

# Venn Diagram Word Problems

## 1.ProblemOne

This first problem is a fairly easy one, where all of the information we need has been given to us in the question.

**“A Class of 40 students completed a survey on what pets they like. The choices were: Cats, Dogs, and Birds. Everyone liked at least one pet.**

**10 students liked Cats and Birds but not dogs**

**6 students liked Cats and Dogs but not birds**

**2 students liked Dogs and Birds but not Cats**

**2 students liked all three pets**

**10 students liked Cats only**

**9 students liked Dogs only**

**1 student liked Birds only**

**Represent these results using a three circle Venn Diagram.”**

The type of three circle Venn Diagram we will need is the following:

### Three Circle Venn Diagram

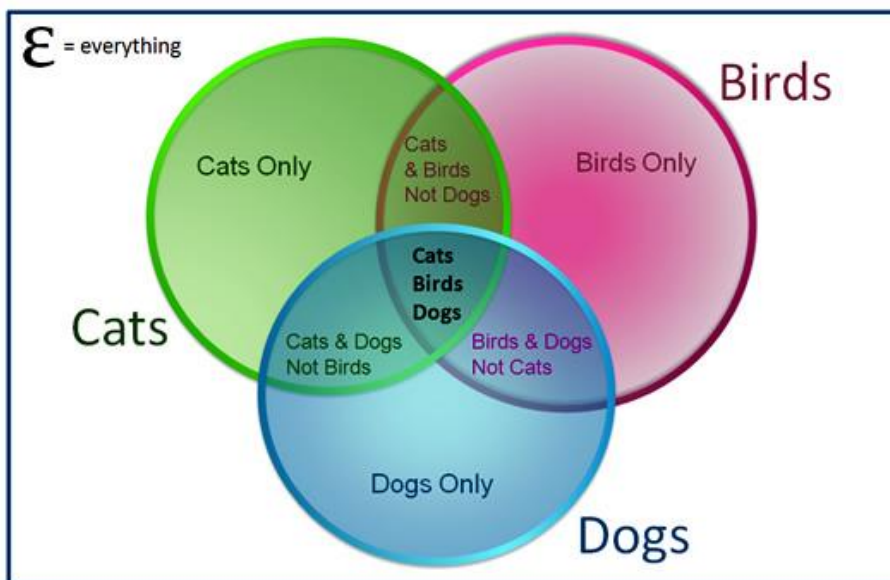


Image Source: Passy's World of Mathematics

This three circle word problem is an easy one.

All of the number values for each section of the diagram have been given to us in the question.

All we need to do is carefully put the number values onto the Diagram.

We also need to check that all of the numbers add up to the total of 40 students when we are finished.

The completed Venn Diagram is shown below.

