

FOR THE EXAMINER

EXAM. NUMBER:

Total
Marks:


Coimisiún na Scrúduithe Stáit State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2009

MATHEMATICS - ORDINARY LEVEL - PAPER 1 (300 marks)

THURSDAY, 4 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:

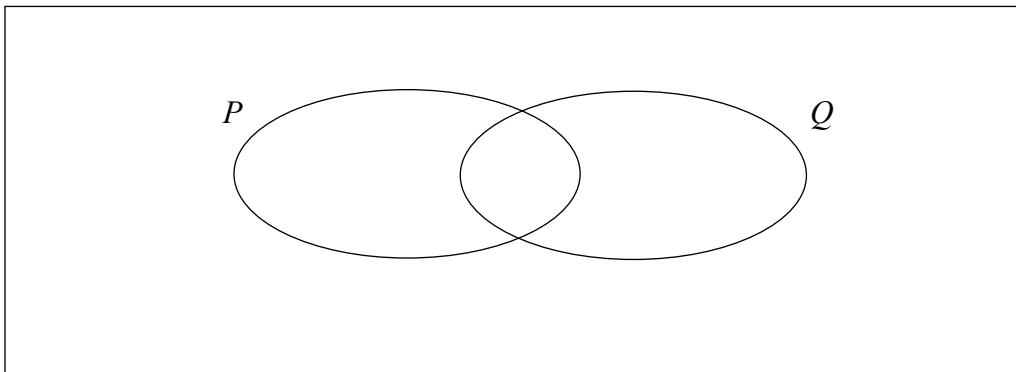
For Superintendent/Examiner use only:

Centre Stamp

Question	Mark
1	
2	
3	
4	
5	
6	
Total	
Grade	

1. (a) $P = \{w, x, y, z\}$ $Q = \{v, w, x\}$

Fill the elements of P and Q into the following diagram.

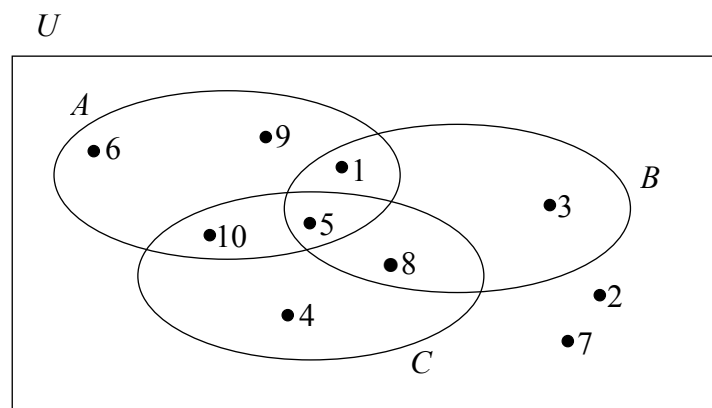


1(b) U is the universal set.

$A = \{1, 5, 6, 9, 10\}$

$B = \{1, 3, 5, 8\}$

$C = \{4, 5, 8, 10\}$



(i) List the elements of $B \cup C$.

(ii) List the elements of A' , the complement of the set A .

(iii) List the elements of $(B \cap C) \setminus A$.

(iv) Write down $\#B$.

1(c) In a survey, a group of students were asked if they were studying French or German at school.

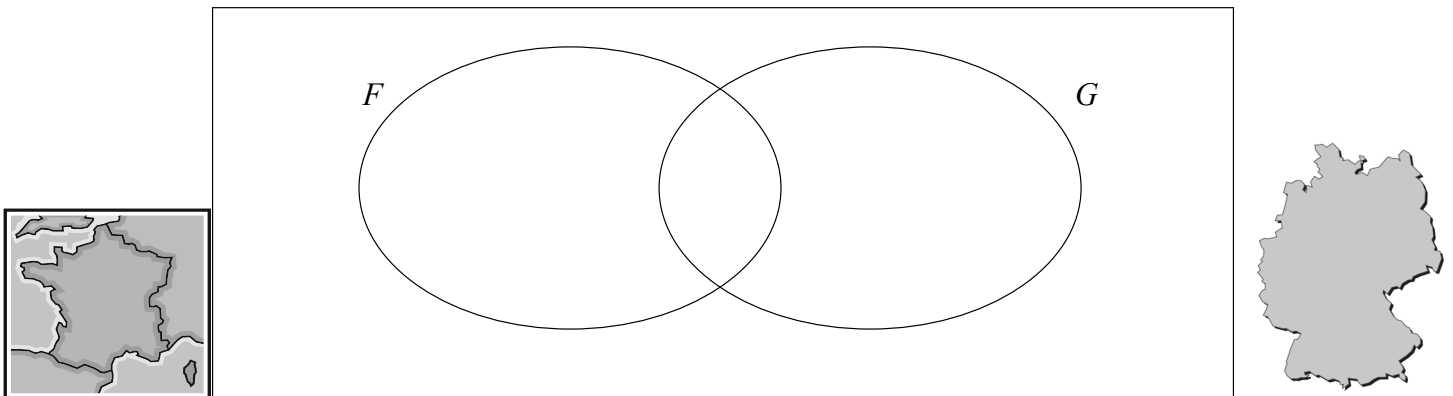
80 of these students said they were studying French (F).

