Homework — Part 2: Exam practice (IB past papers)

10 real IB questions (only the parts about this lesson), Paper 1 and Paper 2. Total: **59 marks**. Paper 1 — no calculator.

1. Paper 1 IB May 2025

Consider events A and B such that $\mathrm{P}(A') = \mathrm{P}(A \cup B) = \frac{3}{4}$ and $\mathrm{P}(B \mid A) = \frac{2}{3}$.

(a) **Find** $\mathrm{P}(A \cap B)$. **[3]**

(b) **Show that** events A and B are independent. **[3]**

2. Paper 2 IB May 2022

Events A and B are independent and $\mathrm{P}(A) = 3\mathrm{P}(B)$.

Given that $\mathrm{P}(A \cup B) = 0.68$, **find** $\mathrm{P}(B)$. **[6]**

3. Paper 1 IB November 2025

Two events A and B are such that $\mathrm{P}(A) = 0.5$, $\mathrm{P}(B) = 0.6$ and $\mathrm{P}(A \cap B) = 0.4$.

(a) **Show that** A and B are not independent. **[1]**

(b) **Find** $\mathrm{P}(A \mid B')$. **[3]**

4. Paper 2 IB May 2021

At a school, 70% of the students play a sport and 20% of the students are involved in theatre. 18% of the students do neither activity.
At the school 48% of the students are girls, and 25% of the girls are involved in theatre.
A student is selected at random. Let G be the event "the student is a girl" and let T be the event "the student is involved in theatre".

(a) **Find** $\mathrm{P}(G \cap T)$. **[2]**

(b) **Determine** if the events G and T are independent. **Justify** your answer. **[2]**

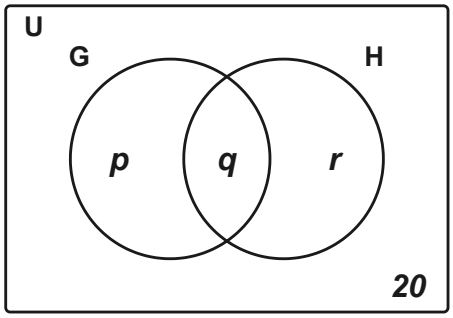
5. Paper 1 IB May 2023

Events A and B are such that $\mathrm{P}(A) = 0.4$, $\mathrm{P}(A \mid B) = 0.25$ and $\mathrm{P}(A \cup B) = 0.55$.

Find $\mathrm{P}(B)$. **[5]**

6. Paper 2 IB May 2026

A school surveys 150 students about their subject selection. From the survey, 90 students study geography (G) and 70 students study history (H). 20 students said they do not study either. This is shown in the following Venn diagram. *(You found $p = 60$, $q = 30$, $r = 40$ in the last homework.)*



Show that the events G and H are not independent. [2]

7. Paper 1 IB May 2026

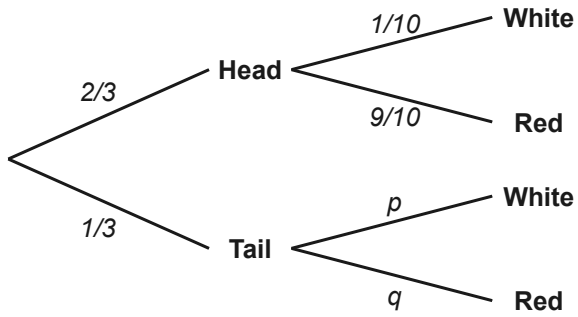
A game is played where a biased coin is tossed and then a ball is drawn from one of two bags. If the player obtains a head, then a ball is drawn from Bag A, otherwise a ball is drawn from Bag B.

The probability of obtaining a head is $\frac{2}{3}$.

Bag A contains 1 white ball and 9 red balls.

Bag B contains 4 white balls and 6 red balls.

This is shown in the following tree diagram.



(a) **Write down** the value of p and the value of q. [2]

(b) **Show that** the probability of drawing a white ball is $\frac{1}{5}$. [2]

(c) Given that a white ball is drawn, **calculate** the probability that it came from Bag A. [3]

8. Paper 2 IB May 2022

Let A and B be two independent events such that $\mathrm{P}(A \cap B') = 0.16$ and $\mathrm{P}(A' \cap B) = 0.36$.

(a) Given that $\mathrm{P}(A \cap B) = x$, **find** the value of x. [4]

(b) **Find** $\mathrm{P}(A' \mid B')$. [2]

9. Paper 1 IB November 2022

Events A and B are such that $\mathrm{P}(A) = 0.3$ and $\mathrm{P}(B) = 0.8$.

(a) **Determine** the value of $\mathrm{P}(A \cap B)$ in the case where the events A and B are independent. **[1]**

(b) **Determine** the minimum possible value of $\mathrm{P}(A \cap B)$. **[3]**

(c) **Determine** the maximum possible value of $\mathrm{P}(A \cap B)$, justifying your answer. **[2]**

10. Paper 2 IB May 2023

In a large city, 160 people were surveyed. Of those, 60 were children (C) and the rest adults (A). Each person in the survey was asked whether they preferred milk chocolate (M) or dark chocolate (D). It was found that 48 of the children preferred milk chocolate. This information is shown in the following table.

	M **(milk chocolate)**	D **(dark chocolate)**	**Total**
C **(children)**	48	p	60
A **(adults)**	x	y	q

(a) **Find** the value of (i) p; (ii) q. **[2]**

(b) Three people are chosen at random from those surveyed. **Find** the probability that all three are adults. **[4]**

(c) (i) Given that $\mathrm{P}(A \mid M) = \frac{1}{3}$, **find** the value of x. **[3]**

(ii) A person is chosen at random from those surveyed. **Write down** the probability that they are an adult who prefers milk chocolate. **[1]**

(d) **Determine** if the events A and M are independent. **Justify** your answer. **[3]**

Questions © IBO. For use by students of this class only.