

**LC 2018: PAPER 1****QUESTION 7 (55 MARKS)****Question 7 (a)**

$$T_n = a + (n-1)d$$

Number of seats in each row: 28, 29, 30,...

$$a = 28, d = 1, n = 10$$

$$T_{10} = 28 + (10-1)(1) = 28 + 9 = 37$$

**Question 7 (b)**

Number of seats in each row: 28, 29, 30,...

$$a = 28, d = 1, n = ?, T_n = 50$$

$$T_n = 28 + (n-1)(1) = 50$$

$$28 + n - 1 = 50$$

$$\therefore n = 23$$

**Question 7 (c)**

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

Number of seats in each row: 28, 29, 30,...

$$a = 28, d = 1, n = 23$$

$$S_{23} = \frac{23}{2}[2(28) + (23-1)(1)] = \frac{23}{2}[56 + 22]$$

$$= \frac{23}{2}[78] = 897$$

**Question 7 (d)**

Number of seats in each row: 28, 29, 30,...

$$a = 28, d = 1, S_n = 600$$

$$S_n = \frac{n}{2}[2(28) + (n-1)(1)] = 600$$

$$n[56 + n - 1] = 1200$$

$$n[n + 55] = 1200$$

$$n^2 + 55n - 1200 = 0$$

$$n = \frac{-55 \pm \sqrt{55^2 - 4(1)(-1200)}}{2} = 16.7$$

$$\therefore n = 16$$

$$16 \text{ full rows: } S_{16} = \frac{16}{2}[2(28) + (16-1)(1)]$$

$$= 8[56 + 15] = 568$$

$$\text{Number of people in next row} = 600 - 568$$

$$= 32$$

**MARKING SCHEME NOTES****Question 7 (a) [Scale 5B (0, 3, 5)]**

- 3: • correct number of seats for any row between row 4 and row 9 (inclusive)

**Note:** Accept 37 without work

**Question 7 (b) [Scale 10C (0, 3, 8, 10)]**

- 3: • any evidence of counting (e.g. listing 28, 29, ...)

- 13 or 22 without work
- writes  $T_n = a + (n-1)d$
- $a$  or  $d$  identified

- 8: •  $50 - 28$  or  $50 - 37$
- $28 + (n-1)1 = 50$

**Note:** Accept 23 without work

**Question 7 (c) [Scale 10C (0, 3, 8, 10)]**

- 3: •  $S_n$  formula written
- any evidence of counting (e.g. listing 28 + 29 + 30 + ...)
  - $a$  or  $d$  identified

- 8: • full listing with addition indicated but incorrect solution
- $S_n$  formula fully substituted

**Note:** Accept 897 without work

**Question 7 (d) [Scale 10C (0, 3, 8, 10)]**

- 3: •  $S_n$  formula written
- $a$  or  $d$  identified
  - any evidence of counting (e.g. listing 28 + 29 + 30 + ...)

- 8: •  $n^2 + 55n - 1200 = 0$
- $\frac{n}{2}(56 + n - 1) = 600$
  - full listing to 16 or 17 terms with addition indicated but incorrect solution

**Note:** Accept (16, 32) without work

**Question 7 (e) [Scale 5C (0, 3, 4, 5)]**

- 3: • 276(25)
- 212(12)

- 4: • 76(25) + 212(12) formulated

**Note:** Accept correct answer without work

**Question 7 (e)**

$$\begin{aligned} \text{Total income} &= 276 \times \text{€}25 + 212 \times \text{€}12 \\ &= \text{€}9444 \end{aligned}$$

**Question 7 (f)**

(i) Adults : Children = 3 : 1

$$\text{Number of adult tickets} = \frac{3}{4} \times 752 = 564$$

$$\text{Number of child tickets} = \frac{1}{4} \times 752 = 188$$

(ii) Let  $x$  = Cost of child ticket

$$\therefore 2 \cdot 5x = \text{Cost of adult ticket}$$

$$188x + 564 \times 2 \cdot 5x = 17\,578$$

$$1598x = 17\,578$$

$$\therefore x = \text{€}11$$

**MARKING SCHEME NOTES**

**Question 7 (f) (i) [Scale 5C (0, 3, 4, 5)]**

**3:** • 4

- $\frac{752}{x}$ ,  $x \neq 4, 1$

**4:** • 188 found or 564

**Note:** Accept correct answer without work

**Question 7 (f) (ii) [Scale 10C (0, 3, 8, 10)]**

**3:** •  $x$ ,  $2 \cdot 5x$

- correct answer without work

**8:** •  $188x + 564(2 \cdot 5x) = 17\,578$ , or consistent with f (i)