

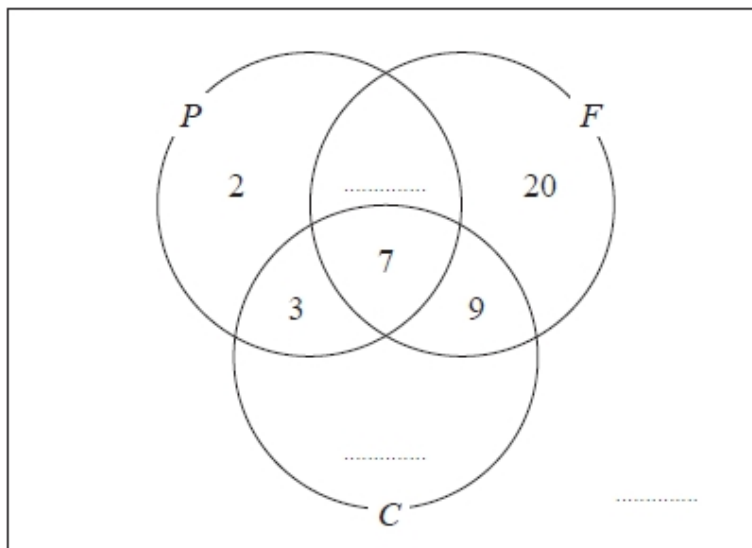
S197 Venn diagrams 2

Q1.

Sam wants to investigate what musical instruments people play.

He asked a sample of 100 people whether they play any or none of the piano (P), the flute (F) or the clarinet (C).

The incomplete Venn diagram shows some information about his results.



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

.....

(1)

Of the 100 people Sam asked,

37 played the piano and the flute

31 played the clarinet.

(b) Complete the Venn diagram.

(2)

One of the 100 people Sam asked is chosen at random.

Given that this person played at least two of the instruments,

(c) find the probability that this person played all three of the instruments.

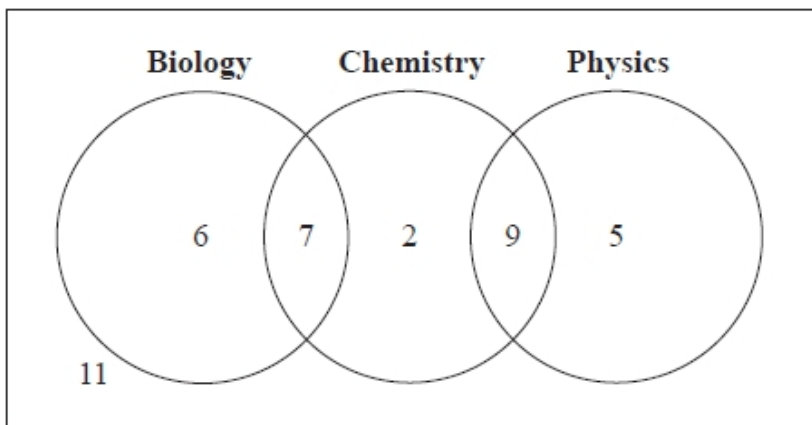
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(2)

(Total for question = 5 marks)

Q2.

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)

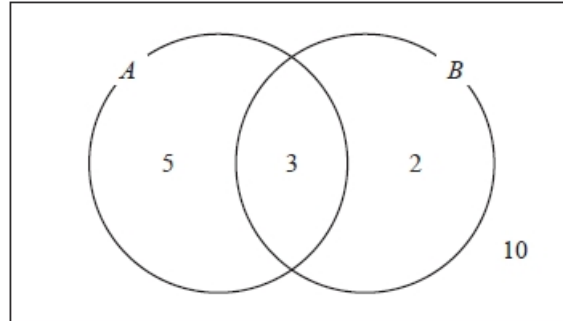
Q3.

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.

.....
.....
.....
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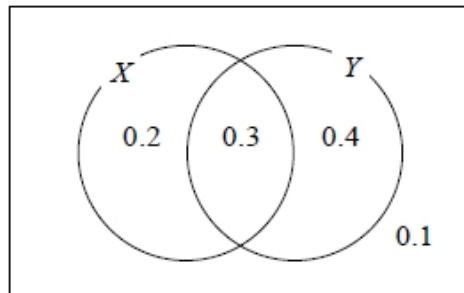
(2)

(Total for question = 6 marks)

Q4.

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)

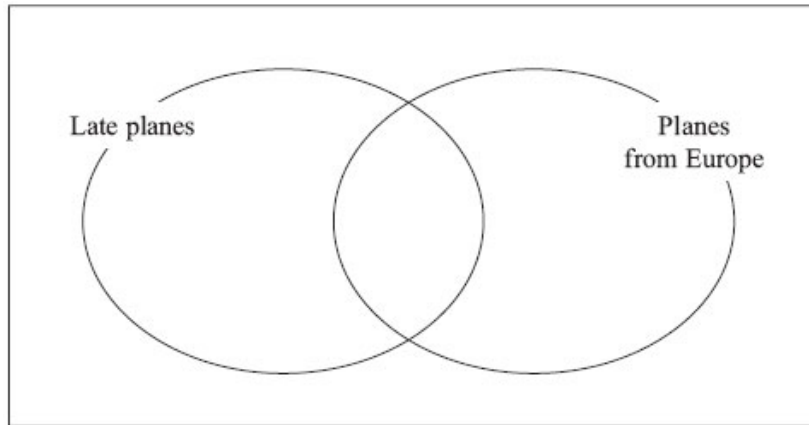
(Total for question = 6 marks)

Q5.

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)

Q6.

Sami asked 50 people which drinks they liked from tea, coffee and milk.

All 50 people like at least one of the drinks

19 people like all three drinks.

16 people like tea and coffee but do **not** like milk.

21 people like coffee and milk.

24 people like tea and milk.

40 people like coffee.

1 person likes only milk.

Sami selects at random one of the 50 people.

(a) Work out the probability that this person likes tea.

.....
(4)

(b) Given that the person selected at random from the 50 people likes tea, find the probability that this person also likes exactly one other drink.

.....
(2)

(Total for question = 6 marks)