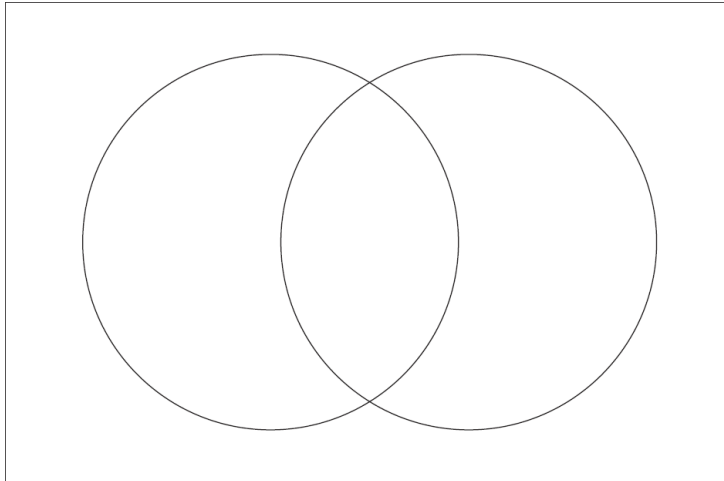Customers at an ice-cream shop can have toppings and/or sauce on their ice-cream cone.

- Two-fifths of the customers take sauce only.
- 15% of the customers take sauce and toppings.
- One in five customers do not take sauce or toppings.

(a) Complete the Venn diagram below to illustrate this information.

[2]

(b) Find the probability that a customer, selected at random, takes toppings or sauce, but not both, on their ice-cream cone.

Answer _____ [2]

(c) Given that a customer, selected at random, does not take a topping on their ice-cream cone, what is the probability that they do not take sauce either?

Answer _____ [2]

(d) During one Sunday, 80 ice-cream cones are sold.

**(i)** How many of these would you expect to be with sauce or toppings or both?

Q2

100 people were asked whether they had hot food at breakfast (**B**), lunch (**L**) or dinner (**D**) yesterday,

- 54 **only** had hot food for dinner
- 1 person didn't have hot food for any meal
- no-one had hot food for all three meals
- a **total** of 4 people didn't have hot food for dinner
- the number of people who had hot breakfast **and** hot dinner is equal to the number of people who had hot lunch **and** hot dinner.

