

MATHEMATICS - LOWER COURSE - PAPER II (150 marks)

15

TUESDAY, 15 JUNE - MORNING 9.30 to 12.00

Examination Number

SECTION A (45 marks)

Attempt all questions. You should not spend more than 45 minutes on this section.
 Answer each question by writing one of (a), (b), (c), (d) in the box under each question number.
 If you wish to change an answer, cross out your first choice and write your new answer near the box.
 Mathematical tables may be obtained from the Superintendent.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. The lowest common multiple of 4, 10, 12 is

(a) 2

(b) 12

(c) 60

(d) 120

2. $10101_2 \times 10_2$ is(a) 1010110_2 (b) 10111_2 (c) 101010_2 (d) 21_{10} 3. $4 \cdot 12 - (2 \cdot 38 - 1 \cdot 29)$ is

(a) 3.03

(b) 4.03

(c) 0.45

(d) 1.45

4. $3 \cdot 12 \times 10^{-3}$ is

(a) 0.312

(b) 3120

(c) - 9.36

(d) 0.00312

5. $\frac{2}{3} + \frac{1}{6} - \frac{11}{12}$ is(a) $-\frac{1}{12}$ (b) $1\frac{3}{4}$ (c) $-\frac{1}{6}$ (d) $1\frac{1}{2}$

6. 125% of a sum of money is IR£60. The sum of money in IR£ is

(a) 12

(b) 48

(c) 75

(d) 45

7. $A = \{1, 2, 3, 5\}$, $B = \{4, 5, 7\}$, $C = \{4, 6\}$.
 $(A \cup C) \setminus B$ is

(a) {4, 5, 7}

(b) {1, 2, 3}

(c) {1, 2, 3, 6}

(d) {7}

8. The n th term of a sequence is $n^2 - n - 1$. The 10th term is

(a) 91

(b) 98

(c) n^{10}

(d) 89

9. $(a - b)^2 =$

(a) $a^2 - 2ab - b^2$ (b) $a^2 - 2ab + b^2$ (c) $a^2 - b^2$ (d) $a^2 + b^2$

10. If $4 = \frac{2}{y}$, then y is

(a) $\frac{1}{2}$ (b) $\frac{1}{4}$

(c) 2

(d) 4

11. $(x + 2)$ is a factor of $x^2 - x - 6$. The other factor is

(a) $x + 3$ (b) $x - 3$ (c) $x - 6$ (d) $x - 1$

12. $\frac{2^3 \times 2^7}{2^{10}} =$

(a) 1

(b) 0

(c) 2

(d) 2^{20}

13. The mean of 4, 2, 0, 4, 2, 0, 4, 2, 0 is

(a) 0

(b) 4

(c) 3

(d) 2

14. Which one of the following has $\{p, q\}$ as domain ?

(a) $\{(p,p), (p,q)\}$ (b) $\{(p,p), (q,q)\}$ (c) $\{(p,q)\}$ (d) $\{(q,p)\}$

15. If $2(x - 3) < 3(x - 5)$, then

(a) $x > -9$ (b) $x < -9$ (c) $x > 9$ (d) $x < 9$

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SECTION B (105 marks)

Attempt QUESTION 1 and THREE other questions

Marks may be lost if all your work is not clearly shown

1. (a) Calculate the compound interest on IR£3500 for 2 years at 15% per annum.
 (b) A booking fee for a June holiday is 12% of the cost. In January a person paid IR£72 as a booking fee. In May, the cost of the holiday increased by 5%. How much more was needed to pay for the holiday ?

(25 marks)

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2. (a) Find the value of

$$xy(x+z) - z^2(x+y) + 4xyz$$

when $x = 1, y = -1, z = -2.$

- (b) Multiply

$$4x^2 + 6xy + 9y^2 \text{ by } 2x - 3y$$

and express your answer in its simplest form.

(20 marks)

3. (a) Factorise (i) $5xp - 3yp + 3yq - 5xq$
 (ii) $4a^2 - b^2$
 (iii) $3x^2 - x - 4.$

- (b) Solve

$$4 - 2(x - 6) = 3 - 7(x + 1)$$

and check your solution.

(20 marks)

4. 33 students were asked if they had visited France, Spain or England. 5 had been to all three countries, 7 to both France and Spain, 13 to both Spain and England and 9 to both France and England. If 12 had been to France, 18 to Spain and 23 to England, represent the information on a Venn diagram.
 Find, how many had visited:

- (i) one country only
- (ii) at least one country
- (iii) more than one country
- (iv) France or Spain.

(25 marks)

5. If $x \in \mathbb{R}$, draw the graph of

$$f : x \rightarrow x^2 - 2x - 2$$

in the domain $-2 \leq x \leq 4$.

- (i) For what value of x is $f(x) = -3$?
- (ii) Draw the axis of symmetry of f .
- (iii) If $x = 3.6$, use the graph to estimate the value of $f(x)$.
- (iv) Find another value of x such that

$$f(x) = f(3.6). \quad (25 \text{ marks})$$

6. A child kept a record of money, in pence, given to her, each day, for ten days.
The record read

20, 24, 21, 24, 0, 22, 19, 20, 24, 26.

Name the mode.

Calculate the mean amount of money given to her per day.

A second child received double the first child's amount each day for the same ten days.

Calculate the mean in this case.

How much must each child receive on day eleven so that the mean for each, for the eleven days, is 21p and 41p respectively.

(25 marks)

7. (a) Express as a single fraction

$$\frac{5}{5x - 6} - \frac{2}{2x + 3}$$

Check your answer by putting $x = 0$.

- (b) A theatre, with seating accommodation for 200 patrons, took in IR£360 on a night when all seats were sold.

If seats were priced at IR£1.50 and IR£2.50, find how many of each price there were.

(30 marks)