AN ROINN OIDEACHAIS

LEAVING CERTIFICATE EXAMINATION, 1992

MATHEMATICS – ALTERNATIVE – ORDINARY LEVEL

THURSDAY, 11 JUNE – MORNING 9.30 – 12.00

PAPER 1 (300 marks)

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

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

Attempt Section A or Section B

SECTION A

1. *(i)* V.A.T. at 12·5% is added to a bill of IR£64·40. What is the total bill ?

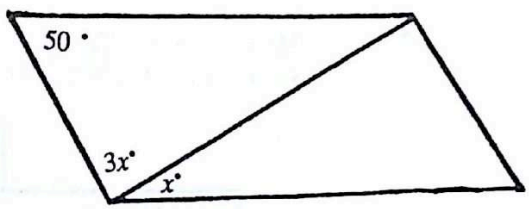
(ii) Ann and John shared a prize in the ratio 6 : 7. John received IR£28. How much was the prize ?

(iii) When a carton of 2 litres of milk is poured into a jug, 15 ml spills. What percentage is spilled ?

(iv) f is the function $x \to -3(1-x)$.
Calculate $f(-2)$

(v) A pupil is picked at random.
Find the probability that the pupil's birthday does not fall on February 28 in a year of 365 days..

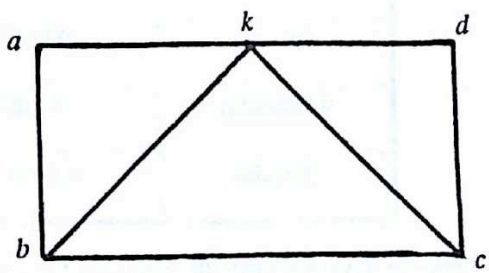
(vi) The diagram shows a parallelogram. Calculate x.



(vii) In the rectangle $abcd$

$|ad| = 2|ab|$
$|ak| = |kd|$

Say why $|kb| = |kc|$



(viii) Construct an angle A such that

$$\sin A = 0{\cdot}8.$$

(ix) If $\sin B = 0{\cdot}77$, find B.

(x) Find the distance between the two points $(-1, 2)$ and $(2, -1)$.

OVER→

SECTION B

Use your calculator to answer each of the following:

(i) Find $12 - \sqrt{12}$, correct to two decimal places.

(ii) Find $\sqrt{0{\cdot}0402}$, correct to four decimal places.

(iii) Find $(1{\cdot}0101)^3$, correct to two decimal places.

(iv) Which is the greater $0{\cdot}06$ or $(0{\cdot}6)^5$?

(v) Calculate 11 3/5 % of IR £3511·71 to the nearest penny.

(vi) An article priced at IR£43·75 is reduced by 14 3/4 % in a sale.
Find, to the nearest penny, the reduced price.

(vii) Find the total bill

156 milk cartons at 31p each
279 newspapers at 75p each
26 deliveries of fruit at IR£2·59 per delivery.

(viii) Is $(\sqrt{3})^3 - (\sqrt{2})^4$ less than $\sqrt{1{\cdot}44}$?

(ix) Find, correct to two significant figures,

$$\frac{1{\cdot}791 \times 1{\cdot}006}{475{\cdot}250 \div 0{\cdot}810}$$

(x) Find, correct to three significant figures,

$$(56{\cdot}2 + (13{\cdot}39 \times 5)) / (63{\cdot}392 - 19{\cdot}201)$$

2. Mary works flexible hours and each day she has a one hour break for lunch for which she is paid. Her record for four days showed:

	Starting Time	Finishing Time
Monday	08 00	17 30
Tuesday	07 30	17 30
Wednesday	07 30	17 30
Thursday	08 30	

(i) For the days recorded she worked a total of 35 hours. What time did she finish on Thursday ?

(ii) Mary is paid IR£8 an hour for the first 30 hours worked and IR£12 an hour for the remainder. Calculate her gross pay for the four days.

(iii) Mary pays PRSI of 7·75% on her gross pay.
She has a tax free allowance of IR£75 and pays tax at the rate of 29% on the remainder. Calculate her take-home pay.