Complete the Venn diagram with a **possible** set of correct values.
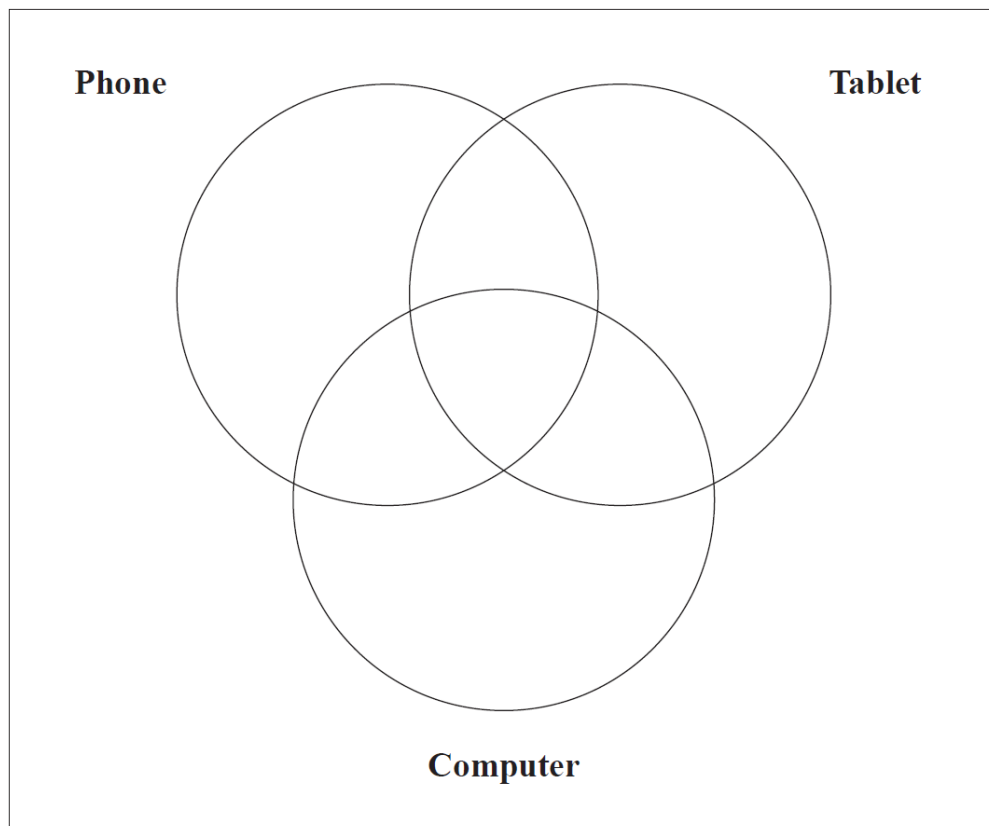
[5 marks]
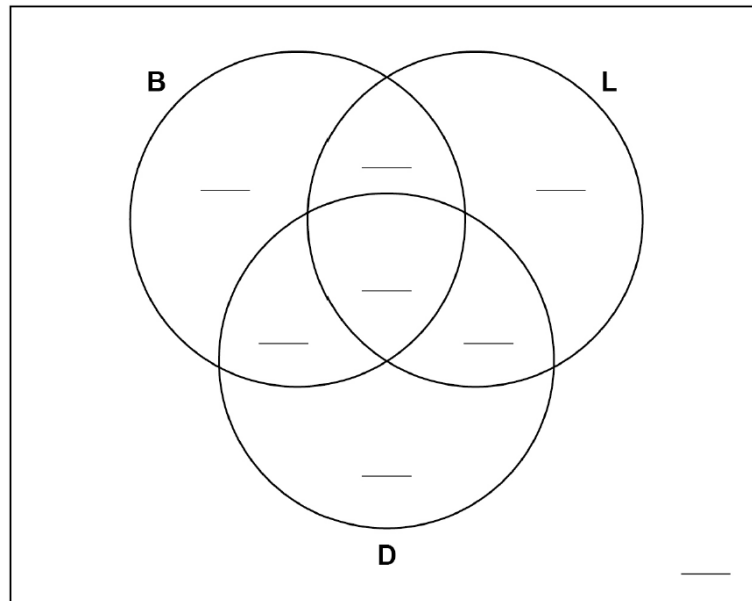
A group of 150 people were surveyed about electronic devices they owned.

The results were as follows:

Q3

96 people owned a phone,
87 people owned a tablet,
91 people owned a computer,
53 people owned a phone and a tablet,
62 people owned a phone and a computer,
55 people owned a tablet and a computer,
28 people owned all three devices.

(a) Complete the Venn diagram below.

[4]

(b) How many people did not own a phone or a computer?

One person who owned a tablet was chosen at random.

(d) Find the probability that they owned a computer too.

An estate agent studied 85 properties to investigate how many had a garage and how many had a conservatory.

Q4

The study showed that 11 properties had both a garage and a conservatory.

(a) Use the information provided to complete the Venn diagram below.

Garage   Conservatory

32   27
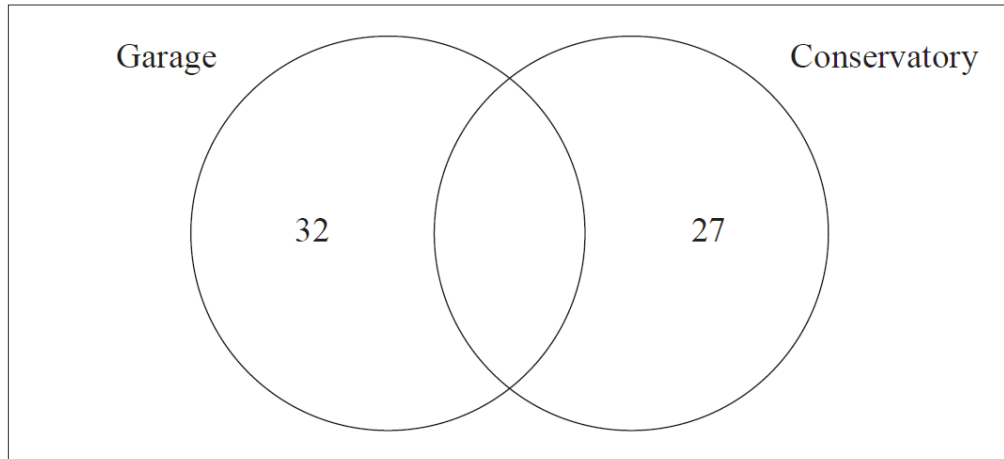
[2]

