3.1 Basic Probability

Question Paper

Course	OCR A Level Maths: Statistics
Section	3. Probability
Topic	3.1 Basic Probability
Difficulty	Medium

Time allowed: **50**

Score: **/40**

Percentage: **/100**

Question 1

The lengths, in cm, of 120 adult platypuses are recorded in the following table:

Length, l (cm)	**Frequency (female)**	**Frequency (male)**
$39 \leq l < 42$	14	0
$42 \leq l < 45$	29	0
$45 \leq l < 48$	12	7
$48 \leq l < 51$	6	21
$51 \leq l < 54$	3	19
$54 \leq l < 57$	1	5
$57 \leq l < 60$	0	2
$60 \leq l < 63$	0	1

One platypus is chosen at random. Find the probability that the platypus is:

(i) male

(ii) less than 51 cm long

(iii) a male less than 45 cm long

(iv) a female between 45 and 54 cm long.

[4 marks]

Question 2

Two fair spinners each have three sectors numbered 1 to 3. The two spinners are spun together and then the product of the numbers indicated on each spinner is recorded.

Find the probability of the product indicated by the spinners being

(i) exactly 6

(ii) less than 4

(iii) an odd number.

[4 marks]

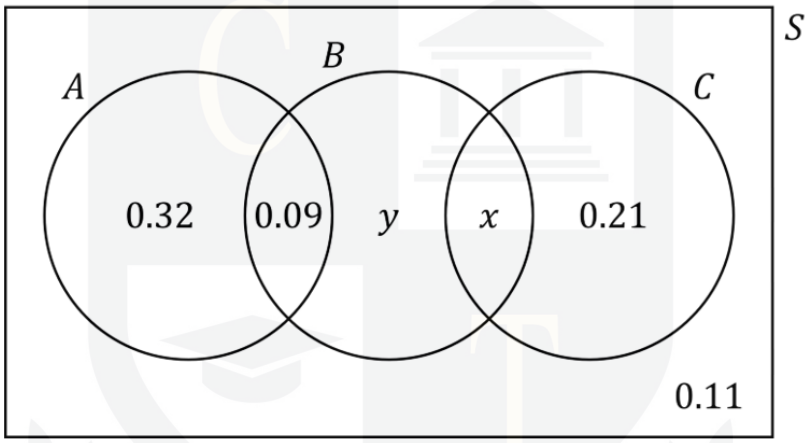
Question 3

The Venn diagram below shows the probabilities of members of an exotic sports society participating in various activities.

A represents the event that the member participates in aerial yoga.

B represents the event that the member participates in bog snorkelling.

C represents the event that the member participates in cheese rolling.



Given that the probability of a member participating in cheese rolling is 0.44,

(a) determine the values of

(i) x

(ii) y.

[3 marks]

Question 3

(b) Determine the probability that a member of the society

(i) participates in at least one of the three activities

(ii) participates in exactly one of the three activities.

[2 marks]

Question 4

On any given day the probability that Radigast has a lichen smoothie with his lunch is 0.4, and the probability that he has a wild mushroom wrap is 0.8. Given that the probability of him having both those items is 0.35, find the probability that Radigast has:

(i) a wild mushroom wrap but not a lichen smoothie

(ii) neither a wild mushroom wrap nor a lichen smoothie.

[4 marks]

Question 5

(a) A and B are two events such that $\mathrm{P}(A) = 0.35$, $\mathrm{P}(B) = 0.25$ and $\mathrm{P}(A \text{ or } B) = 0.6$. State, with a reason, whether A and B are mutually exclusive.

[2 marks]

Question 5

(b) C and D are two events such that $\mathrm{P}(C) = 0.2$, $\mathrm{P}(D) = 0.4$ and $\mathrm{P}(C \text{ and } D) = 0.18$.
State, with a reason, whether C and D are independent.

[2 marks]

Question 6

The Idiosyncratic Delights ice cream company polls a group of students to find out whether they like the company's two signature ice cream flavours – asparagus and blue cheese. The probability that a student likes asparagus ice cream is 0.2. The probability that a student likes blue cheese ice cream is 0.15. The probability that a student likes neither flavour is 0.68.

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

[3 marks]

Question 6

(b) Determine whether the events 'likes asparagus ice cream' and 'likes blue cheese ice cream' are independent.

[2 marks]

Question 7

A bag contains 13 yellow tokens and 7 green tokens. Two tokens are drawn from the bag without replacement.

(a) Draw a tree diagram to represent this experiment.

[3 marks]

Question 7

(b) Find the probability that the two tokens drawn are the same colour.

[3 marks]

Question 8

In a game of Galactic Unicorns your Monocerian-class space frigate is attacking an evil Sargonian robot ship. Your attack will either hit or miss the robot ship, the probability of hitting the ship is 0.7. If you hit the robot ship then there is a probability of 0.8 that the ship will be destroyed, otherwise it will manage to escape. If you miss the robot ship then there is a probability of 0.2 that it will manage to escape, otherwise it will surrender because it has witnessed the immense power of your rainbow lasers.

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

[3 marks]

Question 8

(b) Find the probability that the robot ship

(i) is destroyed

(ii) manages to escape

(iii) surrenders.

[3 marks]

Question 8

(c) Show that the events 'you hit the robot ship' and 'the robot ship manages to escape' are independent.

[2 marks]