FOR THE EXAMINER

EXAM. NUMBER:

Total Marks:

Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2008

MATHEMATICS - ORDINARY LEVEL - PAPER 1 (300 marks)

THURSDAY, 5 JUNE - MORNING, 9:30 to 11:30

Time: 2 hours

Attempt **ALL** questions. Each question carries 50 marks.

Answers and supporting work should be written into the boxes provided.

Extra paper and graph paper can be obtained from the Superintendent, if needed.

The symbol ✍ indicates that supporting work must be shown to obtain full marks.

Make and model of calculator used:

For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. **(a)** $S = \{a, b, c\}$

(i) Write down a subset of S that has one element.

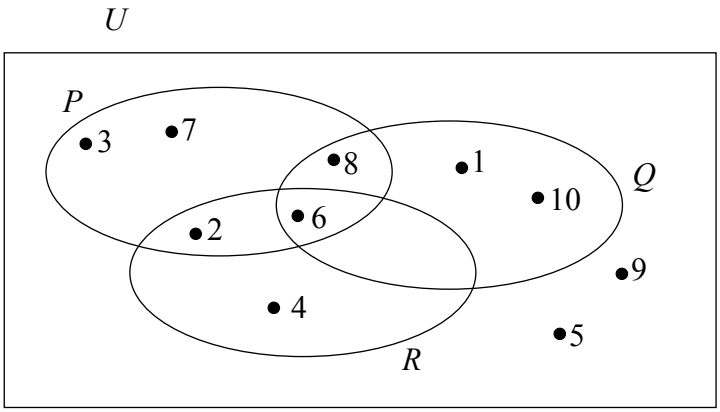
(ii) Write down a subset of S that has two elements.

1(b) U is the universal set.

$P = \{2, 3, 6, 7, 8\}$

$Q = \{1, 6, 8, 10\}$

$R = \{2, 4, 6\}$



List the elements of:

(i) $P \cap Q$

(ii) $Q \setminus R$

(iii) $(Q \cup R)'$

(iv) $(P \cap R) \setminus Q$

1(c) M is the set of natural numbers from 1 to 36, inclusive.

(i) List the elements of M that are multiples of 6.

(ii) List the elements of M that are multiples of 9.

(iii) Write down the lowest common multiple of 6 and 9.

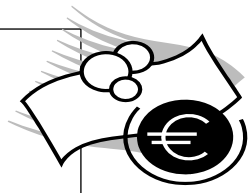
(iv) Express 30 as the product of three prime numbers.

2. **(a)** €260 is shared between Mark and Una in the ratio 6:7.

How much does each receive?

Mark = Una =

2(b) **(i)** On a day when €1 = £0·68, find the value in euro of £816.



(ii) By rounding each of these numbers to the nearest whole number, estimate the value of $\frac{5\cdot 8\times 8\cdot 148}{11\cdot 64}$.

$\frac{5\cdot 8\times 8\cdot 148}{11\cdot 64}$ is approximately equal to:

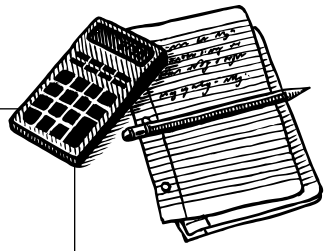
$$\frac{\square \times \square}{\square} = \frac{\square}{\square} = \square$$

(iii) Using a calculator, or otherwise, find the exact value of $\frac{5\cdot 8\times 8\cdot 148}{11\cdot 64}$.

2(c) **(i)** Using a calculator, or otherwise, write $\frac{1}{5}$ and $\frac{11}{50}$ as decimals.

Hence, or otherwise, put the following numbers in order, starting with the smallest and finishing with the largest:

$$0 \cdot 25, \ \frac{1}{5}, \ \frac{11}{50}.$$



$\frac{1}{5} =$ $\frac{11}{50} =$

_____ , _____ , _____ .

(ii) Using a calculator, or otherwise, divide 1170 by 0·45 and express your answer in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbf{N}$.

(iii) Using a calculator, or otherwise, evaluate

$$(3 \cdot 9)^2 - \frac{5 \cdot 32}{\sqrt{0 \cdot 64}} \times 1 \cdot 81$$

Give your answer correct to two decimal places.

3. **(a)** Kate went to the cinema. She bought a ticket at €8·50 and then bought popcorn costing €4·40. How much change did Kate get from a €20 note?