## Venn Diagrams – Problem 1 - ANSWER

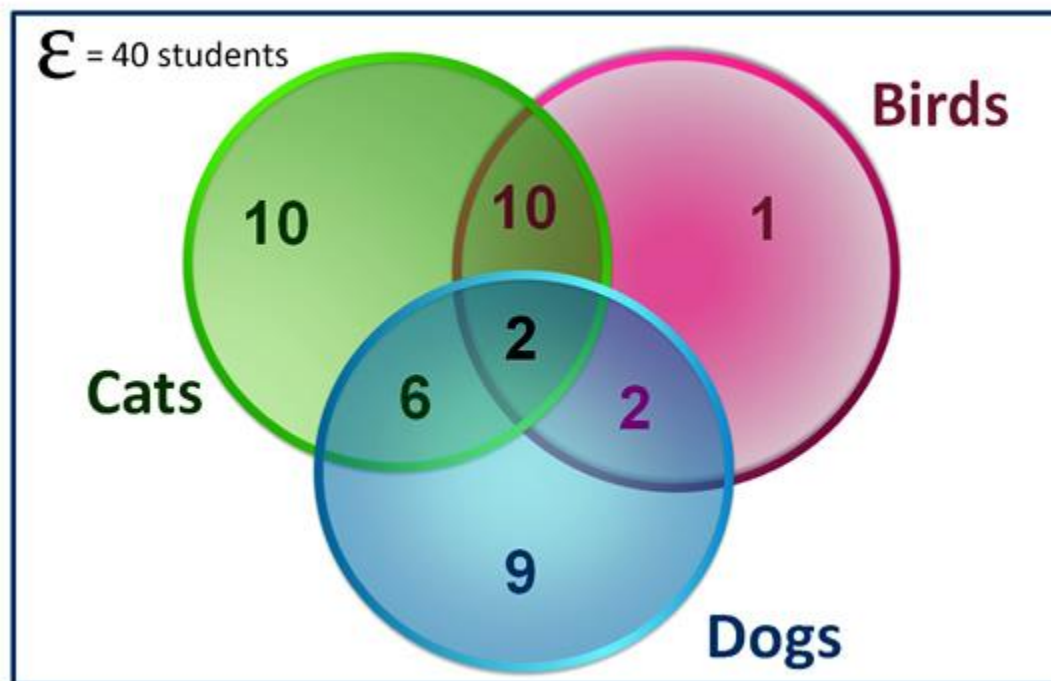
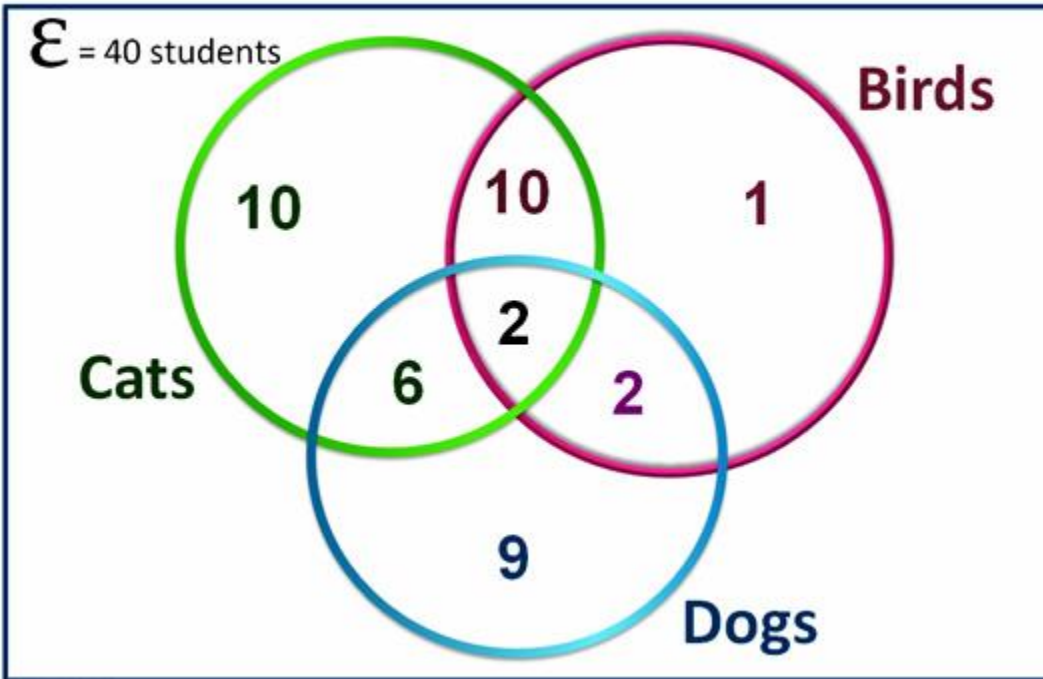


Image Source: Passy's World of Mathematics

Note that we do not need to color in and fill in the circles on Venn Diagrams.

The following diagram is also correct and a fully acceptable answer.

## Venn Diagrams – Problem 1 - ANSWER



## 2. Problem Two

This is a harder version of Problem One, where we are given less information in the question text. This means that we will need to do some working out steps to get to the final completed diagram.

