

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit

State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2006**MATHEMATICS - ORDINARY LEVEL - PAPER 1 (300 marks)****THURSDAY, 8 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:**

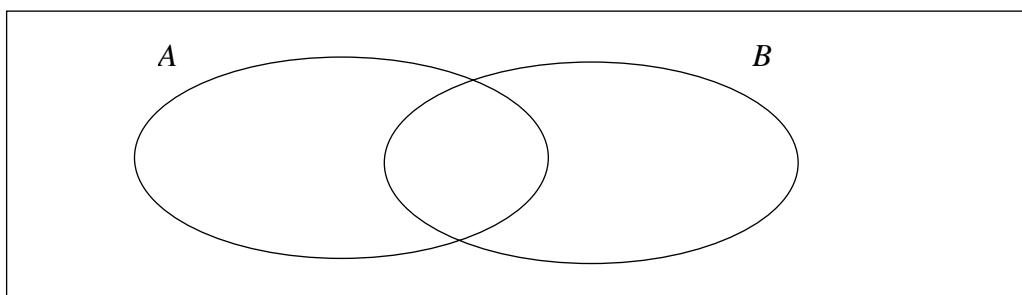
| Question | Mark |
|----------|------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| Total | |
| Grade | |

For Superintendent/Examiner use only:

Centre Stamp

1. (a) $A = \{a, b, c, d, e\}$ $B = \{c, d, f, g\}$

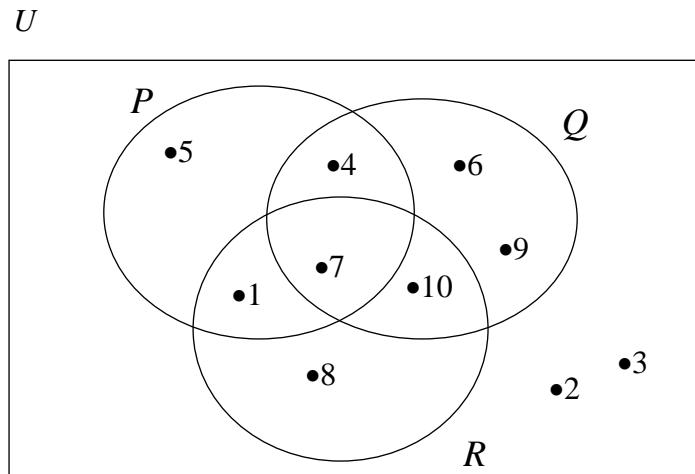
Fill the elements of A and B into the following Venn diagram:



1(b) U is the universal set.
 $P = \{1, 4, 5, 7\}$

$Q = \{4, 6, 7, 9, 10\}$

$R = \{1, 7, 8, 10\}$



(i) List the elements of $Q \cup R$.

(ii) List the elements of $Q \setminus (P \cup R)$.

(iii) List the elements of P' , the complement of the set P .

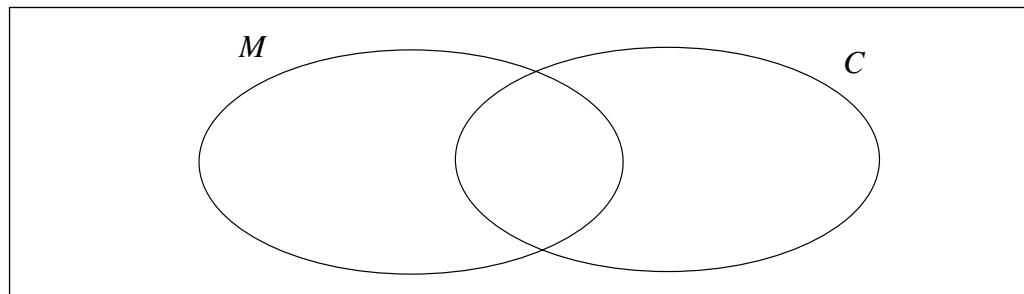
(iv) Write down $\# R$.

1(c)

There are 30 students in a class.
21 own a mobile phone (M) and 12 own a computer (C).
7 own both a mobile phone and a computer.



