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AN ROINN OIDEACHAIS M.46(a)

INTERMEDIATE CERTIFICATE EXAMINATION, 1989

MATHEMATICS – LOWER COURSE – PAPER II (150 marks)

FRIDAY, 9 JUNE, 9.30 a.m. 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 Superintendents.

THIS PAPER MUST BE ENCLOSED IN YOUR ANSWER BOOK

1. $\frac{7}{10} - \frac{3}{5} =$

(a) $\frac{4}{5}$ (b) $\frac{4}{10}$ (c) $-\frac{4}{5}$ (d) $\frac{1}{10}$

2. $1011_2 + 1 =$

(a) 1110_2 (b) 10011_2 (c) 1111_2 (d) 1100_2

3. 25% of IR£25·000 = IR£

(a) 625·00 (b) 100·00 (c) 6·25 (d) 1·00

4. 986·3 =

(a) $9{\cdot}863 \times 10^4$ (b) $9{\cdot}863 \times 10^3$ (c) $9{\cdot}863 \times 10^2$ (d) $9{\cdot}863 \times 10$

5. 57·3 ÷ 0·3 =

(a) 191 (b) 19·1 (c) 1·91 (d) 0·191

6. If $A = \{1, 3, 5\}$, $B = \{1, 2, 5\}$, $C = \{2, 5\}$, then $(A \cap B) \setminus C =$

(a) $\{1\}$ (b) $\{2\}$ (c) $\{1, 2\}$ (d) $\{1, 5\}$

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7. The mode of the data 1, 2, 3, 3, 5, 6, 8 is

☐ (a) 8 (b) 7 (c) 4 (d) 3

8. $\frac{x^8\ y^3}{x^2\ y}$ =

☐ (a) $x^6\ y^2$ (b) $x^4\ y^3$ (c) $x^6\ y^3$ (d) $x^4\ y^2$

9. The value of $2x^2 - x - 10$ when $x = -2$ is

☐ (a) -20 (b) -16 (c) -4 (d) 0

10. The pattern 2, 5, 10, 17, ---- is given by

☐ (a) $3n - 1$ (b) $2n + 1$ (c) $n^2 + 1$ (d) $4n - 2$

11. The range of a function is $\{2, 3\}$. The function could be

☐ (a) $\{(1, 2), (1, 3)\}$ (b) $\{(1, 2), (3, 2)\}$
(c) $\{(1, 2), (2, 3)\}$ (d) $\{(2, 1), (3, 2)\}$

12. In a school of 450 pupils, 300 walk to school. On a piechart of the 450, the walkers are shown by an angle of

☐ (a) 90° (b) 240° (c) 300° (d) 450°

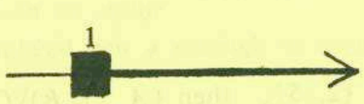
13. Tom has six pence more than John. Together they have 24 pence. An equation showing this is

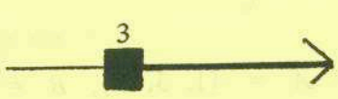
☐ (a) $x(x + 6) = 24$ (b) $2x + 6 = 24$
(c) $x(x - 6) = 24$ (d) $x - 6 = 24x$

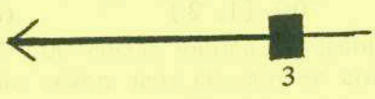
14. If $0{\cdot}25 : 0{\cdot}5 = x : 18$, then x is

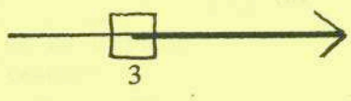
☐ (a) $\frac{1}{2}$ (b) 9 (c) 36 (d) 72

15. The solution set of $2x < 3(x - 1)$, $x \in \mathbf{R}$ is

☐ (a) 

(b) 

(c) 

(d) 

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INTERMEDIATE CERTIFICATE EXAMINATION, 1989

MATHEMATICS – LOWER COURSE – PAPER II

FRIDAY, 9 JUNE – MORNING 9.30 to 12.00

SECTION B (105 marks)

Attempt **QUESTION 1** (30 marks) and **THREE** other questions (25 marks each)

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

1. (a) A child was sent to the shop with IR£10·00. She bought

flour	IR£1·02
bread soda	0·38
butter	IR£1·26

2 litres milk at 52p a litre

$2\frac{1}{2}$ kg of tomatoes at IR£1·36 per kg

8 apples at 15p each.