**“A Class of 40 students completed a survey on what pets they like. The choices were: Cats, Dogs, and Birds.**

**Everyone liked at least one pet.**

**10 students liked Cats and Birds but not Dogs  
2 students liked Dogs and Birds but not Cats**

**12 students liked Cats and Birds  
8 students liked Cats and Dogs**

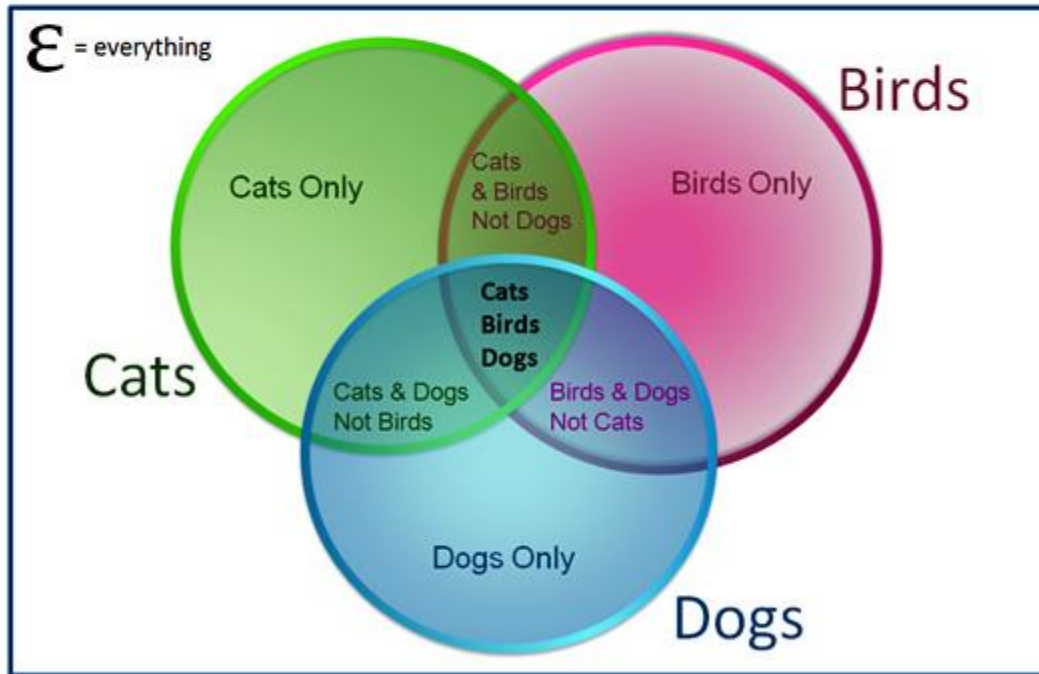


**All together, 28 students liked Cats, 19 students liked Dogs, and 15 students liked Birds.**

**Represent these results using a three circle Venn Diagram.”**

We need the exact same type of Venn Diagram as for Question 1.

## Three Circle Venn Diagram



We now need to go carefully through the word problem, and work out what information we can use straight away.

There should always be some data we can place onto the diagram to get started, even though it might not seem to be that much.

**"A Class of 40 students" - This is the  $E$  = everything total and can go on diagram now**

**"Everyone liked at least one pet" - There is nobody outside the circles**

**"10 students liked Cats and Birds but not Dogs" - This can go on the diagram now**

**"12 students liked Cats and Birds" - This can help us work out values later**

**"8 students liked Cats and Dogs" - This can help us work out values later**

**2 students liked Dogs and Birds but not Cats - This can go on the diagram now**

**All together, 28 students liked Cats, 19 students liked Dogs, and 15 liked Birds.**

**- These three values are the Totals of each of the circles on our diagram.**

**We will use these later to help work out the number values for:**

**"Cats Only", "Dogs Only" and "Birds Only"**

When we place what we know so far onto the diagram, this is what we have:

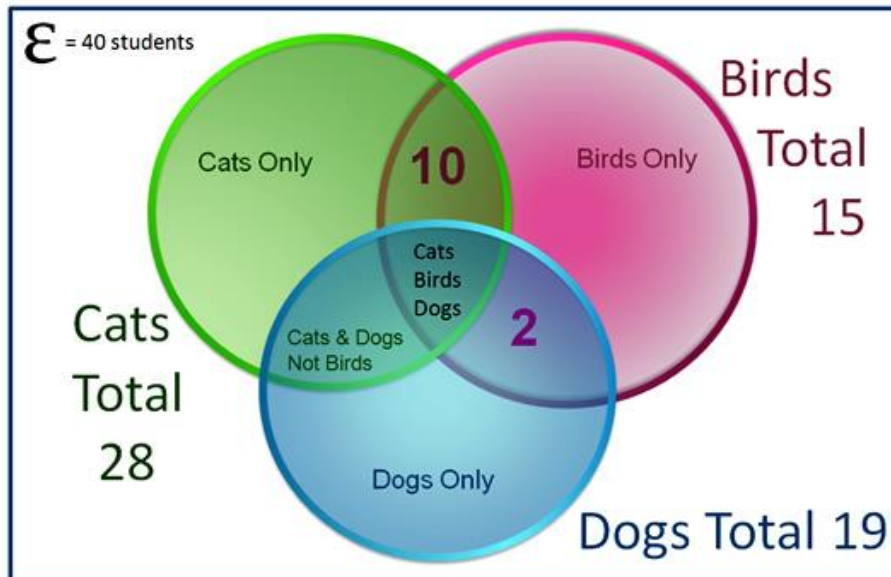


Image Source: Passy's World of Mathematics

We now need to work through the other information in the word problem, one piece at a time.

Usually in these problems we need to work on the overlapping parts in the centre of the diagram, and then work our way out to the "Cats Only", "Dogs Only", and "Birds Only" outer sections of the diagram.

Remember: Work for the Inside Out.