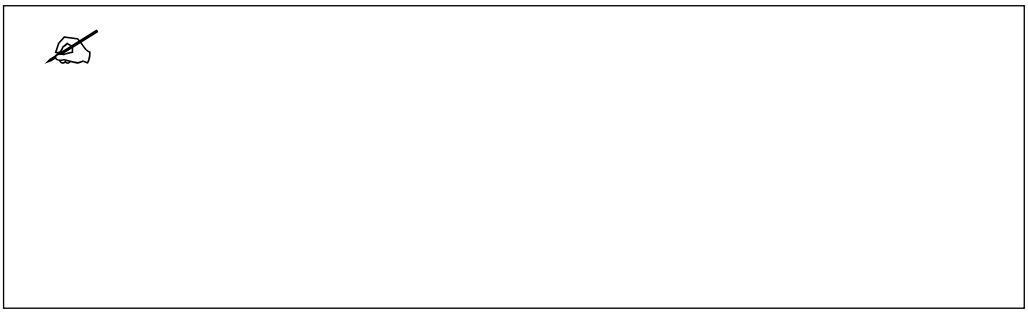
3(b) **(i)** VAT at 13·5% is added to a bill of €860.
Calculate the total bill.

(ii) €4750 is invested at 3·7 % per annum.
What is the amount of the investment at the end of one year?

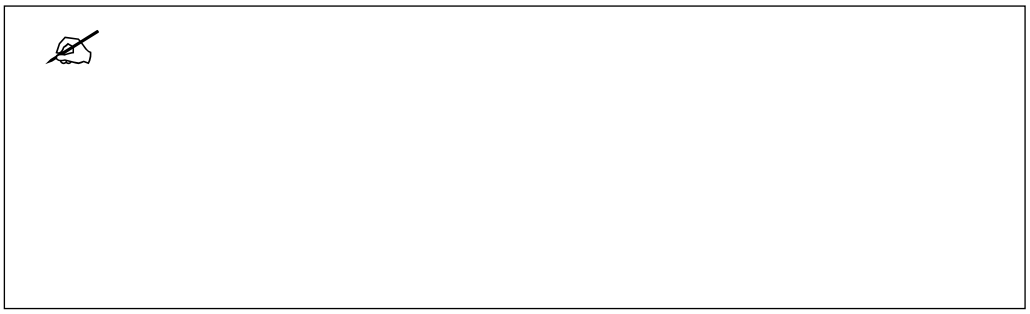
3(c) Darragh's annual wage is €48 000.
He pays income tax at the rate of 20% on the first €34 000 of his wage and income tax at the rate of 41% on the remainder of his wage.
Darragh has an annual tax credit of €3600.

(i) Find the tax on the first €34 000 of his wage, calculated at the rate of 20%.

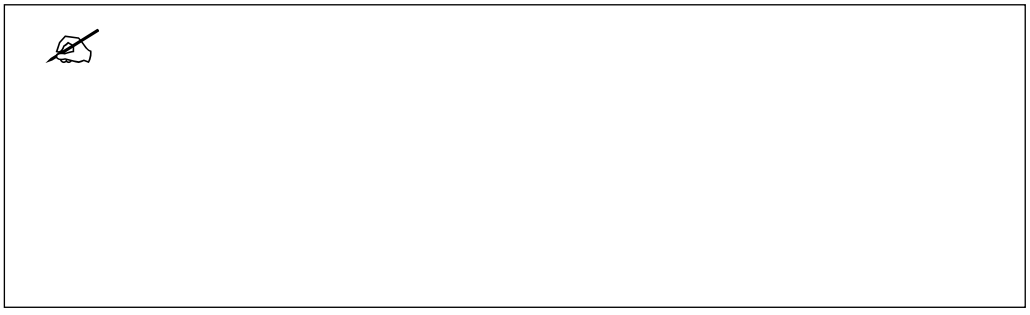
(ii) Find the tax on the remainder of his wage, calculated at the rate of 41%.



(iii) Hence calculate Darragh's gross tax.



(iv) Calculate Darragh's take home pay.



4. **(a)** If $a = 5$ and $b = 7$, find the value of :

(i) $9a + b$

(ii) $ab + 13$

4(b) **(i)** Solve the equation $3(2x - 1) = 4x + 9$.

(ii) Multiply $(5x - 2)$ by $(3x + 4)$.
Write your answer in its simplest form.

4(c) Shane is x years old. Eileen is three years younger than Shane.

(i) Find Eileen's age in terms of x.

(ii) If the sum of Shane's age and Eileen's age is 47,
write down an equation in x to represent this information.

(iii) Solve the equation that you formed in part **(ii)** above, for x.

(iv) When Eileen is $2x + 5$ years old, find the sum of Shane's age and Eileen's age.

5. **(a)** Find the values of x for which $3x + 2 \leq 8,\ x \in \mathbf{N}$.

