1. (a) List the elements of the set $A = \{x \mid -4 \leq x \leq 2, x \text{ is an integer}\}$.

(1)

A number is chosen at random from set *A*.

Write down the probability that the number chosen is

(b) a negative integer;

(2)

(c) a positive even integer;

(1)

(d) an odd integer less than –1.

(2)

(Total 6 marks)

2. A survey of 100 families was carried out, asking about the pets they own. The results are given below.

56 owned dogs (*S*)
38 owned cats (*Q*)
22 owned birds (*R*)
16 owned dogs and cats, but not birds
8 owned birds and cats, but not dogs
3 owned dogs and birds, but not cats
4 owned all three types of pets

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

(5)

(b) Find the number of families who own no pets.

(2)

(c) Find the percentage of families that own exactly one pet.

(3)

(d) A family is chosen at random. Find the probability that they own a cat, given that they own a bird.

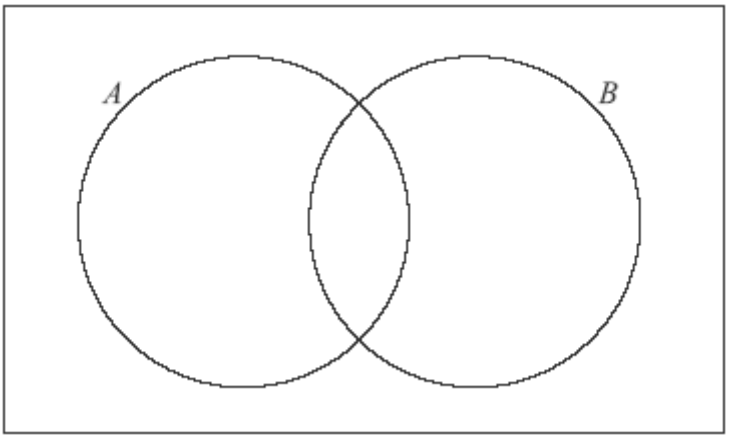
(2)

(Total 12 marks)

3. A group of 30 students were asked about their favourite topping for toast.

18 liked peanut butter (A)
10 liked jam (B)
6 liked neither

(a) Show this information on the Venn diagram below.



(2)

(b) Find the number of students who like both peanut butter and jam.

(2)

(c) Find the probability that a randomly chosen student from the group likes peanut butter, given that they like jam.

(2)
(Total 6 marks)

4. In a research project on the relation between the gender of 150 science students at college and their degree subject, the following set of data is collected.

		Degree Subject		
		Biology	Physics	Chemistry
Gender	Male	40	16	35
	Female	15	24	20

Find the probability that a student chosen at random

(a) is male;

(2)

(b) is either male or studies Chemistry;

(2)

(c) studies Physics, given that the student is male.

(2)
(Total 6 marks)

5. A survey was carried out in a group of 200 people. They were asked whether they smoke or not. The collected information was organized in the following table.

	Smoker	**Non-smoker**
Male	60	40
Female	30	70

One person from this group is chosen at random.

(a) Write down the probability that this person is a smoker.

(2)

(b) Write down the probability that this person is male given that they are a smoker.

(2)

(c) Find the probability that this person is a smoker or is male.

(2)

(Total 6 marks)

6. A class consists of students studying Spanish or French or both. Fifteen students study Spanish and twelve study French.

The probability that a student studies French given that she studies Spanish is $\frac{7}{15}$.

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

(3)

(b) Find the probability that a student studies Spanish given that she studies one language only.