Here is what we will do next.

**Let's now work on this piece of information:**

**" 12 students liked Cats and Birds"**

**This tells us that :**

the Cats and Birds Not Dogs part of the diagram  
+  
the Cats and Birds and Dogs part in the centre  
=  
**A total of 12 items.**

( We only care that the students liked Cats and Birds,  
and we do not care whether or not they liked Dogs. )



This information refers to the following section of the Venn Diagram.

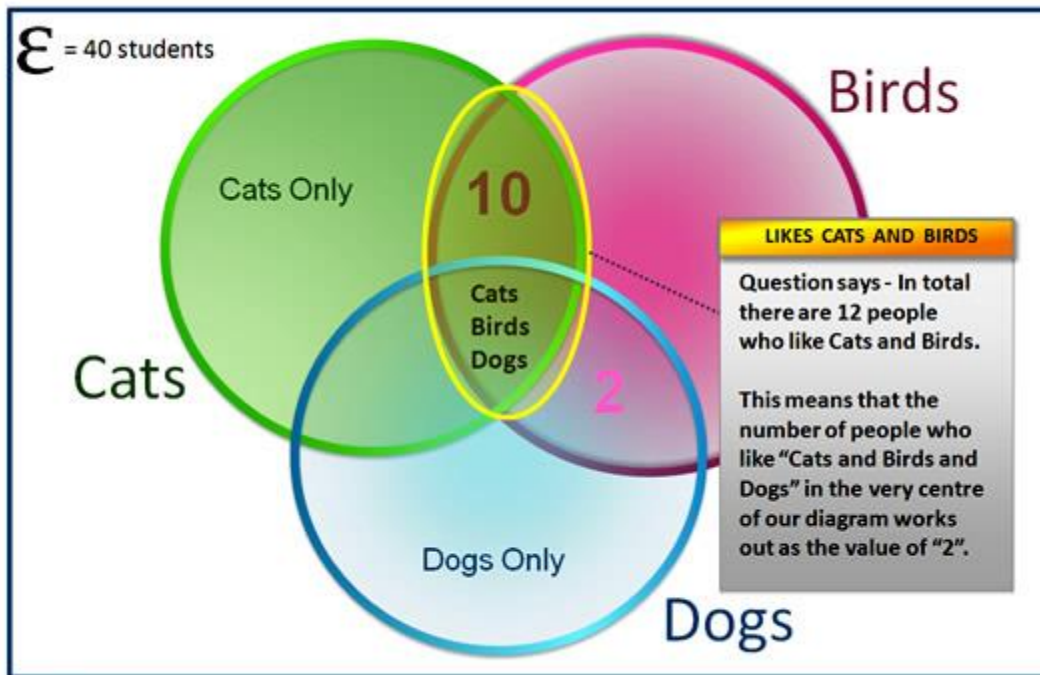
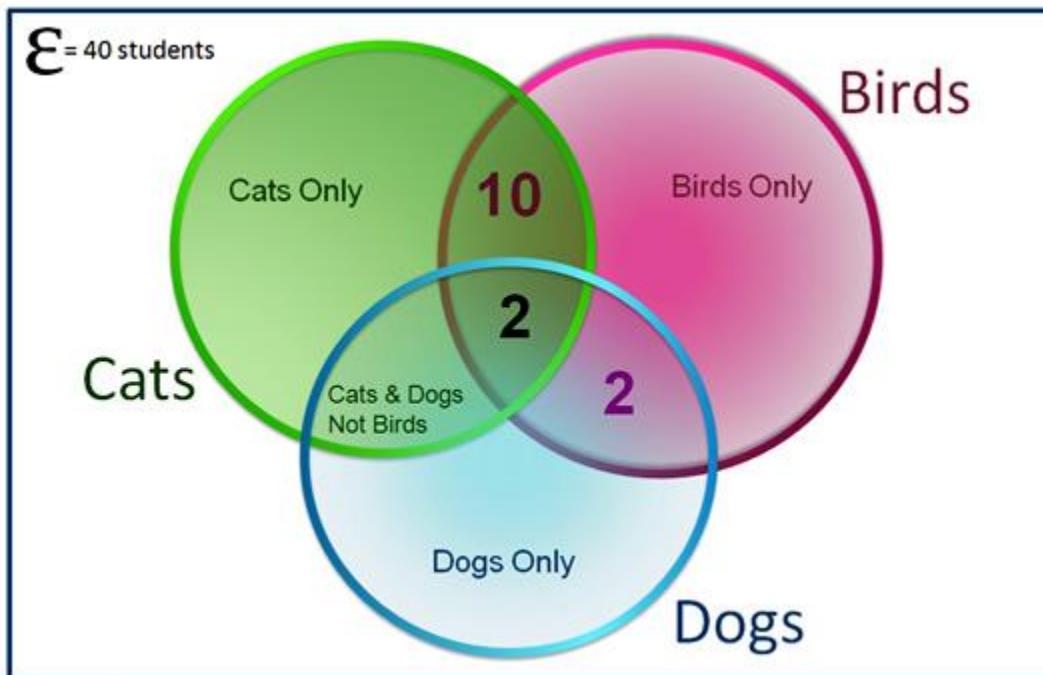