3. (a) IR£600 was invested at 15% per annum compound interest.

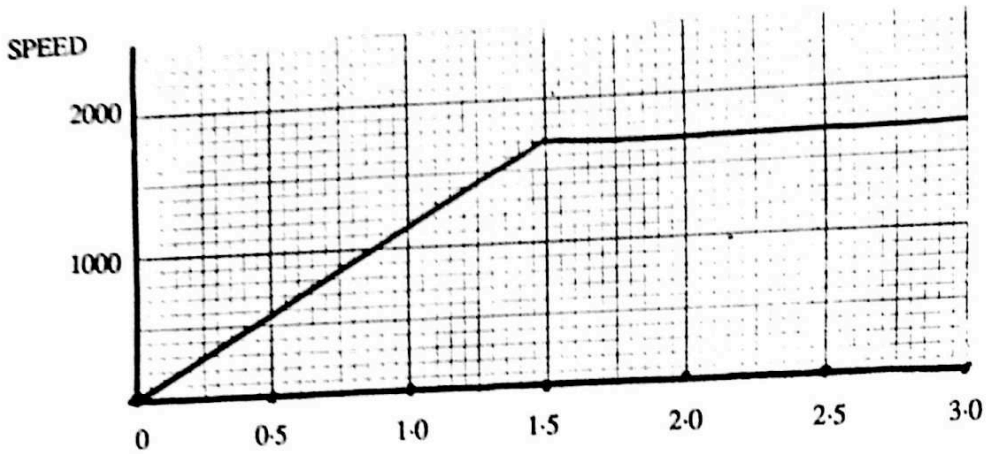
(i) Calculate the amount after 3 years, correct to the nearest IR£.

(ii) Show that at the end of the 5th year the investment has more than doubled itself.

(b) An investment of IR£2000 increased in value by 10% per annum for each of the first two years. At the end of the third year it had lost 5% of the value it had at the beginning of that year.

Calculate its value at the end of the third year.

4. The graph, below, gives the speed of a car in metres per minute over a given time interval.



Use the graph to find, as accurately as possible,

(i) the speed after 1 minute

(ii) the length of time the car was moving at constant speed

(iii) the distance travelled by the car in the 3 minutes, noting that the area under the graph gives the distance.

5. (a) Solve the equation

$$2{\cdot}52\,x - 11{\cdot}85 = 3\,(2{\cdot}4 - 1{\cdot}7\,x)$$

(b) Solve the quadratic equation

$$2x^2 - 3x - 4 = 0$$

giving your answer correct to two places of decimals.

(c) Solve the simultaneous equations

$$5x - 2y = 20$$
$$3x + 4y = -1$$

OVER→

6. Draw the graph of the function

$$f : x \rightarrow 2 - 5x - 3x^2$$

for the values $-3 \leq x \leq 2$, $x \in \mathbf{R}$.

Use your graph to estimate

(i) $f(-1\frac{1}{2})$

(ii) the values of x for which $f(x) = 0$

(iii) the values of x for which $f(x) = 2$.

7. *(a)* The two sets

{17, 5, 21, 56, 41} and { 5, x, $2x$, 38, 22 } have the same mean. Find x.

(b) A carpark attendant counted the cars entering the carpark during 10 minute intervals. His records showed:

TIME	08 00 - 08 10	08 10 - 08 20	08 20 - 08 30	08 30 - 08 40	08 40 - 08 50	08 50 - 09 00
NUMBER OF CARS	30	70	120	140	100	40

(**Note:** 08 00 – 08 10 means 08 00 and later but earlier than 08 10 and similarly for the others).

Complete the following cumulative frequency table

TIME	< 08 10	< 08 20	< 08 30	< 08 40	< 08 50	< 09 00
CUMULATIVE FREQUENCY						

Draw the ogive and use it to find as accurately as possible

(i) the time by which exactly 300 cars had entered

(ii) the number of cars entering between 08 15 and 08 45

(iii) the median time.

FORMULAE FOR PAPER I

1 Litre = 1000 ml

Distance formula: $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

Compound Interest

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

Area of triangle is half the length of the base by the height.

Roots of quadratic equation

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