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LEAVING CERTIFICATE EXAMINATION, 1992

MATHEMATICS - ALTERNATIVE - ORDINARY LEVEL

SAMPLE PAPER 1 (300 marks) - 2 ½ hours

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

Marks may be lost if all your work is not clearly shown or if you do not indicate where a calculator has been used.

1. (i) On paying a bill a customer was allowed a discount of 10%. The customer paid IR£162. What was the amount of the bill ?
- (ii) IR£36 was divided among two pupils in the ratio 7 : 5. How much did each get ?
- (iii) Calculate the percentage error when 52 is written instead of 25.
- (iv) The floor of a room is a square measuring 81 m^2 and the height of the room is 3m. Find the area of one wall.
- (v) Rewrite the formula
- $$x = \frac{y - k}{t}$$
- in the form $k =$
- (vi) f is the function : $x \rightarrow 1 - 2x$. Calculate $f(-1)$.
- (vii) Solve the equation
- $$(3x - 5) - (3 - 3x) = 4$$
- (viii) Solve the equation
- $$x^2 + \frac{9}{25} = 1$$
- (ix) 73 people are chosen at random. How many would be expected to have their birthdays in April in a year of 365 days ?
- (x) The mean (average) of two numbers x and y is 5. Express x in terms of y .

OVER→

2. Colm's rate of pay is IR£2.50 an hour, Monday to Friday and he is paid time and a half for Saturday. He is allowed one hour for lunch. He is allowed one hour for lunch.

	Starting Time	Finishing Time	Hours Worked
Monday	08 00	16 30	
Wednesday		17 00	8
Saturday	09 00	12 00	

- (i) When did Colm begin work on Wednesday ?
(ii) Calculate Colm's pay for the three days.
(iii) Colm has a tax free allowance of IR£26 and pays 35% tax on the remainder. Colm also pays PRSI which amounts to 7.75% of his total gross pay for the three days. Calculate Colm's take home pay to the nearest p.
3. (a) IR£800 was invested at 5% per annum compound interest. Calculate the
- (i) interest at the end of the first year
(ii) amount after 4 years to the nearest p.

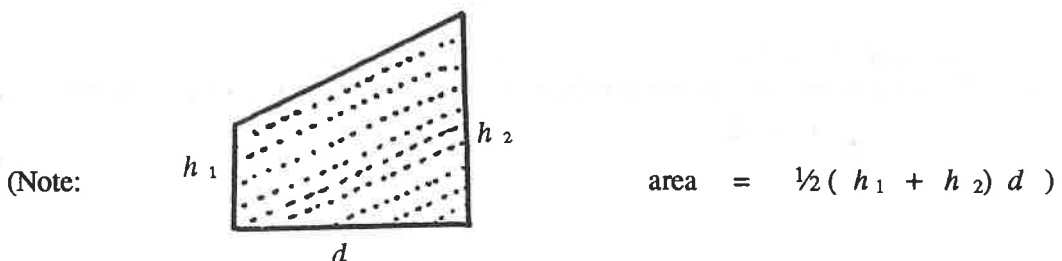
$$\left[A = P \left(1 + \frac{r}{100} \right)^n \right]$$

- (b) A car which was bought for IR£12 000 depreciated at the rate of 25% a year during its first year of use and at a rate 20% a year during its second year of use. Calculate the value of the car at the end of the second year.
4. The area under a speed-time graph gives the distance travelled where v is the speed at a given time t seconds :

t	0	2	4	6	8	10
v	10	12	20	25	25	14

Using the horizontal axis for t draw a graph of the data in the table and using Simpson's Rule or otherwise (see below) estimate the distance travelled in the 10 seconds.

Say, giving a reason, whether your estimate is higher or lower than the actual distance travelled.



5. (a) Evaluate, to 3 significant figures,

(i)
$$\frac{28.389 - 10.593}{(3.814) \sqrt{0.763}}$$

(ii)
$$\sqrt{r^2 + \left(\frac{1}{2\pi fc}\right)^2}$$

where $r = 5.1000$ $\pi = 3.1420$ $f = 500$ $c = 0.0001$

(iii)
$$\frac{(12.56 \times 10^{-3} + (41.5 \times 10^{-4}))}{(2.31 \times 10^{-2})^2}$$

(b) The formula

$$\frac{x^2 + 10}{2x}$$

is used to get better approximations for the square root of 10. Take $x = 3$ for the first approximation and then use the formula twice to get a better approximation correct to three places of decimals.

6. (a) Solve the quadratic equation $2x^2 + 2x - 7 = 0$ and give your answer correct to two places of decimals.

$$\left[x_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$$

(b) Solve the simultaneous equations

$$3x = 4y + 10$$

$$3y = -(x + 1)$$

(c) If $x = 2t - 3$ and $2y = t - 5$, rewrite the expression

$$3x + 4y$$

in terms of t and hence solve for x and y the equation

$$3x + 4y = 9.$$

OVER→

7. Draw the graph of the function

$$f: x \rightarrow 10 - x - 2x^2$$

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

Use your graph to find, as accurately as possible,

- (i) $f(2\frac{1}{2})$
- (ii) the values of x for which $f(x) = 4$
- (iii) the values of x for which

$$2x^2 = 10 - x$$

8.

60	51	12	28	31	56	28	62	73	84
25	22	77	94	72	48	65	33	59	77
83	42	92	52	37	73	39	67	54	66
41	75	17	24	68	34	81	62	42	88
83	73	15	56	28	84	69	35	67	52

The data, above, refer to examination marks of 50 pupils studying History. Use the data to complete the following table:

CLASSES

	10 - 20	20 - 30	30 - 40	40 - 60	60 - 80	80 - 100
FREQUENCY						
CUMULATIVE FREQUENCY						

(Note: 10 - 20 means 10 to 19 inclusive but does not include 20. Similarly for the other classes)

Draw a cumulative frequency curve (ogive) and use it to estimate the

- (i) number of pupils scoring more than 70
- (ii) mark below which there are 20% of the pupils
- (iii) median mark.