Probability

In all probability, you'll love this topic. After all, it's been scientifically proven that Venn diagrams are the single most exciting thing you can do with circles. And who doesn't love a table or two...

1   In a choir, there are four different types of voice: soprano (S), alto (A), tenor (T) and bass (B). Each person in the choir fits into one of these categories.
The table below shows the proportion of each different type of voice in the choir.

Type of voice	Proportion in choir
S	0.36
A	0.27
T	0.22
B	0.15

The choir performs in two concerts.
At each concert, one singer is selected at random from the whole choir to announce the songs.

a)   Find the probability that neither announcer is a tenor.

....

(2 marks)

b)   Find the probability that both announcers have the same type of voice.

....

(3 marks)

2   Jessica has two packs of cards. One pack has some cards missing. The probability of selecting a heart, P(S), from this pack is 0.3. Jessica selects one card from this pack and one card from her complete pack of cards.

a)   Find the probability that at least one of the two cards is a heart.

....

(2 marks)

b)   Find the probability that exactly one of the two cards is a heart.

....

(3 marks)

Probability

3 Riyad carries out a survey on his classmates to find out what after-school clubs they attend. He uses a Venn diagram to show his findings. *A* represents the number of pupils who do archery, *B* represents the number of pupils who play badminton and *C* represents the number of pupils who play chess.
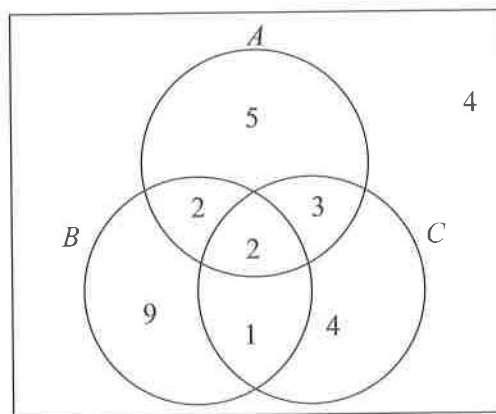
a) Riyad claims that a classmate chosen at random is more likely to not play badminton than to do either archery or chess. State whether or not Riyad is correct, giving reasons for your answer.

> Make sure you read the question carefully — you're interested in pupils who don't play badminton.

....

(3 marks)

b) Calculate the probability that a classmate chosen at random is a member of the badminton club or the chess club, but not both.

....

(1 mark)

4 A film club with 20 members meets once a week. 14 of the members go every week and 13 plan to renew their membership for another year. Of those planning to renew their membership, 10 go every week. One member of the club is selected at random.

a) Find the probability that the person selected plans to renew their membership and goes to the club every week.

> You'll find it helpful to draw a quick Venn diagram here.

....

(2 marks)

b) Show whether or not the events 'selected member goes to the club every week' and 'selected member plans to renew their membership' are independent.

(2 marks)

Probability

5 A box of chocolates contains 20 chocolates, all of which are either hard or soft centred. Some of the chocolates contain nuts. The table below shows the number of each type of chocolate.

|	Hard centre	Soft centre	Total
Nuts	6	4	10
No nuts	7	3	10
Total	13	7	20

a) A chocolate is selected at random. Find the probability that the chocolate either has a hard centre or contains nuts.

....

(2 marks)

b) If three chocolates are selected at random without replacement, find the probability that exactly one has a hard centre.

....

(3 marks)

6 This incomplete Venn diagram shows the probabilities of two independent events L and M. Calculate the probability that neither L nor M occur.

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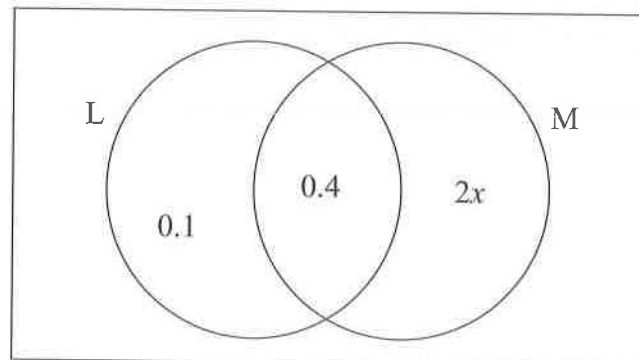
(4 marks)

Probability

7   The events A and B are mutually exclusive. $P(A) = 0.1$ and $P(B) = 0.4$.
Event C has probability $P(C) = 0.3$.

Events B and C are statistically independent, and the probability
of both events A and C occurring is 0.06.

a)   Draw a Venn diagram showing the probabilities of events A, B and C.

(5 marks)

b)   Are events A and C independent? Explain your answer.

....

....

(2 marks)

c)   Find the probability that either event B or C but not both occurs.

....

(1 mark)

d)   Find the probability that neither event A nor event B occurs.

....

(1 mark)

Score

36