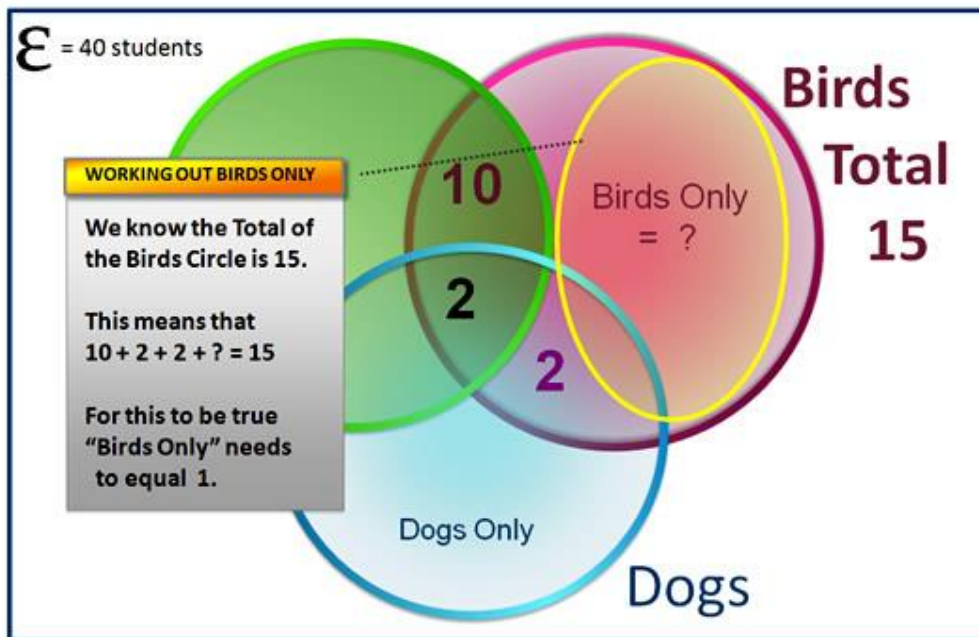
Image Source: Passy's World of Mathematics

We can now fill in the answer of "2" onto the centre of our diagram.

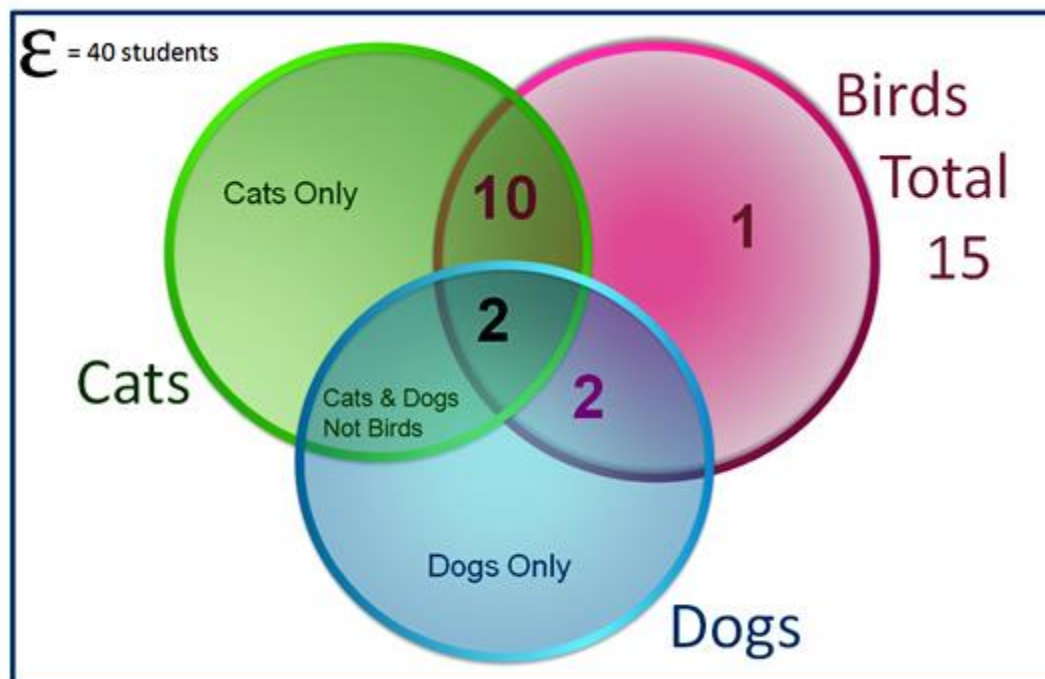


We now have the Birds circle nearly completed.