(i) Represent this information in the Venn diagram below.



(ii) How many students own a mobile phone but not a computer?

(iii) How many students own neither a mobile phone nor a computer?

(iv) How many students do not own a mobile phone?

- 2.** (a) In a school of 646 pupils the ratio of girls to boys is 9:8.
Find the number of girls and the number of boys in the school.



Number of girls =

Number of boys =

- 2(b)** (i) On a day when $\text{€}1 = \$1.21$, find the value in euro of \$6655.



- (ii) By rounding each of these numbers to the nearest whole number,
estimate the value of $\frac{4.368 + 10.92}{3.12}$.



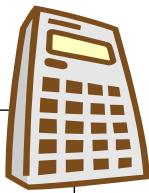
$\frac{4.368 + 10.92}{3.12}$ is approximately equal to:

$$\frac{\boxed{} + \boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}} = \boxed{}$$

- (iii) Using a calculator, or otherwise, find the exact value of $\frac{4.368 + 10.92}{3.12}$.

- 2(c) (i) Using a calculator, or otherwise, find the exact value of $(4^2)^3$.

$$(4^2)^3 =$$



- (ii) Using a calculator, or otherwise, multiply $65 \cdot 5$ by 40 and express your answer in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbf{Z}$.



- (iii) Using a calculator, or otherwise, evaluate

$$\frac{1}{0.0125} + \frac{\sqrt{86.49}}{15.5} \times 7.48.$$

Give your answer correct to two decimal places.



3. (a) Find the total cost of the following bill:



6 litres of milk at €1·05 a litre
3 loaves of bread at €1·20 a loaf
5 apples at 65c each.



Total Cost =

- 3(b) (i) Vat at 21% is added to a bill of €750.
Calculate the total bill.



- (ii) €7450 is invested at 2·6% per annum.
What is the amount of the investment at the end of one year?



- 3(c) John's weekly wage is €730.
He pays income tax at the rate of 20% on the first €440 of his wage
and income tax at the rate of 42% on the remainder of his wage.
John has a weekly tax credit of €65.

- (i) Find the tax on the first €440 of his wage, calculated at the rate of 20%.



- (ii) Find the tax on the remainder of his wage, calculated at the rate of 42%.



- (iii) Hence calculate John's gross tax.



- (iv) Calculate John's take home pay.



4. (a) If $a = 2$ and $b = 5$, find the value of :



(i) $3a + b$



(ii) $ab - 3$

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



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

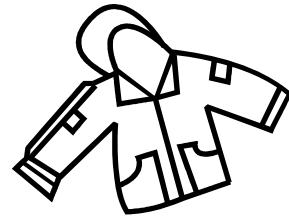


4(c)

The cost of 2 jumpers and 3 shirts is €84.

The cost of 4 jumpers and 1 shirt is €78.

Let ϵ be the cost of a jumper and let ϵ be the cost of a shirt.



- (i)** Write down two equations, each in x and y , to represent the above information.



First equation:

Second equation:

- (ii)** Solve these equations to find the cost of a jumper and the cost of a shirt.



Cost of a jumper =

Cost of a shirt =

- (iii)** Verify your result.



5. (a) Write in its simplest form

$$4(x + 3) + 2(5x + 4).$$



5(b) Factorise:

(i) $xy + wy$



(ii) $ax - ay + bx - by$

(iii) $p^2 - 36$

(iv) $4a^2 + 8a$

- 5(c)** (i) Solve the equation $x^2 - 5x - 14 = 0$.



- (ii) Express $\frac{3x+2}{4} - \frac{x+4}{5}$ as a single fraction.

Give your answer in its simplest form.



- (iii) Verify your answer to part (ii) by letting $x = 6$.



