

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:

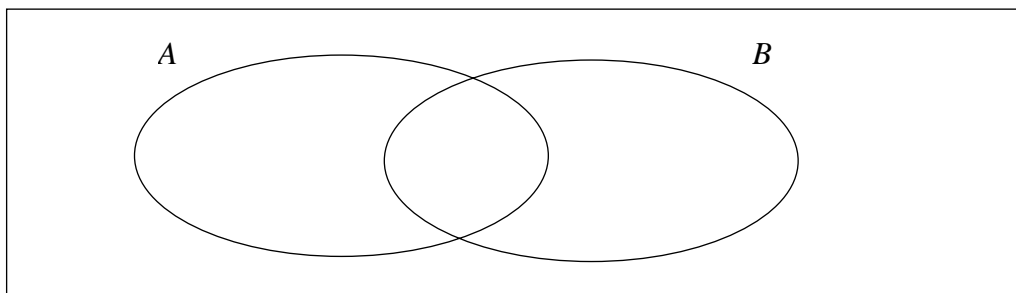
For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

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:

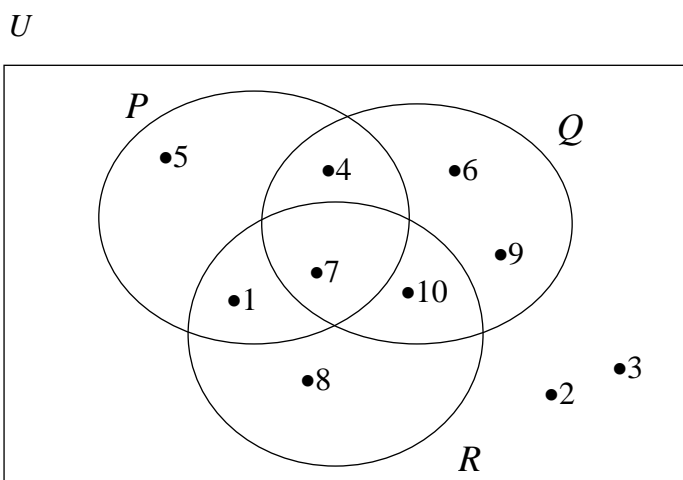


1(b) U is the universal set.

$P = \{1, 4, 5, 7\}$

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

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



(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 $\#R$.

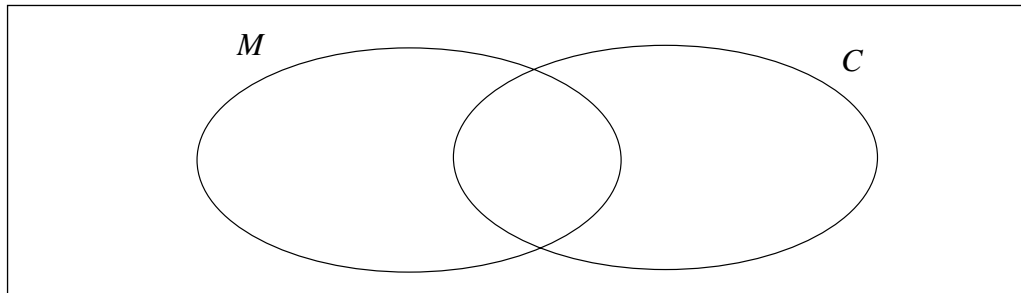


1(c)

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 €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 $\frac{4 \cdot 368 + 10 \cdot 92}{3 \cdot 12}$.

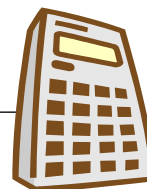


$\frac{4 \cdot 368 + 10 \cdot 92}{3 \cdot 12}$ is approximately equal to:

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

- (iii)** Using a calculator, or otherwise, find the exact value of $\frac{4 \cdot 368 + 10 \cdot 92}{3 \cdot 12}$.

- 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) $ab - 3$

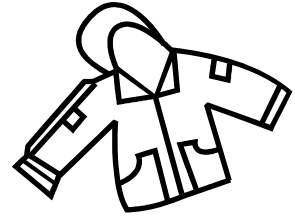
- 4(b) (i)** Solve the equation $2(x - 3) = x + 1$.