The only thing left to do is work out the "Birds Only" section, which we will now do.



We can now fill in the answer of "1" onto our diagram.



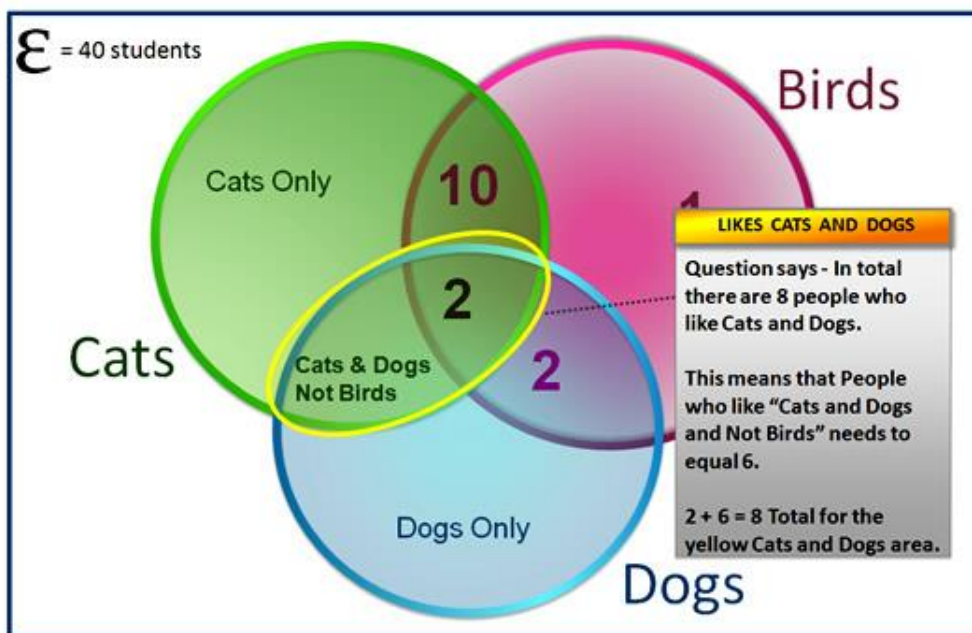
now have the Birds circle completed.

First we need to work on the overlaps that involve Cats and other animals in the centre of the diagram.

**“ 8 students liked Cats and Dogs”**

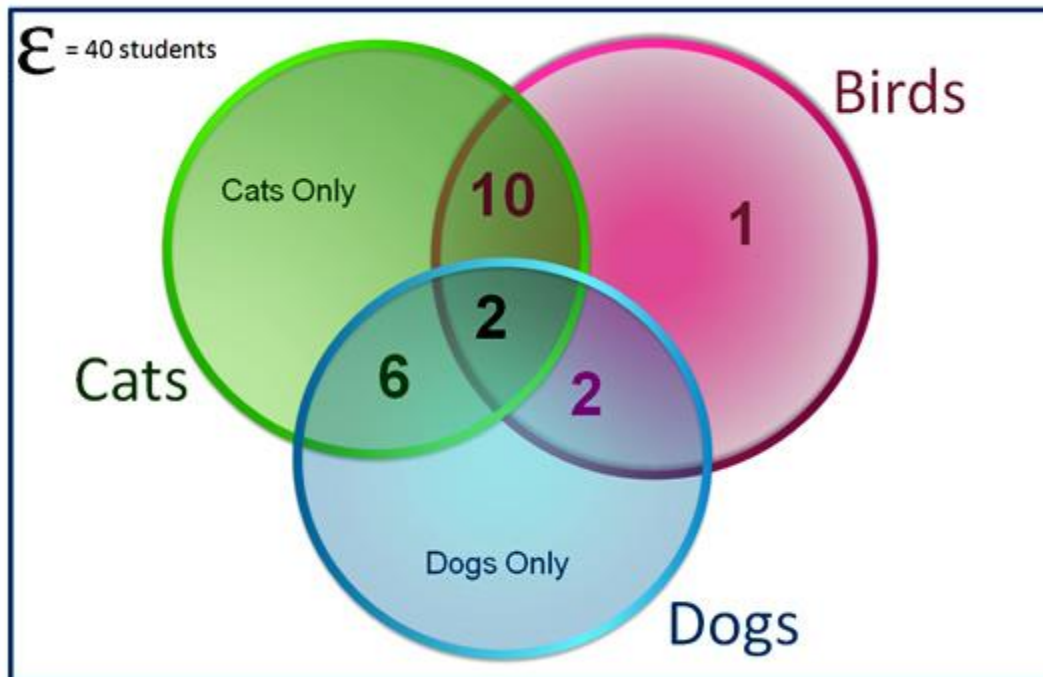
the Cats and Dogs Not Birds part of the diagram  
+  
the Cats and Dogs and Birds part in the centre  
=  
A total of 8 items.