5(b) Factorise:

(i) $4a + ab$

(ii) $2x - 2y + cx - cy$

(iii) $x^2 - 2x - 24$

(iv) $144 - y^2$

5(c) **(i)** Express $\frac{x-1}{5} - \frac{x-2}{7}$ as a single fraction and give your answer in its simplest form.

$\frac{x-1}{5} - \frac{x-2}{7} =$

(ii) Hence, or otherwise, solve the equation

$\frac{x-1}{5} - \frac{x-2}{7} = 1$

(iii) Solve for x and for y:

$$3x + 2y = 73$$
$$4x + y = 59$$

$x =$ $y =$

6. **(a)** $f(x) = 3x - 1$. Find:

(i) $f(5)$

(ii) $f(-4)$

6(b) Draw the graph of the function

$$f: x \to x^2 - 3x - 1$$

in the domain $-1 \leq x \leq 4$, where $x \in \mathbf{R}$.

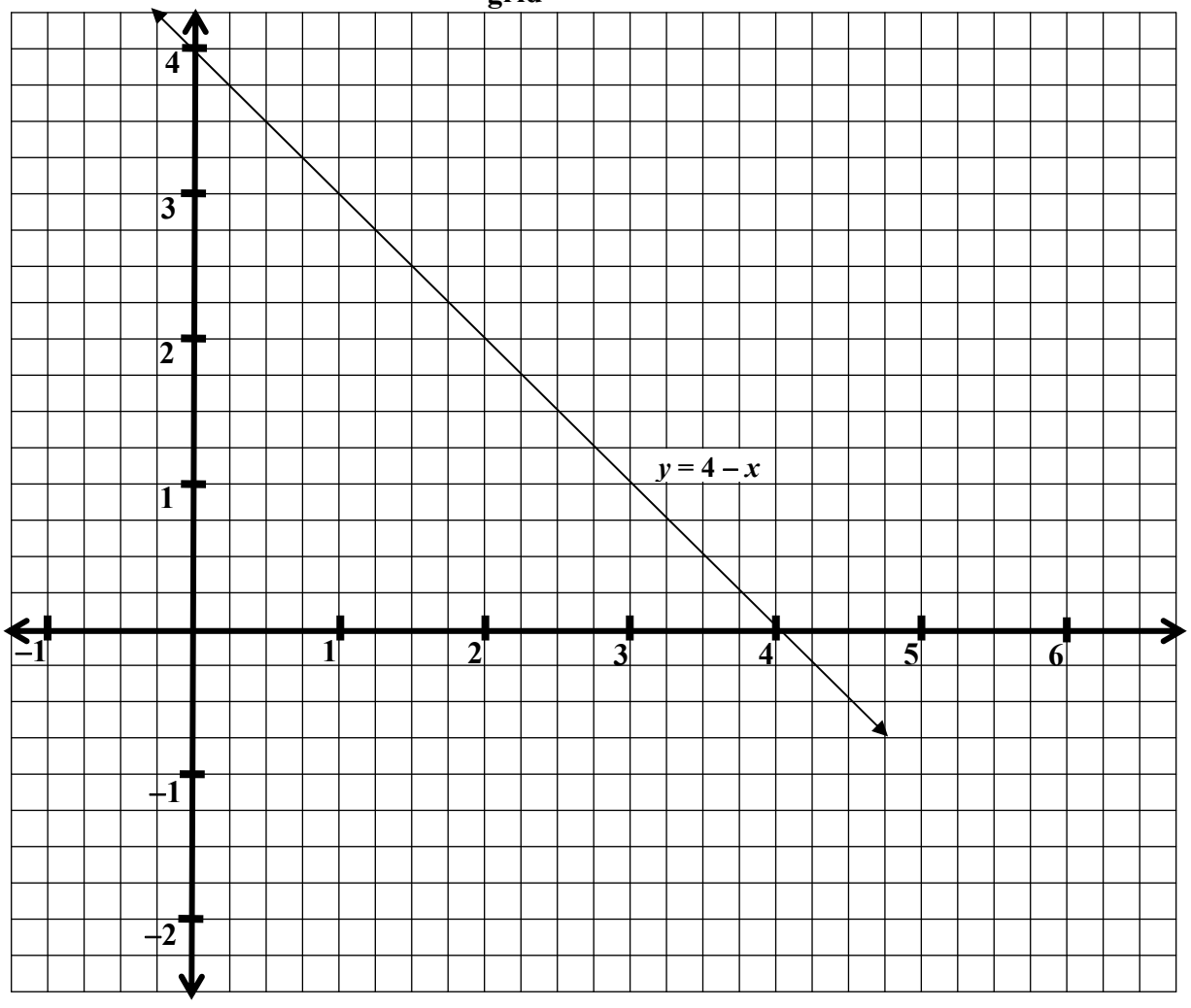
Part (c) on next page

6(c) **(i)** Given that $y = x + 2$, complete the table below.

x	-1	0	1	2
y				

(ii) On the grid below, the graph of the line $y = 4 - x$ is drawn.
Using your answers from **(i)**, draw the graph of $y = x + 2$ on the same grid.

