

Name: _____

GCSE Statistics

Venn Diagrams

Total marks available: 39

Total marks achieved: _____

Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, Centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided
– There may be more space than you need.
- Scientific calculators may be used.
- You must show all your working out with your answer clearly identified
At the end of your solution.

Information

- The marks for each question are shown in brackets
– use this as a guide as to how much time to spend on each question.

Advice

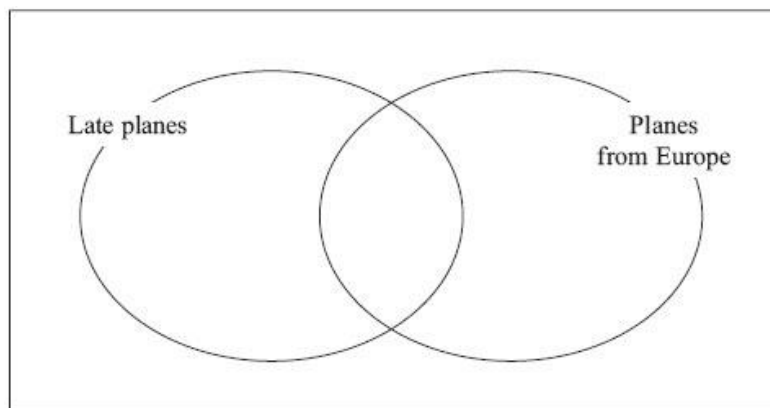
- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Q1.

100 planes landed at Heathrow Airport in a 3 hour period.
40 of the planes were from Europe.
20 of the planes were late, including 5 planes from Europe.

Data source: adapted from www.FlightStats.com

(a) Complete the Venn diagram using the information above.



(3)

One of these planes is chosen at random.

(b) Find the probability that

(i) the plane was **not** from Europe.

.....

(ii) the plane was on time and was from Europe.

.....

(3)

Given that the plane was late,

(c) find the probability that the plane was from Europe.

.....

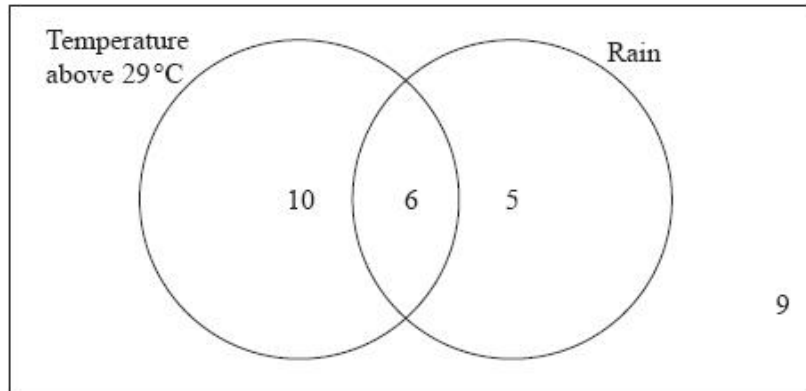
(2)

(Total for Question is 8 marks)

Q2.

The temperature and rainfall in Miami were recorded every day for 30 days.

The Venn diagram shows information about the number of days when the maximum temperature was above 29°C and the number of days when it rained.



Source: www.weather.com

One of these days is selected at random.

- (a) Find the probability that on this day
- (i) the maximum temperature was above 29°C,

.....

- (ii) it did **not** rain,

.....

- (iii) the maximum temperature was above 29°C or it rained or both.

.....

(4)

Two of the days are selected at random.

- (b) Find the probability that on both of these days the maximum temperature was above 29°C **and** it rained.

.....

(2)

Greg thinks when it rains in Miami there is less chance that the maximum temperature will be above 29°C than when it does not rain.

(c) By comparing two suitable probabilities, comment on what Greg thinks.

.....

.....

.....

.....

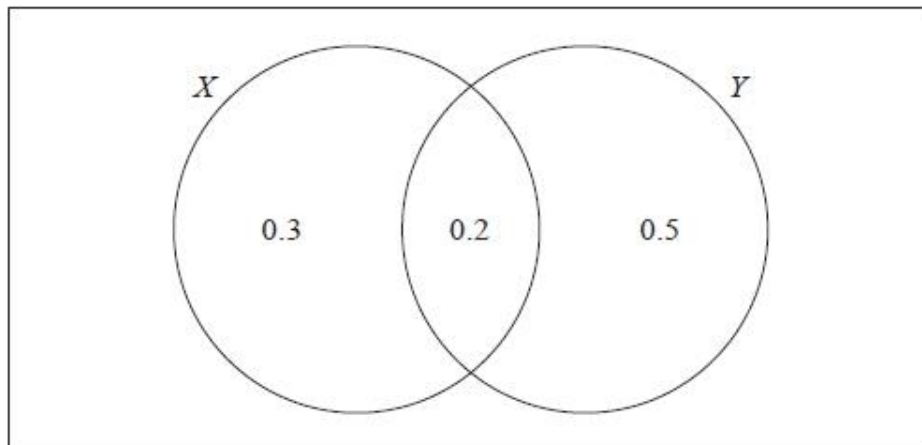
.....