This information refers to the following section of the Venn Diagram.





We can now fill in the answer of “6” onto our diagram.



We are nearly there !

We now only have “Cats Only” and “Dogs Only” to work out, and we have all the information we need to do this.

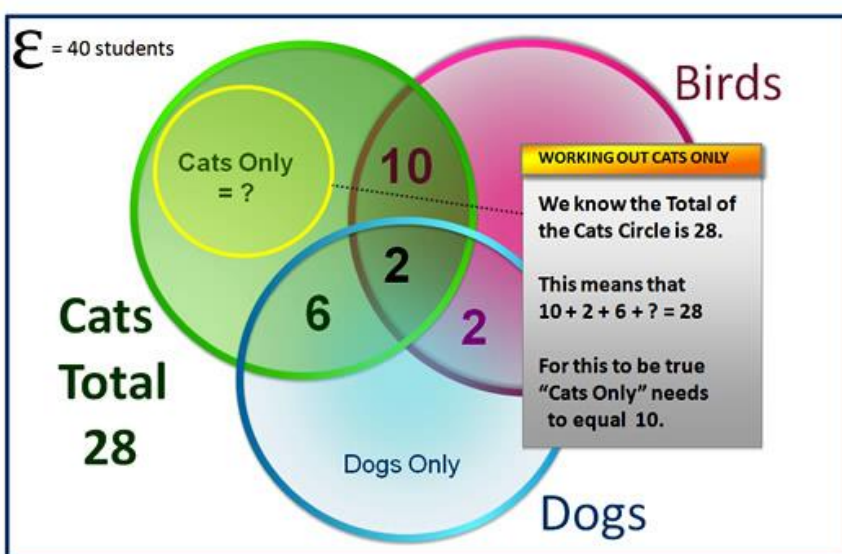


Image Source: Passy’s World of Mathematics

We can now place the “Cats Only” answer onto our diagram.

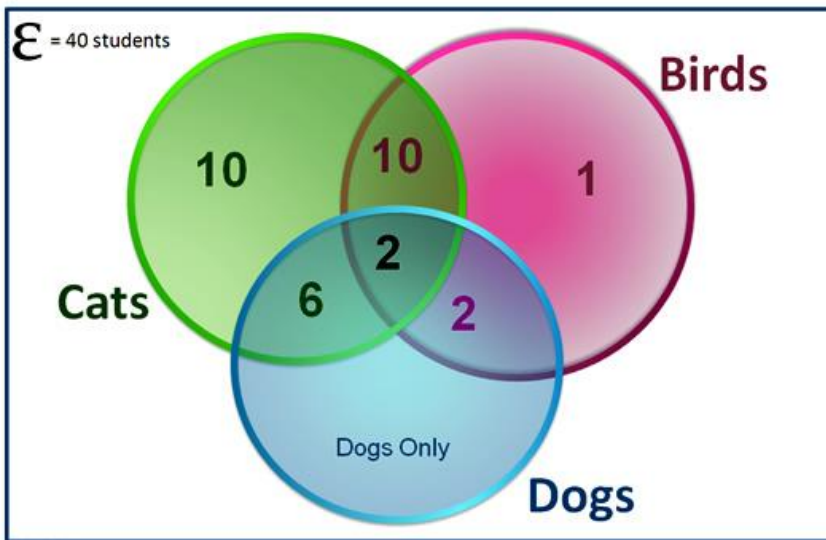


Image Source: Passy's World of Mathematics

We now only need to work out "Dogs Only".