(b) One property is chosen at random from the study.

Find the probability that this property:

(i) has a garage but not a conservatory;

Answer _____ [1]

(ii) does not have a garage.

Answer _____ [2]

One property which has a conservatory is chosen at random from the study.

(c) Find the probability that this property also has a garage.

Answer _____ [2]

The manager of a fruit and vegetable shop kept a record of the type of fruit 50 customers bought one Friday morning.

Q5

27 customers bought oranges
20 customers bought grapes
24 customers bought apples
14 customers bought apples and oranges
12 customers bought oranges and grapes
11 customers bought apples and grapes
8 customers bought apples, oranges and grapes

(a) Complete the Venn diagram below to show this information.

Apples   Oranges
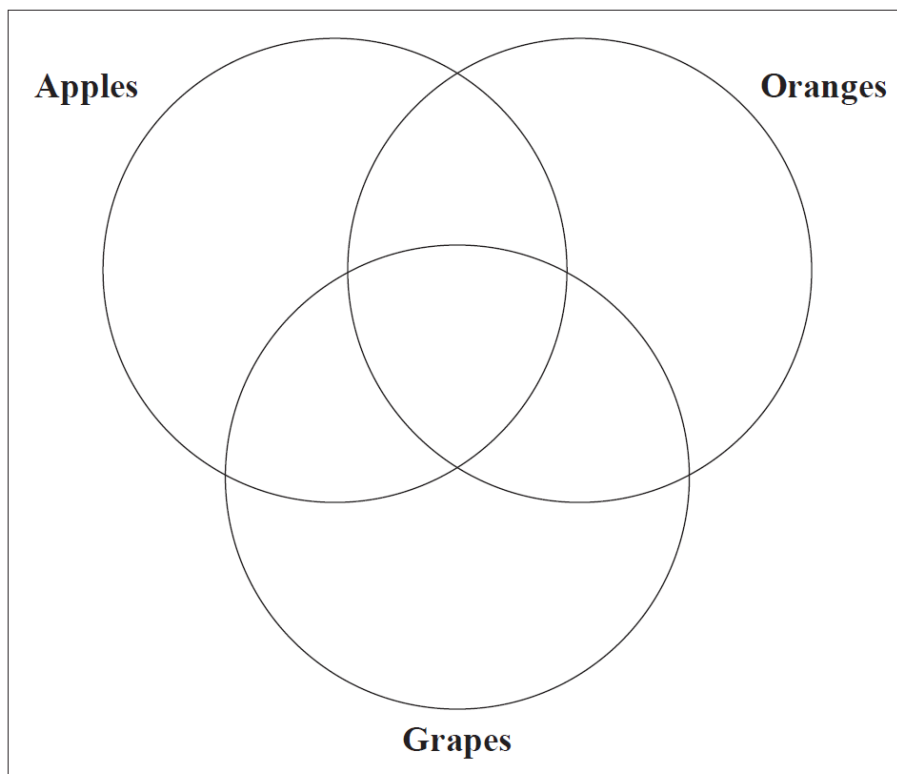
Grapes

[3]

(b) Use the information in the Venn diagram to find the probability that a customer, selected at random, bought:

(i) exactly two types of fruit;

Answer _____ [2]

(ii) apples if they bought grapes.

Answer _____ [2]