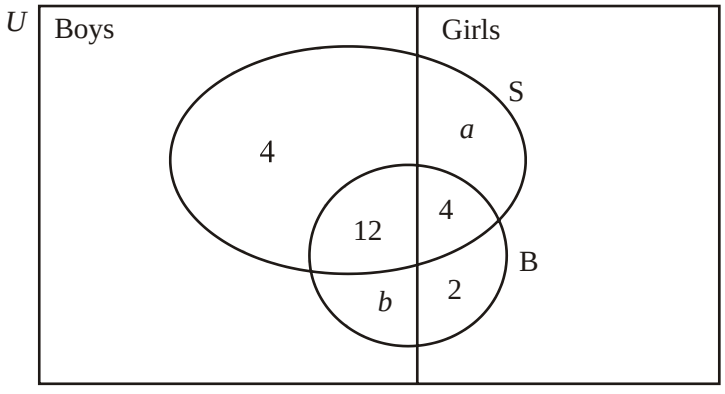
(3)

(Total 6 marks)

7. Children in a class of 30 students are asked whether they can swim (S) or ride a bicycle (B).

There are 12 girls in the class. 8 girls can swim, 6 girls can ride a bicycle and 4 girls can do both.

16 boys can swim, 13 boys can ride a bicycle and 12 boys can do both. This information is represented in a Venn diagram.



(a) Find the values of a and b.

(2)

(b) Calculate the number of students who can do neither.

(2)

(c) Write down the probability that a student chosen at random can swim.

(2)

(d) Given that the student can ride a bicycle, write down the probability that the student is a girl.

(2)

(Total 8 marks)

8. A school jazz band contains three different musical instruments — saxophone (S), clarinet (C) and drums (D). Students in the band are able to play one, two or three different instruments. In a class of 40 IB students, 25 belong to the jazz band. Out of these 25

3 can play all three instruments
5 can play the saxophone and clarinet **only**
5 can play **at least** the clarinet and drums
7 can play **at least** the saxophone and drums
16 can play the saxophone
12 can play the clarinet.

(a) Draw a Venn Diagram and clearly indicate the numbers in each region.

(5)

(b) Show that the number of students who play the drums **only** is 5.

(2)

(c) Find the probability that a student chosen at random from the IB class plays only the saxophone.

(2)

(d) Find the probability that a student chosen at random from the IB class plays either the clarinet or drums or both.

(2)

(e) Given that a student plays the saxophone, find the probability that he also plays the clarinet.

(3)

(Total 14 marks)

9. In a survey of 52 students it was found that 30 study Spanish and 15 have computers. Seven of the students who study Spanish also have computers.

(a) **Copy** and complete this table.

	Study Spanish	Do not study Spanish	Total
Have computers			
Do not have computers			
Total			52

(3)

(b) Draw and **label fully** a Venn diagram to illustrate this information. Use U to represent the set of all students surveyed, S the set of students who study Spanish and C the set of students who have computers.

(2)

(c) Describe, in words, the set represented by $C \cup S'$.

(2)

(d) Find $n(C \cup S')$.

(1)

A student is selected at random to attend a computer workshop given in Spanish.

(e) What is the probability that the student

(i) has a computer and studies Spanish?

(2)

(ii) as a computer but does not study Spanish?

(2)

(iii) as a computer if he/she studies Spanish?

(2)

(Total 14 marks)

10. In a club with 60 members, everyone attends either on Tuesday for Drama (D) or on Thursday for Sports (S) or on both days for Drama and Sports.

One week it is found that 48 members attend for Drama and 44 members attend for Sports and x members attend for both Drama and Sports.

(a) (i) Draw and **label fully** a Venn diagram to illustrate this information.

(3)

(ii) Find the number of members who attend for both Drama and Sports.

(2)

(iii) Describe, in words, the set represented by $(D \cap S)'$.

(2)

(iv) What is the probability that a member selected at random attends for Drama only or Sports only?

(3)

The club has 28 female members, 8 of whom attend for both Drama and Sports.

(b) What is the probability that a member of the club selected at random

(i) is female and attends for Drama only or Sports only?

(2)

(ii) is male and attends for both Drama and Sports?

(2)

(Total 14 marks)

11. The table below shows the number of left and right handed tennis players in a sample of 50 males and females.

	Left handed	Right handed	Total
Male	3	29	32
Female	2	16	18
Total	5	45	50

If a tennis player was selected at random from the group, find the probability that the player is

(a) male and left handed;

(b) right handed;

(c) right handed, given that the player selected is female.

(Total 4 marks)