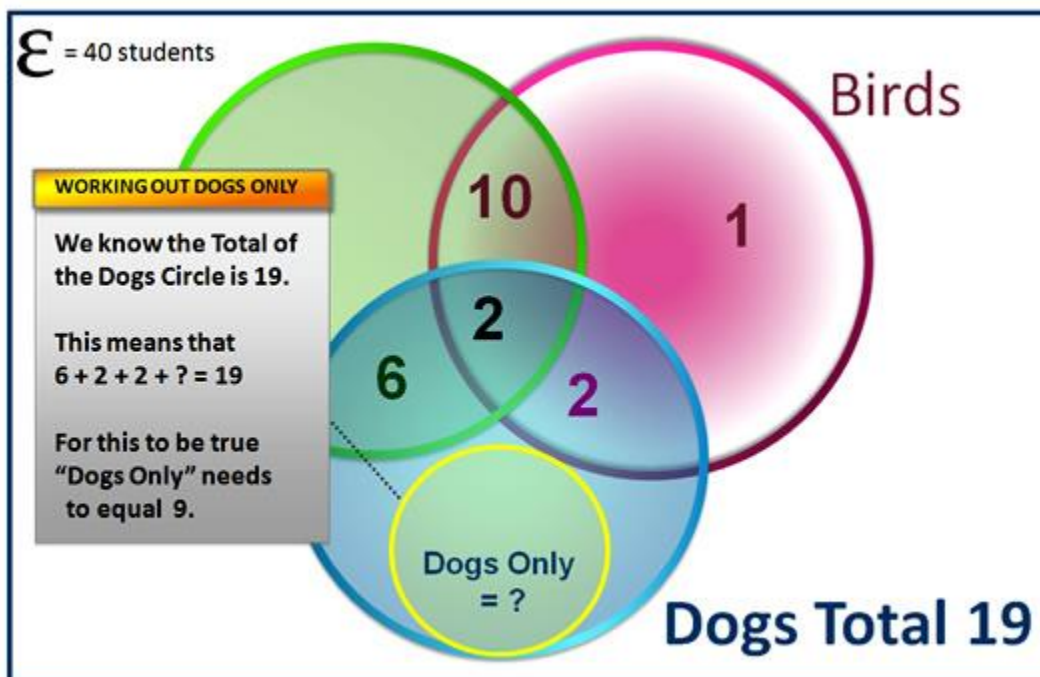


Image Source: Passy's World of Mathematics

Our Diagram for Problem Two is now finally complete.

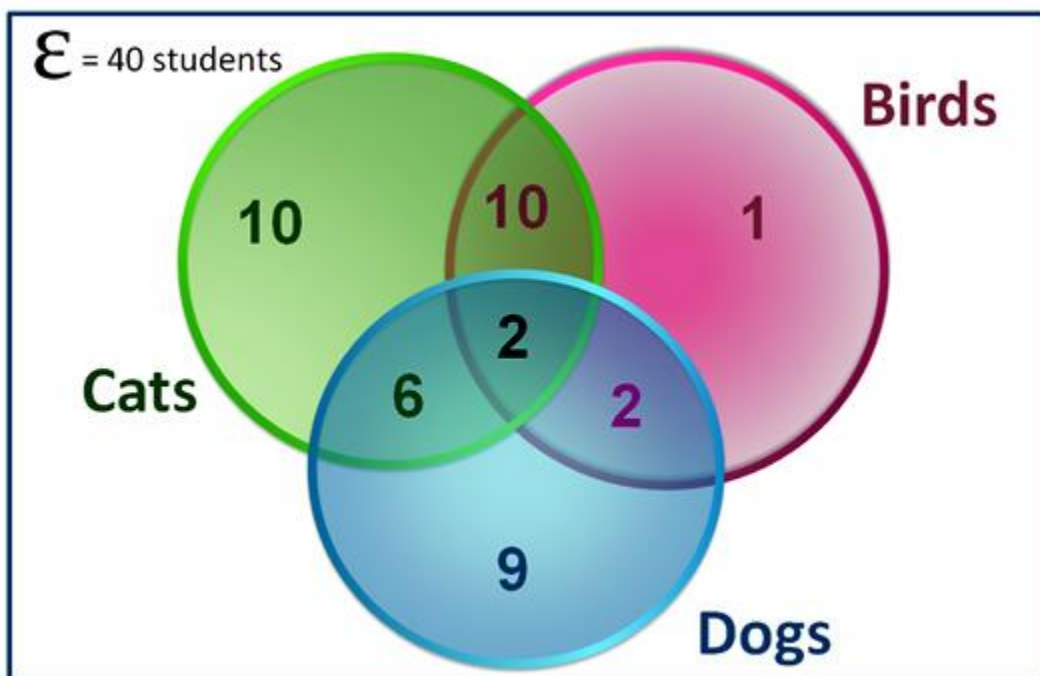


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