

Edexcel IAL S2 Statistics 2 Practice Exam: Mark Scheme

Pearson Edexcel International A Level Mathematics · 15 questions · 60 marks

- M marks are for a correct method; A marks for an accurate answer that follows a correct method; B marks are independent of method.
- Accept any correct method that reaches a correct answer, unless the question says which method to use.
- Practise these topics online with instant feedback: alevelmathrevision.com/alevel-frontend/alevel-unit.html?course=ial&unit=8

Question 1

2 marks

1. The list of all 3000 library-card holders **B1**
2. The individual library-card holders **B1**

Final answer: a) the list of card holders; b) the card holders

Question 2

3 marks

$$P(X \leq 8) - P(X \leq 3) \text{ M1}$$

$$0.9532 - 0.2340 \text{ A1}$$

$$0.7192 \text{ A1}$$

Final answer: 0.7192

Question 3

3 marks

$$\text{Total} \sim \text{Po}(1.5 + 2.5) = \text{Po}(4) \text{ M1 A1}$$

$$P(T \leq 2) = 0.2381 \text{ A1}$$

Final answer: 0.2381

Question 4

3 marks

1. Testing a firework destroys it, so a census would leave nothing to sell **B1**
2. Sampling frame: a list (e.g. of serial numbers) of all the fireworks in a batch **B1**
Sampling units: the individual fireworks **B1**

Final answer: a) testing is destructive

Question 5

4 marks

$$\text{Shorter piece} < 6 \text{ when } X < 6 \text{ or } X > 24 \text{ M1 A1}$$

$$\frac{6+6}{30} \text{ M1}$$

$$0.4 \text{ A1}$$

Final answer: 0.4



Question 6

4 marks

$$H_0 : p = 0.4, H_1 : p < 0.4 \text{ B1}$$

$$X \sim B(30, 0.4), P(X \leq 6) \text{ M1}$$

$$= 0.0172 \text{ A1}$$

$0.0172 < 0.05$: reject H_0 ; evidence that fewer than 40% use self-checkout **A1**

Final answer: $0.0172 < 0.05$, reject H_0

Question 7

4 marks

$$N(25, 25) \text{ B1}$$

$$P(Y > 31.5) \text{ M1}$$

$$P(Z > 1.3) \text{ M1}$$

$$1 - 0.9032 = 0.0968 \text{ A1}$$

Final answer: 0.0968

Question 8

5 marks

$$1. k \left[2x^2 - \frac{x^3}{3} \right]_0^3 = 1 \text{ M1}$$

$$9k = 1, k = \frac{1}{9} \text{ A1*}$$

$$2. \frac{1}{9} \int_0^3 (4x^2 - x^3) dx \text{ M1}$$

$$\frac{1}{9} \left[\frac{4x^3}{3} - \frac{x^4}{4} \right]_0^3 \text{ A1}$$

$$\frac{7}{4} \text{ A1}$$

Final answer: b) $7/4$

Question 9

3 marks

$$P(X \geq n) = 1 - P(X \leq n-1) < 0.05 \text{ M1}$$

$$P(X \leq 11) = 0.9467, P(X \leq 12) = 0.9730 \text{ A1}$$

$$n = 13 \text{ A1}$$

Final answer: $n = 13$

Question 10

4 marks

$$P(X \leq 8) = 0.0940, P(X \leq 9) = 0.1763 \text{ M1 A1}$$

$$k = 8 \text{ A1}$$

$$P(X > 8) = 1 - 0.0940 = 0.9060 \text{ B1ft}$$

Final answer: $k = 8$; 0.9060

Question 11

4 marks

$$P(X = 0) = 0.75^n < 0.01 \text{ M1}$$

$$n > \frac{\ln 0.01}{\ln 0.75} = 16.01 \text{ M1 A1}$$

$$0.75^{16} = 0.01002, 0.75^{17} = 0.00752: n = 17 \text{ A1}$$

Final answer: $n = 17$



Question 12

4 marks

1. $np = 3$ is small (and p is far from 0.5), so the distribution is very skewed **B1**
2. $Po(3)$ **B1**
 $1 - P(X \leq 4) = 1 - 0.8153$ **M1**
 0.1847 **A1**

Final answer: b) 0.1847**Question 13**

5 marks

1. $\frac{P(X > 15)}{P(X > 8)} = \frac{5/20}{12/20}$ **M1 A1**
 $\frac{5}{12}$ **A1**
2. $P(X < 6) + P(X > 14)$ **M1**
 $\frac{12}{20} = 0.6$ **A1**

Final answer: a) 5/12; b) 0.6**Question 14**

6 marks

1. $\int_0^q \frac{x}{4} dx = \frac{q^2}{8} = 0.25$ **M1**
 $q = \sqrt{2} = 1.41$ **A1**
2. $\int_Q^4 \frac{4-x}{4} dx = \frac{(4-Q)^2}{8} = 0.25$ **M1 A1**
 $Q = 4 - \sqrt{2} = 2.59$ **A1**
3. $4 - 2\sqrt{2} = 1.17$ **B1ft**

Final answer: a) $\sqrt{2} = 1.41$; b) $4 - \sqrt{2} = 2.59$; c) $4 - 2\sqrt{2} = 1.17$ **Question 15**

6 marks

1. It is calculated from the sample alone, with no unknown parameters **B1**
2. $Y \sim B(5, 0.1)$ **M1**
 $P(Y = 0) = 0.59049$, $P(Y = 1) = 0.32805$ **A1**
 $P(Y = 2) = 0.0729$, $P(Y = 3) = 0.0081$ **A1**
 $P(Y = 4) = 0.00045$, $P(Y = 5) = 0.00001$ **A1**
3. $1 - 0.59049 - 0.32805 = 0.08146$ **B1**

Final answer: b) 0.59049, 0.32805, 0.0729, 0.0081, 0.00045, 0.00001; c) 0.08146End of mark scheme · More free exams: alevelmathrevision.com/alevel-frontend/free-practice-exams