(i) How much change did she get ?

(ii) What was the greatest number of 28p stamps she could have bought with the change ?

(b) IR£550 was borrowed for 2 years at 10% compound interest. Calculate the amount repaid.

2. (a) Solve for x

$$2(3x - 1) - 3(2 - x) = 5(3x + 2) - 6.$$

(b) If $a = 4, \quad b = -5$, find the value of

$$\frac{a^2 - b}{(a^2 - b^2)(3a + b)}.$$

(c) Express as a single fraction

$$\frac{3}{4a + 7} - \frac{2}{5a + 5}.$$

3. (a) Factorise

(i) $6ax - 4by + 3bx - 8ay.$

(ii) $9x^2 - 4y^2.$

(b) The total fares for 3 adults and 5 children on a bus was IR£4·50. For 2 adults and 3 children the same journey the total fare was IR£2·85. Find, using simultaneous equations, the cost of the journey for

(i) an adult

(ii) a child.

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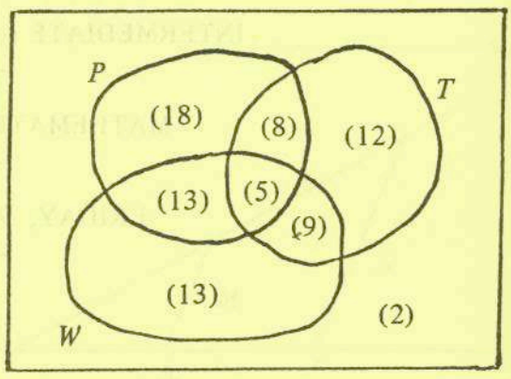
4. A number of people were asked in a survey which newspaper P, T, or W they read on a Sunday. The results are shown on the Venn Diagram.
[(18) means that 18 people read P; (2) means 2 people read none of the papers, etc.]



Showing each time how you arrive at the answer, say how many people

(i) read two papers only ?

(ii) read at least one paper ?

(iii) were questioned for the survey ?

Use one of the symbols $\cup$, $\cap$, $\setminus$ for each question mark so that

(iv) $\#\big((P \;?\; W) \;?\; T\big) = 13$,

(v) $\#\,(P \cap T) = \#\big(W \;?\; (P \;?\; T)\big)$.

5. Draw the graph of the function

$$x \;\to\; 5x - x^2,\; x \in \mathbf{R}$$

in the domain $0 \leqslant x \leqslant 5$.

If the graph shows the temperature on a winter's day between 10 o'clock a.m. and 3 o'clock p.m.

i.e. $x = 0$ on the X-axis represents 10 o'clock
$x = 5$ on the X-axis represents 3 o'clock,

estimate

(i) the time when the temperature was highest,

(ii) the highest temperature recorded,

(iii) the two times of the day when the temperature was 3·5°.

6. Thirty people were asked at lunch-break how often they went to a hairdresser in the previous three months. Their replies were given in an array like this, (1 meaning once, etc.)

1	2	2	3	3	1
2	1	3	4	4	3
2	2	1	3	4	4
3	3	3	1	3	4
5	5	5	5	1	1

(i) Express the array as follows:

number of visits	1	2	3	4	5
number of people	7				

(ii) Draw a bar-chart to display the data.

(iii) Verify that the mean of the above data is 2·8 visits per person.

(iv) Some of those who had gone only once felt they had been negligent and went again that evening. This changed the mean to 3·0 visits per person. How many of them went again that evening ?

7. (a) Solve

$$5x^2 - 7x + 8 = 2x^2 + 3x.$$

(b) The total cost of 20 books was IR£39·00. Some of the books cost IR£2·50 each and the rest cost IR£1·50 each.

(i) Write an algebraic equation for the total cost of the twenty books.

(ii) Calculate how many books of each price were bought.