6. (a) $f(x) = 2x - 1$. Find:



(i) $f(4)$



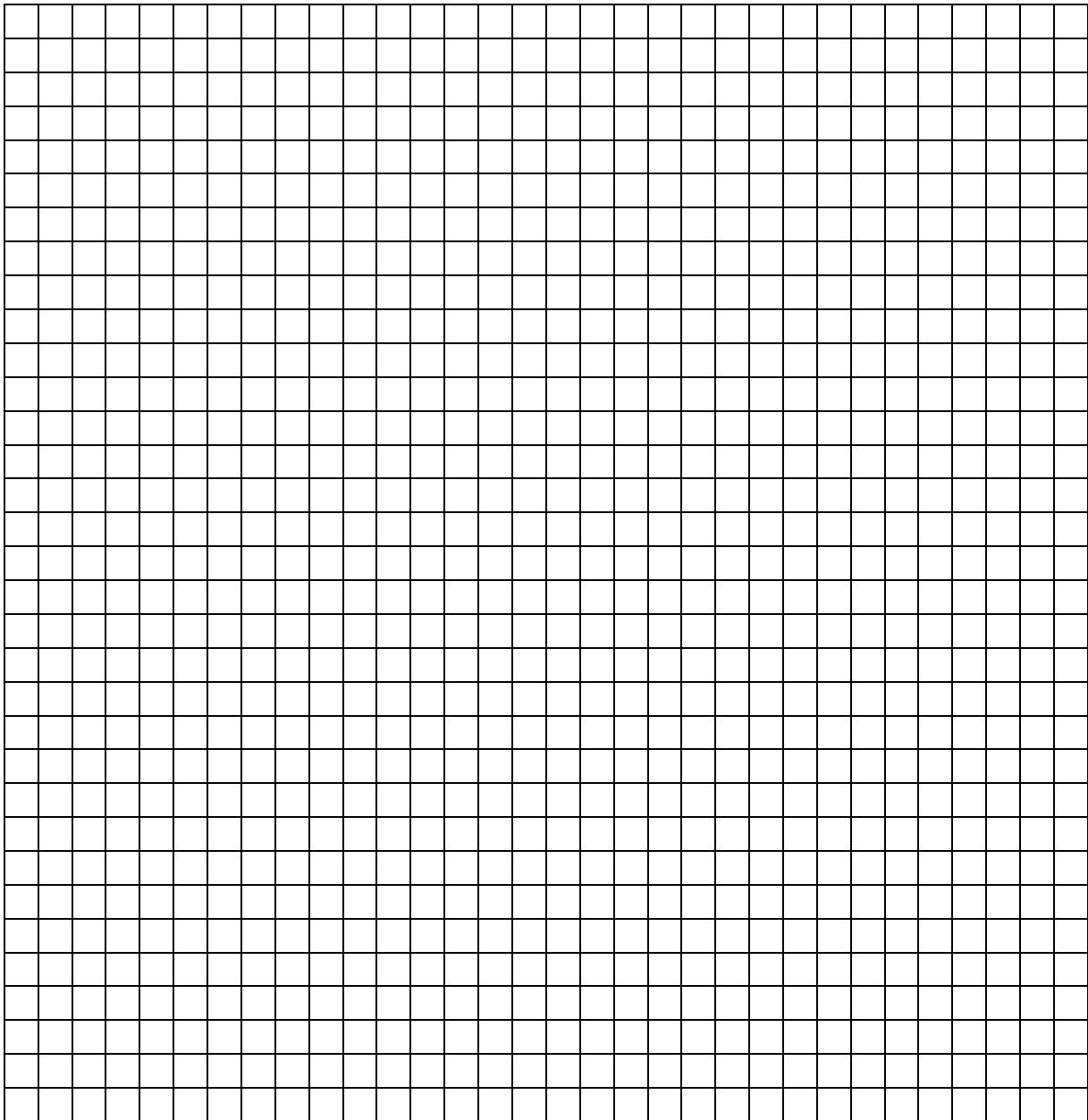
(ii) $f(-5)$

6(b) Draw the graph of the function

$$f: x \rightarrow 1 + 4x - x^2$$

in the domain $-1 \leq x \leq 5$, where $x \in \mathbf{R}$.





- 6(c) (i)** Draw the axis of symmetry of the graph drawn in **6 (b)** above.



Work to be shown on the graph.

