FOR THE EXAMINER

EXAM. NUMBER:

Total Marks:

Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2003

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:

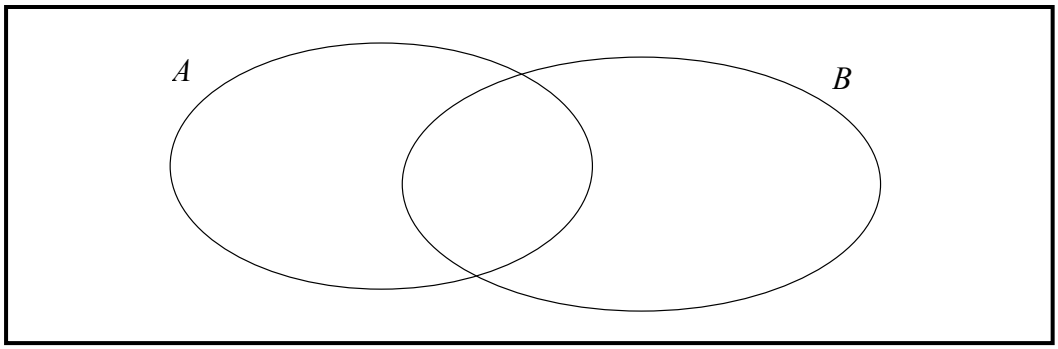
For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. **(a)** $A = \{1, 2, 3, 4, 5\}$ $B = \{2, 4, 6, 8\}$

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

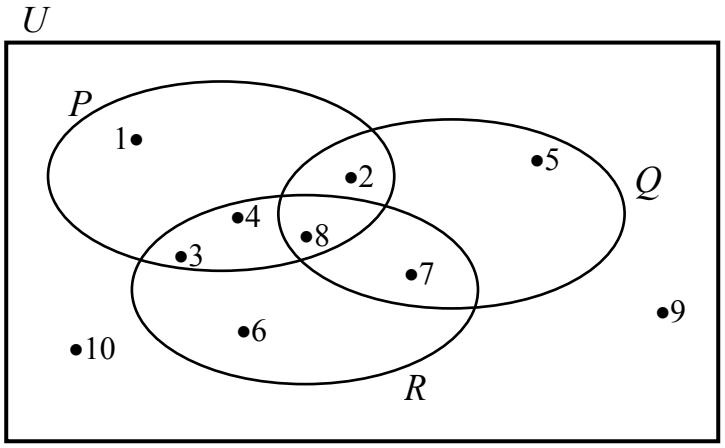


1(b) U is the universal set.

$P = \{1, 2, 3, 4, 8\}$

$Q = \{2, 5, 7, 8\}$

$R = \{3, 4, 6, 7, 8\}$



List the elements of:

(i) $P \cap Q$

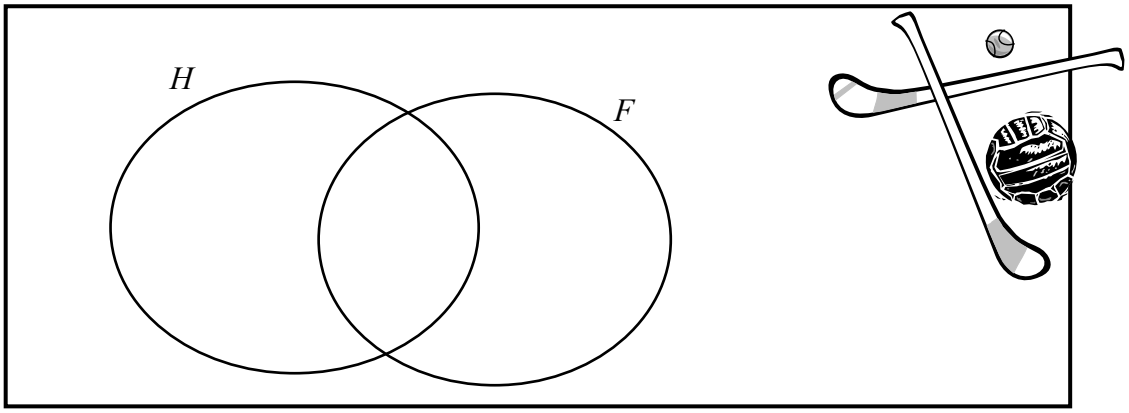
(ii) $R \setminus Q$

(iii) Q'

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

1(c) There are 33 students in a class. 11 play hurling (H) and 23 play football (F). 4 play both sports.

