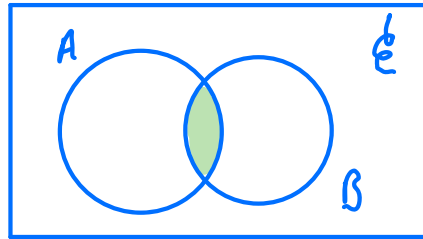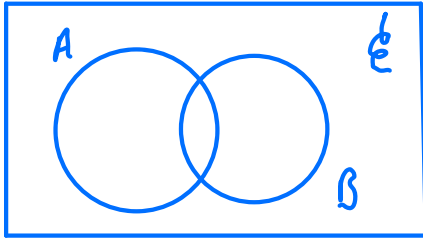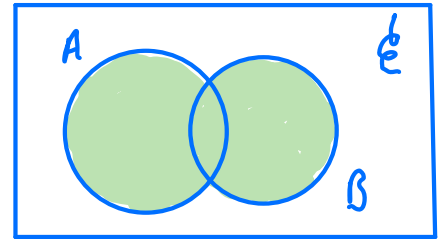# Venn Diagram Revision

$A \cap B$
intersection of
A and B

$A \cup B$
Union of A and B
A or B or Both

6. A group of 100 people produced the following information relating to three attributes. The attributes were wearing glasses, being left handed and having dark hair.

Glasses were worn by 36 people, 28 were left handed and 36 had dark hair. There were 17 who wore glasses and were left handed, 19 who wore glasses and had dark hair and 15 who were left handed and had dark hair. Only 10 people wore glasses, were left handed and had dark hair.

(a) Represent these data on a Venn diagram.

(6)

G   L
10   7   6
  9 10 5
   12
41   D
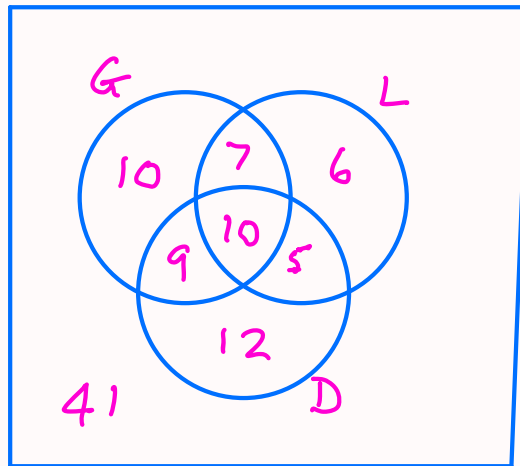
A person was selected at random from this group.

Find the probability that this person

(b) wore glasses but was not left handed and did not have dark hair, $\dfrac{10}{100} = \dfrac{1}{10}$

(1)

(c) did not wear glasses, was not left handed and did not have dark hair, $\dfrac{41}{100}$

(1)

(d) had only two of the attributes, $\dfrac{9+5+7}{100} = \dfrac{21}{100}$

(2)

(e) wore glasses given that they were left handed and had dark hair. $\dfrac{10}{15} = \dfrac{2}{3}$
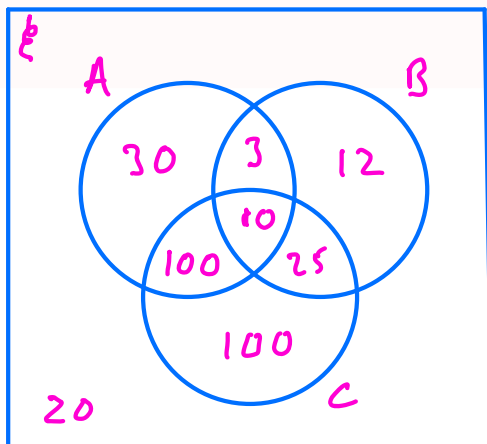
(3)

5. A person's blood group is determined by whether or not it contains any of 3 substances A, B and C.

A doctor surveyed 300 patients' blood and produced the table below.

Blood contains	No. of Patients
only C	100
A and C but not B	100
only A	30
B and C but not A	25
only B	12
A, B and C	10
A and B but not C	3

(a) Draw a Venn diagram to represent this information.

(4)

(b) Find the probability that a randomly chosen patient's blood contains substance C.

$$\frac{235}{300}$$ **(2)**

Harry is one of the patients. Given that his blood contains substance A,

(c) find the probability that his blood contains all 3 substances.

$$\frac{10}{300}$$ **(2)**

Patients whose blood contains none of these substances are called universal blood donors.

(d) Find the probability that a randomly chosen patient is a universal blood donor.

$$\frac{20}{300}$$ **(2)**

5. Articles made on a lathe are subject to three kinds of defect, *A*, *B* or *C*. A sample of 1000 articles was inspected and the following results were obtained.

> 31 had a type *A* defect
> 37 had a type *B* defect
> 42 had a type *C* defect
> 11 had both type *A* and type *B* defects
> 13 had both type *B* and type *C* defects
> 10 had both type *A* and type *C* defects
> 6 had all three types of defect.

(*a*) Draw a Venn diagram to represent these data.

(6)

Find the probability that a randomly selected article from this sample had

(*b*) no defects,

$$\frac{918}{1000}$$

(1)

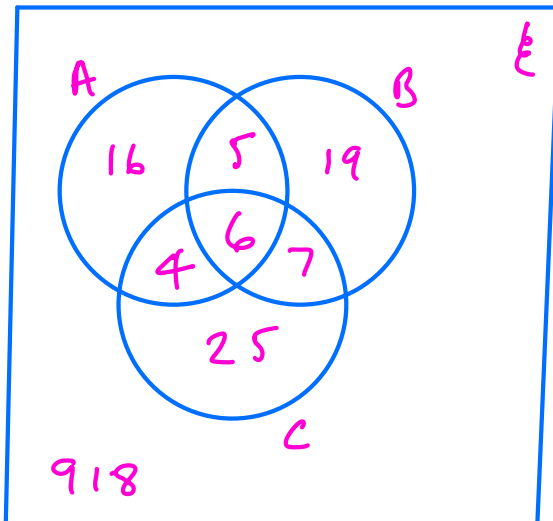(*c*) no more than one of these defects.

$$\frac{918 + 25 + 16 + 19}{1000} = \frac{978}{1000}$$

(2)

An article selected at random from this sample had only one defect.

(*d*) Find the probability that it was a type *B* defect.

(2)

$$= \frac{19}{16 + 25 + 19}$$

$$= \frac{19}{60}$$