

# IB Maths AA HL Unit 4 Statistics and Probability Practice Exam: Mark Scheme

IB Mathematics: Analysis and Approaches HL · 10 questions · 58 marks

- M marks are for a correct method; A marks for an accurate answer that follows a correct method; R marks are for clear reasoning.
- Accept any correct method that reaches a correct answer, unless the question says which method to use.
- Practise these topics online with instant feedback: [ibmathrevision.com/HLAAUnit4](https://ibmathrevision.com/HLAAUnit4)

## Section A: no calculator

### Question 1

3 marks

a.  $\bar{x} = 0.5(12) + 2$  **(M1)**  
 $= 8$  **A1**

b.  $x = 0.5(20) + 2 = 12$  **A1**

### Question 2

4 marks

a.  $0.65 = 0.3 + P(B) - 0.3P(B)$  **M1A1**

$0.7P(B) = 0.35 \implies P(B) = 0.5$  **A1**

b. independent, so  $P(A' | B) = P(A') = 0.7$  **A1**

### Question 3

8 marks

a. median = 10 **A1**

$Q_1 = 7, Q_3 = 14.5$  **A1A1**

b.  $Q_3 + 1.5 \times \text{IQR} = 14.5 + 1.5(7.5) = 25.75$  **M1A1**  
 $30 > 25.75$  **R1AG**

c. box from 7 to 14.5 with median at 10 **A1**  
 whiskers to 3 and 17, outlier marked at 30 **A1**

### Question 4

4 marks

a.  $X \sim B\left(4, \frac{1}{6}\right)$  **A1**

b.  $\binom{4}{2} \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^2$  **(M1)**  
 $= \frac{150}{1296} = \frac{25}{216}$  **A1**

c.  $\frac{2}{3}$  **A1**



**Question 5**

7 marks

- a. discrete **A1**
- b.  $\frac{80}{1200} \times 420$  **(M1)**  
Year 10: 28, Year 11: 30, Year 12: 22 **A1A1**
- c. interval  $1200 \div 80 = 15$  **A1**  
random start between 1 and 15, then every 15th student **A1**
- d. convenience sample: students who use the canteen (early) are over-represented **R1**

**Section B: calculator allowed**

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**Question 6**

4 marks

- a.  $0.7(0.03) + 0.3(0.05)$  **(M1)**  
 $= 0.036$  **A1**
- b.  $\frac{0.015}{0.036}$  **(M1)**  
 $= 0.417$  **A1**

**Question 7**

7 marks

- a. 40th value **(M1)**  
30.8 minutes **A1**
- b.  $Q_1 = 22.2$ ,  $Q_3 = 39.2$  **A1A1**  
IQR = 17.0 minutes **A1**
- c.  $74 - 62 = 12$  **A1**
- d.  $30 < t \leq 40$  (frequency 24) **A1**

**Question 8**

4 marks

- a.  $P\left(Z > \frac{3}{\sigma}\right) = 0.05$  **(M1)**  
 $\frac{3}{\sigma} = 1.645$  **(A1)**  
 $\sigma = 1.82$  mm **A1**
- b.  $= 0.136$  **A1**

**Question 9**

8 marks

- a.  $P(H > 185) = 0.0521$  **A1**
- b.  $P(H > h) = 0.25$  **(M1)**  
 $h = 177.4$  cm **A1**
- c.  $P(H > d) \leq 0.01 \implies d \geq 190.6$  **(M1)A1**  
 $d = 191$  cm **A1**
- d.  $B(5, p)$  with  $p$  from (a) **(M1)**  
 $= 0.0231$  **A1**



### Question 10

9 marks

a.  $X \sim B(20, 0.15)$  **(M1)**

$$P(X = 3) = 0.243 \text{ **A1**}$$

b.  $1 - P(X \leq 4)$  **(M1)**

$$= 0.170 \text{ **A1**}$$

c.  $E(X) = 3$  **A1**

$$\text{Var}(X) = 20(0.15)(0.85) = 2.55 \text{ **A1**}$$

d.  $p = P(X \leq 4) = 0.830$  **(A1)**

$$Y \sim B(10, p), P(Y \geq 8) \text{ **(M1)**}$$

$$= 0.765 \text{ **A1**}$$

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