Using the Venn diagram below, or otherwise, answer the following questions:



(i) How many play hurling but not football?

(ii) How many play football but not hurling?

(iii) How many play neither football nor hurling?

(iv) How many play exactly one of the two sports?

2. **(a)** €2400 is shared between John, Mary and Anne. John gets $\frac{1}{2}$ of the money. Mary gets $\frac{1}{3}$ of the money. How much does Anne get?

2(b) **(i)** 1 euro = 120 Japanese yen. Change 3000 yen to euro.

(ii) Show how to estimate the value of $\frac{5 \cdot 89 \times 12 \cdot 42}{8 \cdot 74}$.

$\frac{5 \cdot 89 \times 12 \cdot 42}{8 \cdot 74}$ is approximately equal to:

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

(iii) Using a calculator, or otherwise, find the exact value of $\frac{5 \cdot 89 \times 12 \cdot 42}{8 \cdot 74}$.

2(c) Using a calculator, or otherwise, find the exact value of:

(i) $(6 \cdot 54)^2$

(ii) $\sqrt{94 \cdot 09}$

(iii) Hence, evaluate $(6 \cdot 54)^2 \times \sqrt{94 \cdot 09} - \frac{1}{3 \cdot 76}$ and give your answer correct to two decimal places.

3. **(a)** A shopkeeper bought a table for €120 and sold it for €162.
Calculate the profit as a percentage of the cost price.

Profit:

Percentage of cost price:

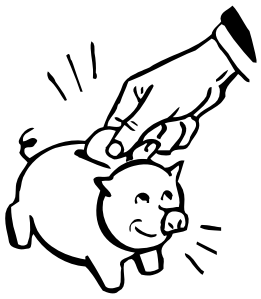
3(b) **(i)** Carla's gross pay is €24 000. Her tax credit is €2500. She pays income tax at the rate of 22%. What is her take-home pay?

Gross Pay	€24 000
Tax @ 22%	
Tax Credit	€2500
Tax Due	
Take-home Pay	

(ii) The train fare from Cork to Dublin is €44·40 for an adult and €19·00 for a child.

How much does it cost one adult and two children to travel from Cork to Dublin?

3(c) **(i)** €4000 is invested at 3% per annum.
What is the amount of the investment at the end of one year?



(ii) €1000 is added to this amount at the beginning of the second year.

The interest rate for the second year is $2 \cdot 5\,\%$ per annum.

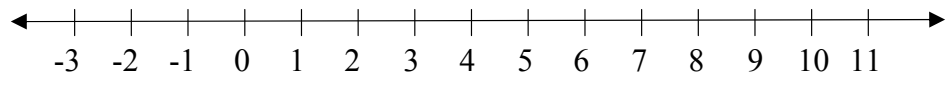
What is the amount of the investment at the end of that year?

4. **(a)** If $x = 3$, find the value of $x^2 - 2x + 5$.

4(b) **(i)** Multiply $(2x + 1)$ by $(3x - 5)$ and write your answer in its simplest form.

(ii) Graph on the number line the solution set of

$$5x - 1 \leq 14, x \in \mathbf{N}.$$



4(c) **(i)** Write $\frac{x+2}{3} - \frac{x-3}{5}$ as a single fraction and give your answer in its simplest form.

$\frac{x+2}{3} - \frac{x-3}{5}$

$=$

(ii) Solve for x and for y:

$$2x - 3y = 9$$
$$5x + 2y = 13$$

5. **(a)** Solve the equation $3(x - 1) = 12$.

5(b) Factorise:

(i) $2xy - 4xw$

(ii) $ab - 2ac + 3b - 6c$

(iii) $x^2 + 2x - 8$

(iv) $36 - y^2$

5(c) x is a number. A second number is 5 greater than x.

(i) Write down the second number in terms of x.

(ii) Twice the first number added to three times the second number is equal to 35. Write down an equation in x to represent this information.

(iii) Solve your equation for x and state what the two numbers are.

First number =

Second number =

(iv) Verify your result.

