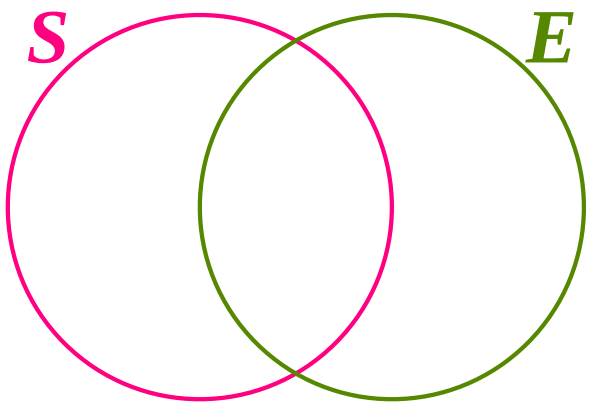
[4 marks]

Question 8

(i) Draw a Venn Diagram show the relationship between the sets *S* and *E* where
S = { The first nine multiples of 6 } & *E* = { The first seven multiples of 8 }

S = { _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____ }

E = { _____ , _____ , _____ , _____ , _____ , _____ , _____ }



[7 marks]

(ii) What is the LCM (the lowest common multiple) of 6 and 8 ?

[1 mark]

(iii) Find this number in your Venn Diagram and draw a cloud around it.

[1 mark]

Question 9

Here are three sets,

A = { factors of 28 }

B = { ***prime*** factors of 28 }

C = { ***prime*** factors of 15 }

List the members of sets A, B and C.

A = { _____ , _____ , _____ , _____ , _____ , _____ }

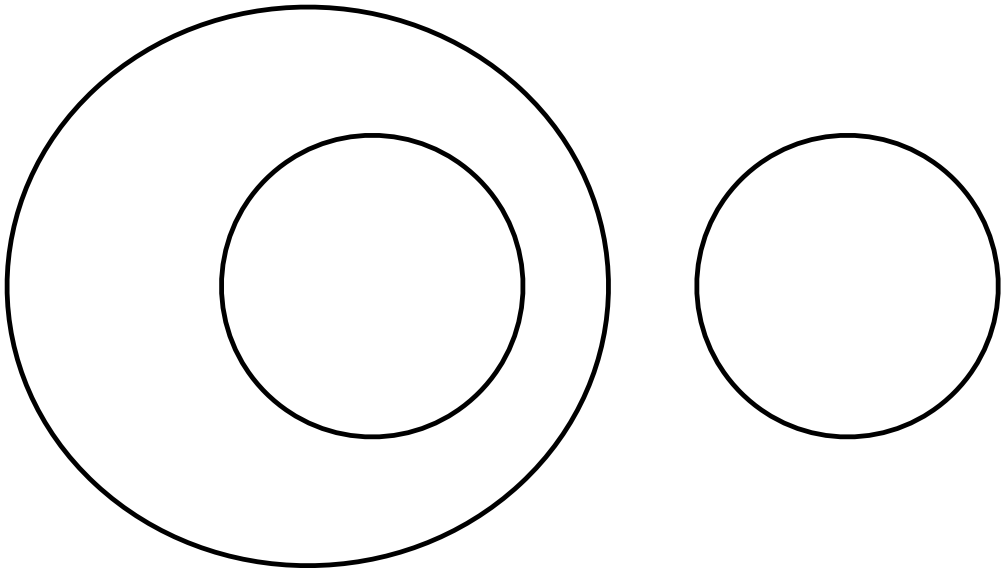
B = { _____ , _____ }

C = { _____ , _____ }

This time the Venn diagram has three hoops and can be drawn as shown below.

Decide which hoop is for set A, which for set B and which for set C.

Then complete the Venn diagram to show the relationship between sets A, B & C.



[8 marks]

Which set is a *subset* of another set ?

[1 mark]

Question 10 : BONUS QUESTION (Voluntary)
This question is crazy !

List the members of the following sets,

A = { The multiples of 35 less than 700 }

[3 marks]

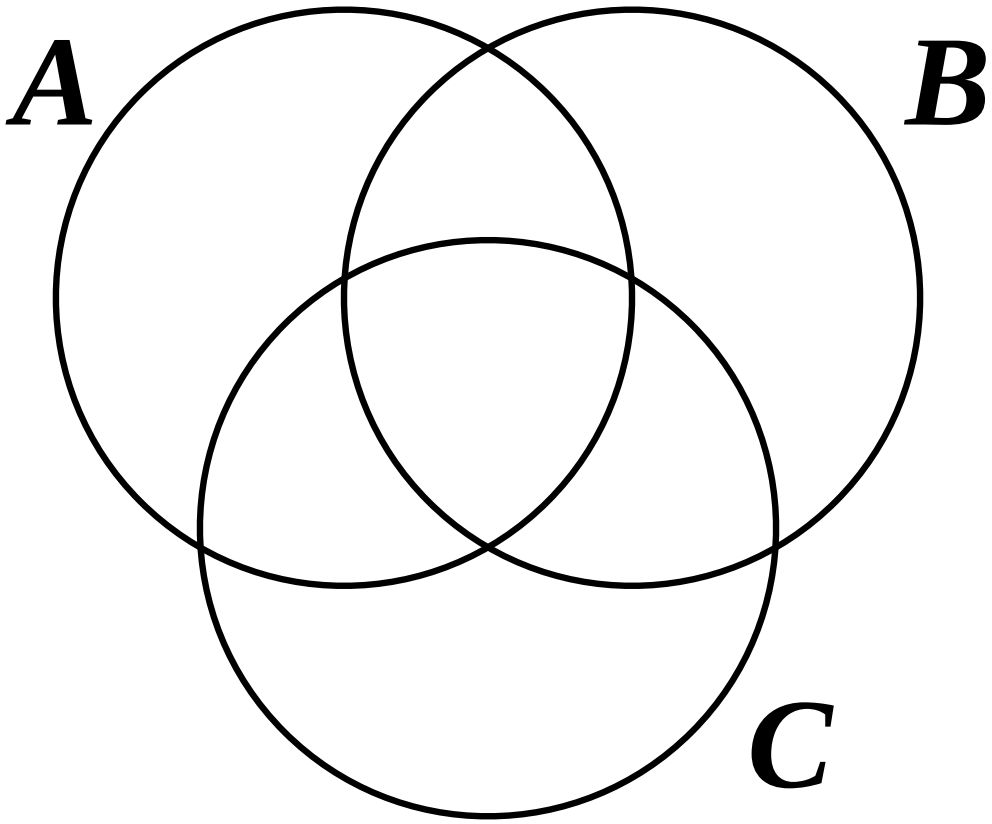
B = { The multiples of 42 less than 700 }

[3 marks]

C = { The multiples of 63 less than 700 }

[3 marks]

Use this Venn diagram to show the relationship between the sets A, B and C.



[4 marks]

Use the Venn Diagram to answer the following questions.

(i) What is the LCM of 35, 42 and 63 ?

[1 mark]

(ii) What is the LCM of 35 and 42 ?

[1 mark]

(iii) What is the LCM of 35 and 63 ?

[1 mark]

(iv) What is the LCM of 42 and 63 ?

[1 mark]