- (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 € x be the cost of a jumper and let € y 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 =

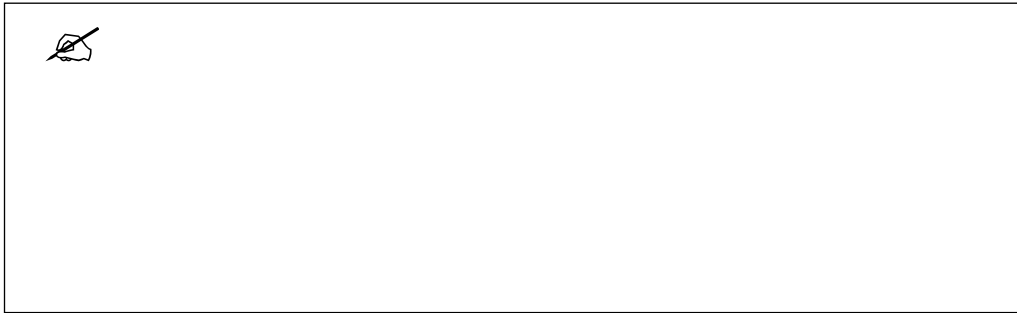
Cost of a shirt =

- (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 $x^2 - 5x - 14 = 0$.




A large empty rectangular box for writing the solution to part (i).

- (ii) Express $\frac{3x+2}{4} - \frac{x+4}{5}$ as a single fraction.
Give your answer in its simplest form.



A large empty rectangular box for writing the solution to part (ii).

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



A large empty rectangular box for writing the verification for part (iii).

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



(i) $f(4)$



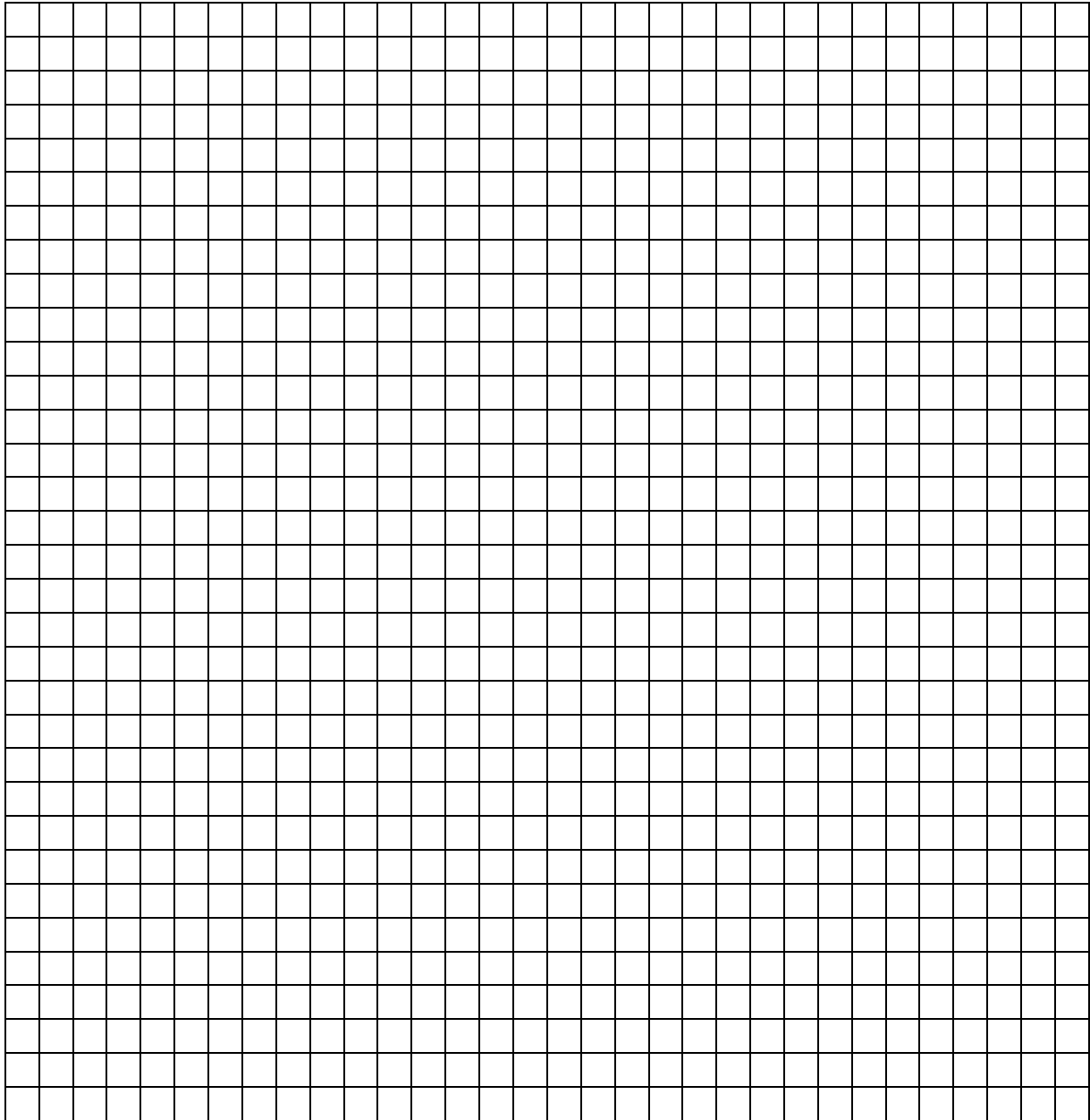
(ii) $f(-5)$

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.