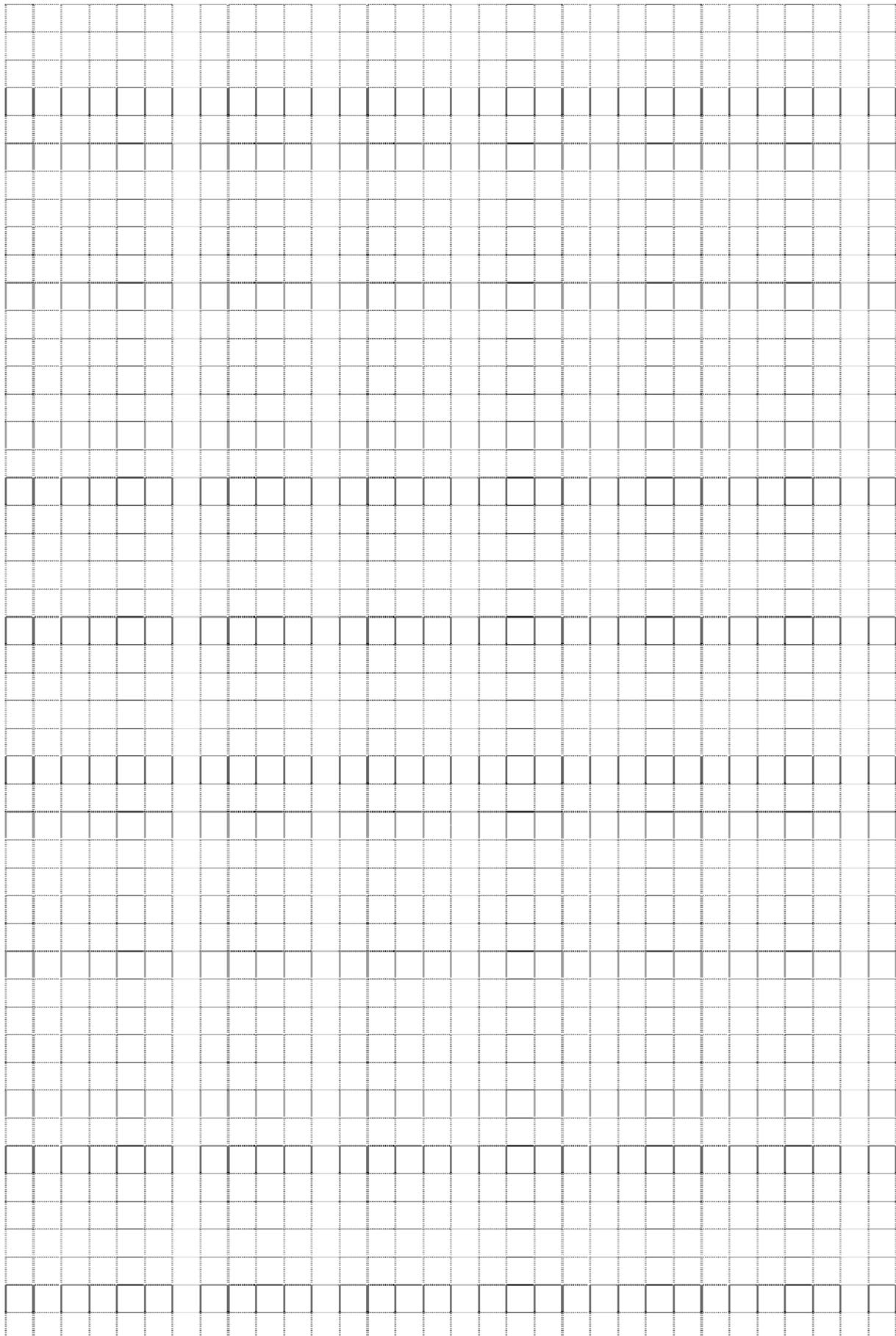
- (ii)** Use the graph drawn in 6 (b) to estimate the value of $f(x)$ when $x = 3.5$.



Work to be shown on the graph and answer to be written here.

Space for extra work

Space for extra work



Space for extra work