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LEAVING CERTIFICATE EXAMINATION, 1995

MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL

THURSDAY, 8 JUNE – MORNING, 9.30 to 12.00

PAPER 1 (300 marks)

Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).

Marks may be lost if necessary work is not clearly shown.

1. **Attempt Section A or Section B.**

SECTION A

(i) In a sale goods are reduced by 15%.
A Hi-fi system sells for IR£297.50 in the sale.
What was the price before the sale?

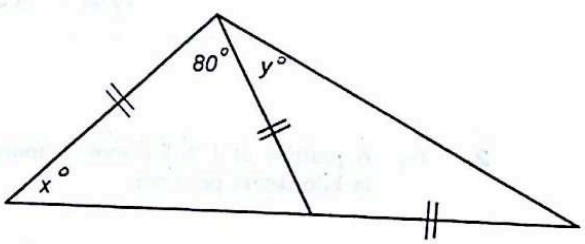
(ii) Two children share IR£51 in the ratio of their ages.
One is 7 years old the other is 5 years old.
How much does the older child receive ?

(iii) 4.8 m was wrongly measured. It was taken to be 5.1 m. Calculate the percentage error.

(iv) A function f does the following: it doubles the given number and takes 7 away from the result. Express f as $f : x \rightarrow ? \, x - ?$

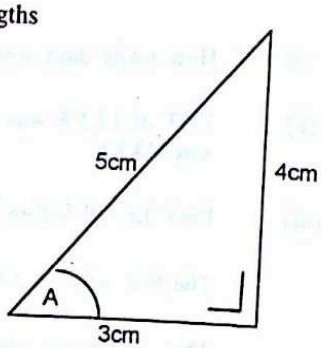
(v) In how many ways can a boy and then a girl be chosen to form a debating team from 12 boys and 13 girls if the choice is random ?

(vi) Calculate the value of x and the value of y. (see diagram)



(vii) Verify that a triangle is right-angled if the lengths of its sides are 6 cm, 8 cm, and 10 cm.

(viii) Using the diagram write tan A as a fraction.



(ix) Construct a triangle pqr when $|pq| = 4$, $|\angle rpq| = 60°$ and $|\angle rqp| = 90°$.

(x) A line has slope 3 and passes through the point (4, 5). Write its equation.

OVER →

SECTION B

Use the calculator to do the following:

(i) Express $\sqrt{199}$, correct to two decimal places.

(ii) Find $(1.19)^3$, correct to four decimal places.

(iii) Find $5 - \sqrt{5}$, correct to two decimal places.

(iv) Express $\frac{5}{11}$, correct to three decimal places.

(v) Calculate 8.4% of IR£4312.92, correct to two decimal places.

(vi) Find $\frac{501}{600} - \frac{5}{6}$, correct to five decimal places.

(vii) Find $\frac{1}{14.5}$, correct to four decimal places.

(viii) Find the largest natural number less than $(\sqrt{8})^3$.

(ix) Find the value of

$$\frac{3.35 \times 10^4 - 5.2 \times 10^3}{1.25 \times 10^2}.$$

(x) Find the value of

$$\frac{62.54 \times \sqrt{81}}{89.94 - 23.46}$$ correct to two decimal places.

2. *(a)* A journey of 176 km took 2 hours 45 minutes. Find the average speed for the journey in kilometers per hour.

(b) On a bill for electricity of IR£72.42 it is stated "the cost per day was IR£1.23 for your electricity needs".

(i) How many days were in question? Give your answer to the nearest day.

(ii) VAT of 12.5% was included in the bill. How much, to the nearest penny, was VAT?

(iii) Find the bill before VAT.

The bill before VAT is the cost of units used.

The cost of one unit is IR£0.0714.

How many units were used to the nearest unit?

3. A phone bill reads as follows:

line and equipment rental		IR£24.72
Calls	Units	
272 local	272	IR£25.83
31 inland	117	IR£11.11
10 international	313	IR£29.73

(i) Find the amount of the bill.

(ii) Find the average cost of a local call to the nearest penny.

(iii) Find the average number of units per inland call to the nearest unit.

(iv) VAT at 21% is added to the bill. Calculate the overall bill to the nearest penny.

(v) VAT together with line and equipment rental represent $x\%$ of the overall bill. Find the value of x to the nearest whole number.

4. *(a)* IR£3000 was invested in an account at compound interest.
The interest during the first year was 4% per annum.
Find this interest.

At the beginning of the second year a further IR£1200 was invested in the same account.
The interest during the second year was 3.5%.
Find the amount in the account at the end of the second year.

(b) The profit in a company was IR£7 million for the year 1992. For each year of the next three years profits were 8% lower than the year before. Calculate to the nearest IR£ the profit at the end of the year 1995.

It is expected that profits over each year of the next three years would be 8% greater than the year before.
Calculate to the nearest IR£ the expected profit at the end of the year 1998.

5. *(a)* Solve for x

$$3(2x - 4) + 1 = 4x - 10.$$

(b) Solve for x and y

$$\begin{aligned} 3x - y &= 11 \\ 2x + 5y &= -4. \end{aligned}$$

(c) Solve for x correct to three places of decimals

$$4x^2 = 19.$$

(d) Solve for x correct to two decimal places

$$3x^2 - 5x + 1 = 0.$$

OVER →

6. Draw the graph of the function f

$$f : x \rightarrow x^2 - x - 4$$

for $-3 \leq x \leq 3$, $x \in \mathbf{R}$.

Use the graph, or otherwise, to estimate,

(i) the values of x to one place of decimals for which $f(x) = 0$.

(ii) the minimum value of $f(x)$.

7. *(a)* The table shows the marks a person got in an interview and the weights given.

	Qualifications	Suitability	Personality	Deportment
marks	75	80	63	54
weights	3	4	2	1

Calculate the weighted mean mark.

(b) The number of customers who entered a supermarket from 0930 hours to 1230 hours is shown.

Time	0930 – 1000	1000 – 1030	1030 – 1100	1100 – 1130	1130 – 1200	1200 – 1230
Number of Customers	55	145	230	290	195	85

(0930 – 1000 means on or after 0930 but before 1000.)

(i) Complete the following cumulative frequency table:

Time	before 1000	before 1030	before 1100	before 1130	before 1200	before 1230
Cumulative frequency	55					

(ii) Draw the cumulative frequency curve.

(iii) Estimate from the curve the number of customers who entered between

0930 and 1015 hours,
1015 and 1100 hours,
1100 and 1145 hours,
1145 and 1230 hours.

In which of these time intervals did most customers enter ?

FORMULAE FOR PAPER 1

MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL

1. Equation of a line, slope m, passing through (x_1, y_1):

$$y - y_1 = m(x - x_1)$$

2. Compound Interest:

$$A = P\left(1 + \frac{r}{100}\right)^n$$

3. Roots of quadratic equation $ax^2 + bx + c = 0$:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$