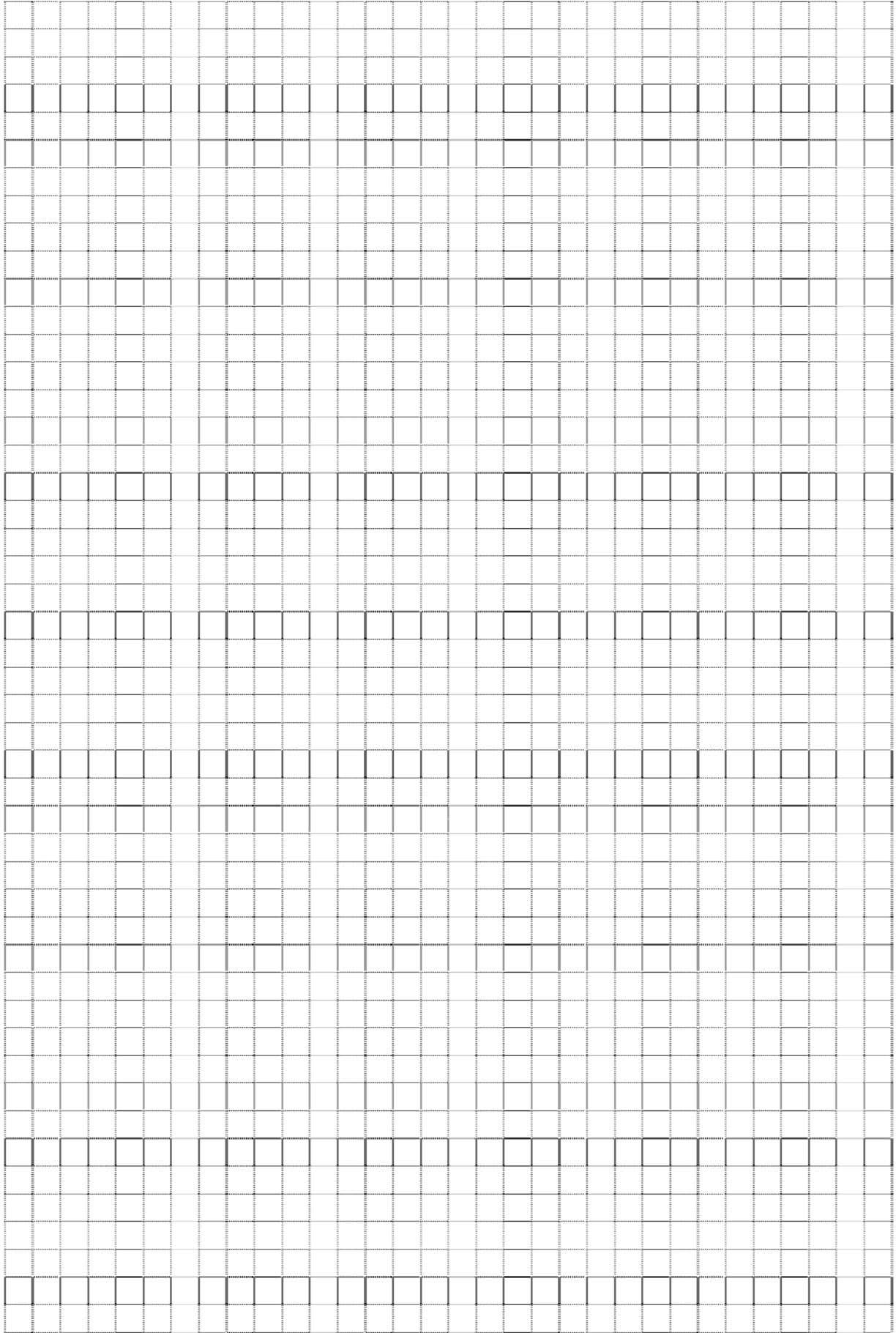
 Work to be shown on the graph.

(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