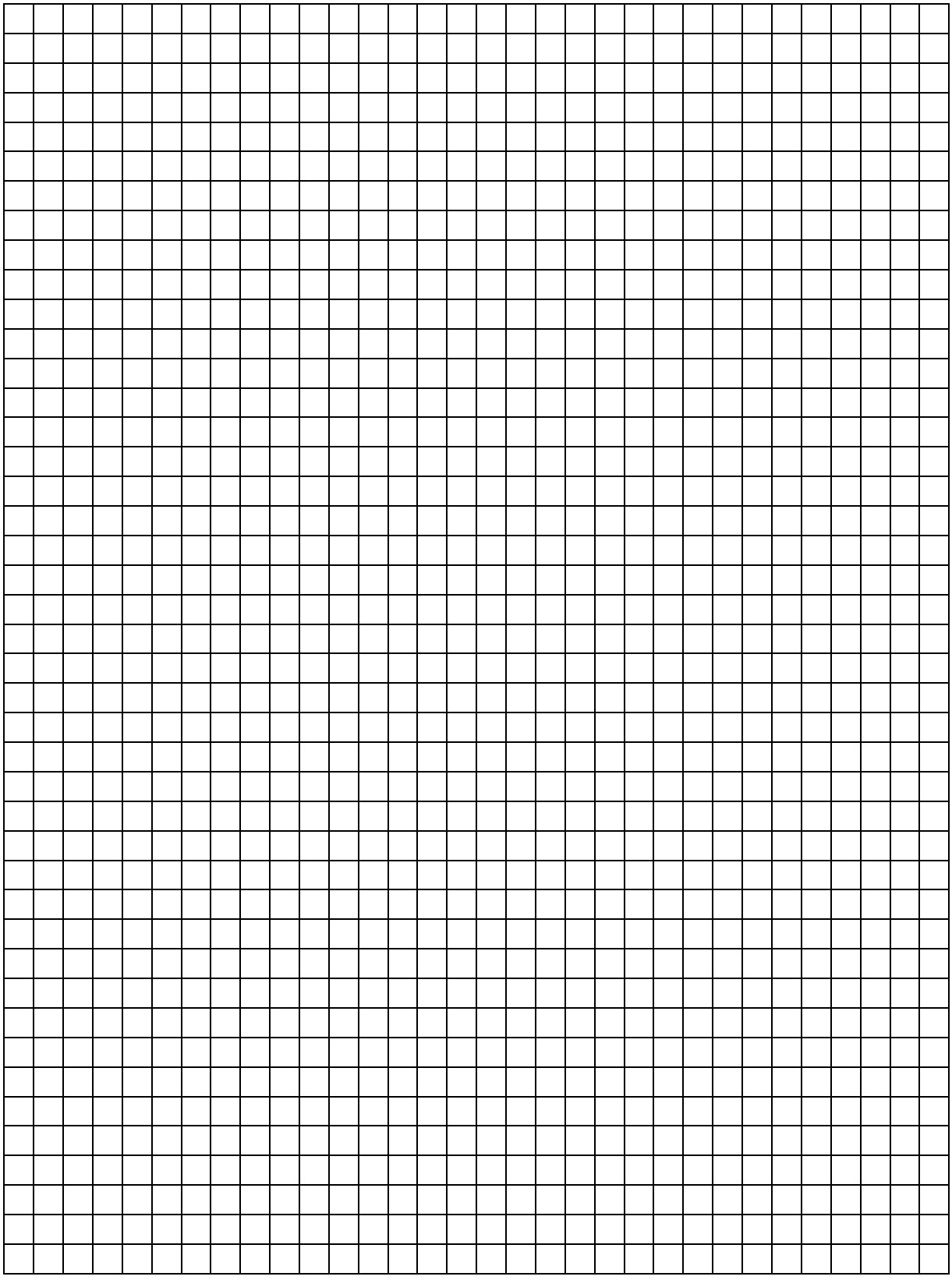
grid



(iii) Use the graphs drawn in **6 (c) (ii)** to write down the coordinates of the point of intersection of the two lines $y = 4 - x$ and $y = x + 2$.

Answer to be written here.

Space for extra work



Space for extra work