(2)

(Total for question = 8 marks)

Q3.

The Venn diagram shows probabilities relating to two events, X and Y .



(a) Explain whether or not X and Y are exhaustive events.

.....
.....

(1)

(b) (i) Work out $P(X) \times P(Y)$.

.....

(ii) Explain why the events X and Y are **not** independent.

.....
.....

(3)

Two different events, A and B , are such that

$$P(A) = 0.6$$

$$P(B) = 0.5$$

$$P(A \cap B) = 0.25$$

(c) Find $P(A \cup B)$.

.....

(2)

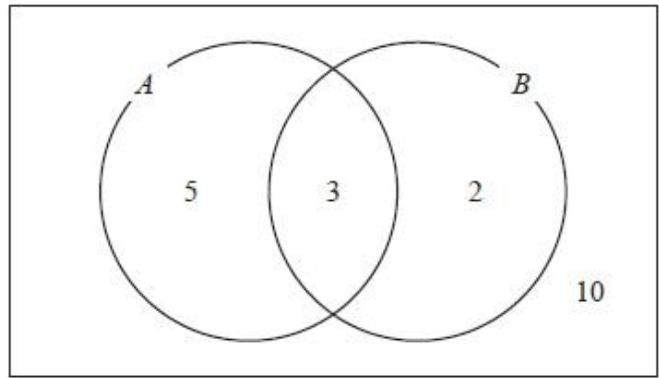
(Total for question = 6 marks)

Q4.

The Venn diagram shows information about 20 films shown in the UK in 2015

A is the event that the film was produced in the UK.
 B is the event that the film made more than £40 million.

The numbers in the Venn diagram indicate the number of films.



(Source: *BFI Statistical Yearbook*)

(a) Explain fully what the number 3 represents in the Venn diagram.

.....
.....

(1)

One of the films is chosen at random.

(b) Find $P(B)$

.....
(1)

(c) Find $P(B | A)$

.....
(2)

(d) Using your answers to part (b) and part (c), explain whether or not A and B are independent events.

.....
.....

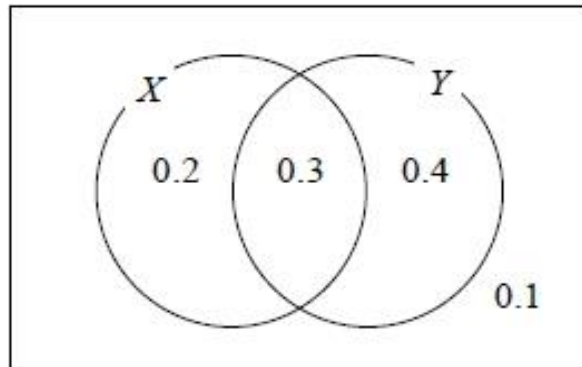
(2)

(Total for question = 6 marks)

Q5.

X and Y are two events.

The Venn diagram shows information about the probabilities of events related to X and Y happening.



(a) Find

(i) the probability of event Y happening

.....
(1)

(ii) $P(X \text{ and } Y)$

.....
(1)

(iii) $P(Y | X)$

.....
(2)

Two different events A and B are independent

$P(A) = 0.8$ and $P(B) = 0.5$

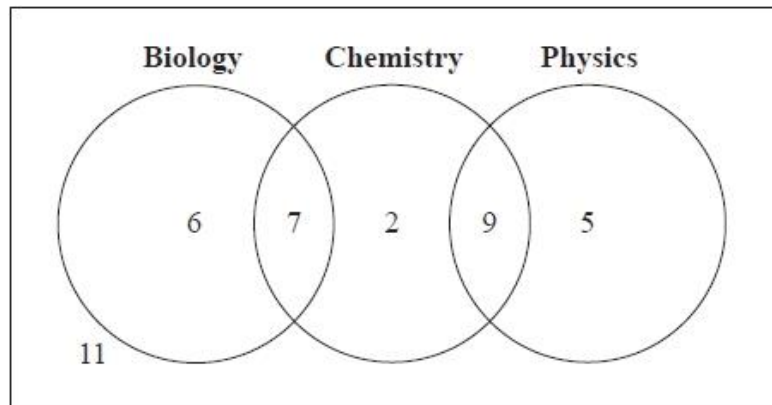
(b) Find $P(A \text{ and } B)$

.....
(2)

(Total for question = 6 marks)

Q6.

There are 40 students in Year 12 at a sixth form college. The Venn diagram gives information about the numbers of students studying Biology, Chemistry and Physics.



One of the 40 students is selected at random.

(a) Write down the probability that this student

(i) studies Biology,

.....
(1)

(ii) studies Chemistry and Biology.

.....
(1)

X is the event that the student selected studies Chemistry.

Y is the event that the student selected studies Physics.

(b) Find

(i) $P(X)$

.....
(1)

(ii) $P(X \text{ and } Y)$

.....
(1)

(iii) $P(Y|X)$

.....
(1)

(Total for question = 5 marks)