6. **(a)** $f(x) = 3x - 5$. Find:

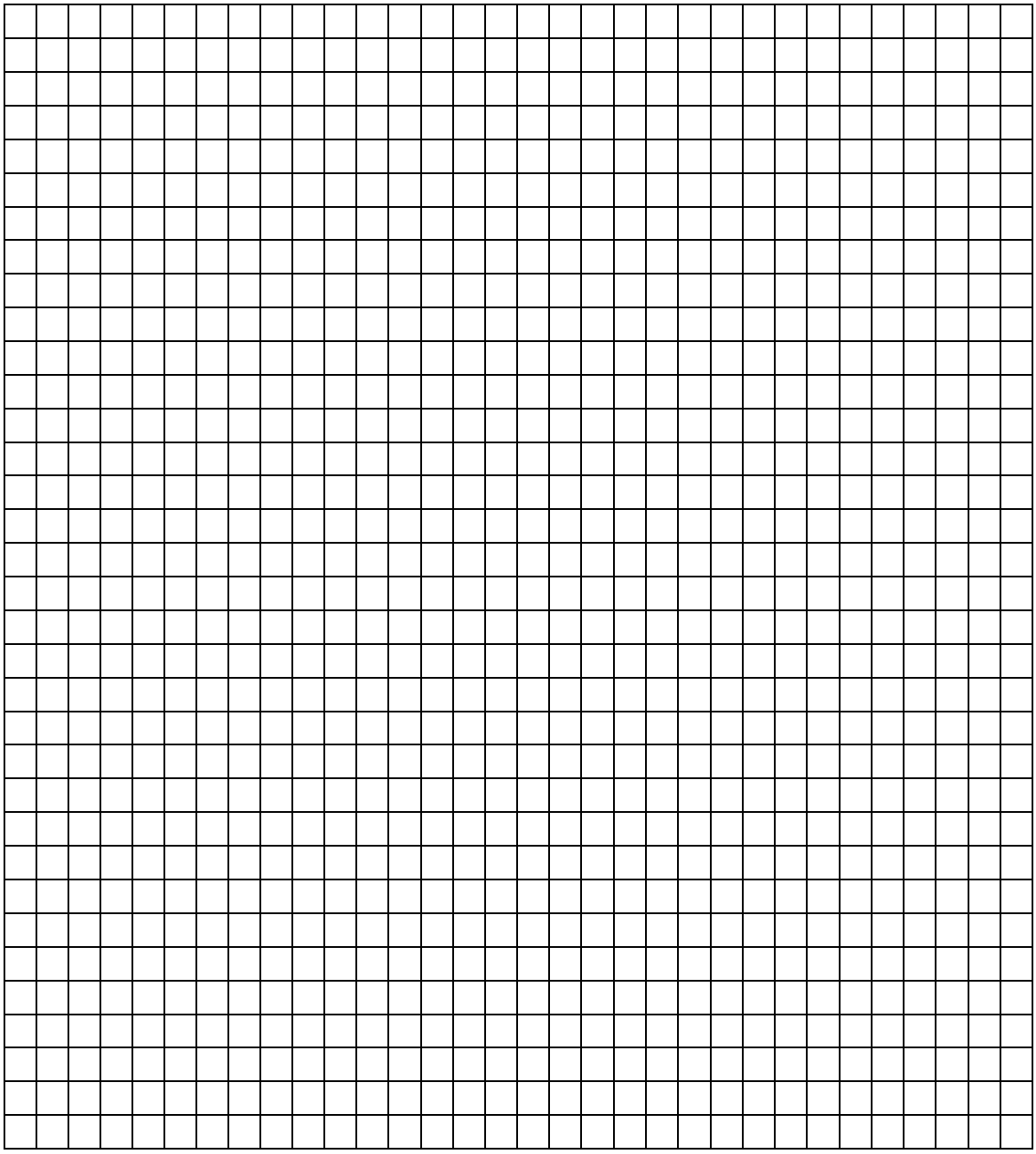
(i) $f(2)$

(ii) $f(-1)$

6(b) Draw the graph of the function

$$g : x \to x^2 - 2x - 2$$

in the domain $-1 \leq x \leq 3$, where $x \in \mathbf{R}$.



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

(ii) Use the graph to estimate the value of $x^2 - 2x - 2$ when $x = 1{\cdot}5$.

Space for extra work

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Space for extra work