24 of these students said they were studying German (G).

15 of these students said they were studying both French and German.

11 of these students said they were studying neither of the two languages.


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



(ii) How many students were in the group?

(iii) How many students did not study German?

2. (a) 9 metres of cloth cost €13.95. Find the cost of 20 metres of the same cloth.




- 2(b) (i) Simplify $\frac{a^9 \times a^3}{a^6 \times a^2}$, giving your answer in the form a^n , where $n \in \mathbf{N}$.



$$\frac{a^9 \times a^3}{a^6 \times a^2} =$$

- (ii) By rounding each of these numbers to the nearest whole number, estimate the value of $\frac{18 \cdot 207}{3 \cdot 7 + 2 \cdot 08}$.



$\frac{18 \cdot 207}{3 \cdot 7 + 2 \cdot 08}$ is approximately equal to:

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

- (iii) Using a calculator, or otherwise, find the exact value of $\frac{18 \cdot 207}{3 \cdot 7 + 2 \cdot 08}$.



- 2(c)** (i) Using a calculator, or otherwise, write $\frac{1}{8}$ and $\frac{13}{80}$ as decimals.

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

$$\frac{1}{8}, \frac{13}{80}, 0.1525.$$

$\frac{1}{8} =$	$\frac{13}{80} =$	
_____ ,	_____ ,	_____ .


- (ii) Using a calculator, or otherwise, find the exact value of $(3 \cdot 61)^{\frac{1}{2}}$.

$(3 \cdot 61)^{\frac{1}{2}} =$

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

$$\sqrt{94 \cdot 09} \times (2 \cdot 75)^2 - \frac{1}{0 \cdot 3125}.$$


Give your answer correct to two decimal places.



- 3. (a)** Aideen owns 6000 shares in a certain company.
She sells two-thirds of her shares.
How many shares does she now own in the company?




- 3(b) (i)** Brian's gross annual pay is €26 000. His annual tax credit is €2800. He pays income tax at the rate of 20%. What is his annual take-home pay?



Gross Pay	€26 000
Tax @ 20%	
Tax Credit	€2800
Tax Due	
Take-home Pay	

- (ii) A dealer buys a car for €17 500. He sells the car for €23 800.
Calculate his profit as a percentage of the cost price.








- 3(c) (i) €20 000 is invested at 5·2% per annum.
What is the amount of the investment at the end of one year?



- (ii) €5000 is withdrawn from this amount at the beginning of the second year.
The interest rate for the second year is 6·25% per annum.
What is the amount of the investment at the end of that year?



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

	(i) $4a + 1$
	(ii) $a^2 - 3a + 6$

- 4(b) (i) Solve the equation $5x - 10 = 3(x + 2)$.



- (ii) Multiply $(x - 3)$ by $(2x + 1)$.
Write your answer in its simplest form.




5. (a) Write in its simplest form $3(x + 2) + 4(3x + 1)$.



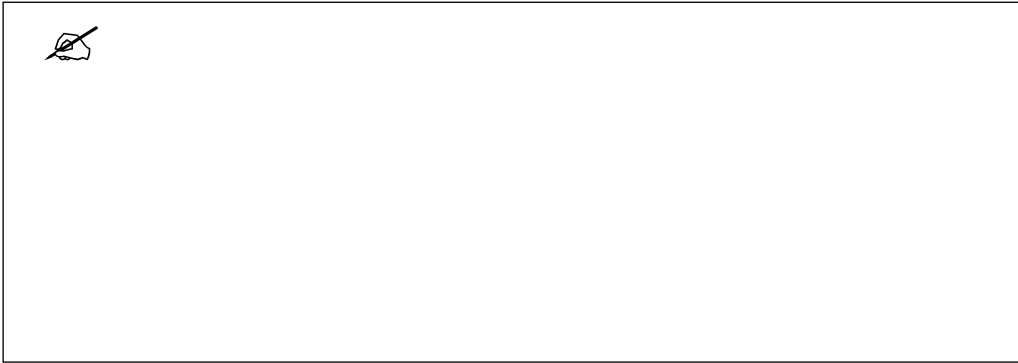
5(b) Factorise

(i) $5cd + 7d$

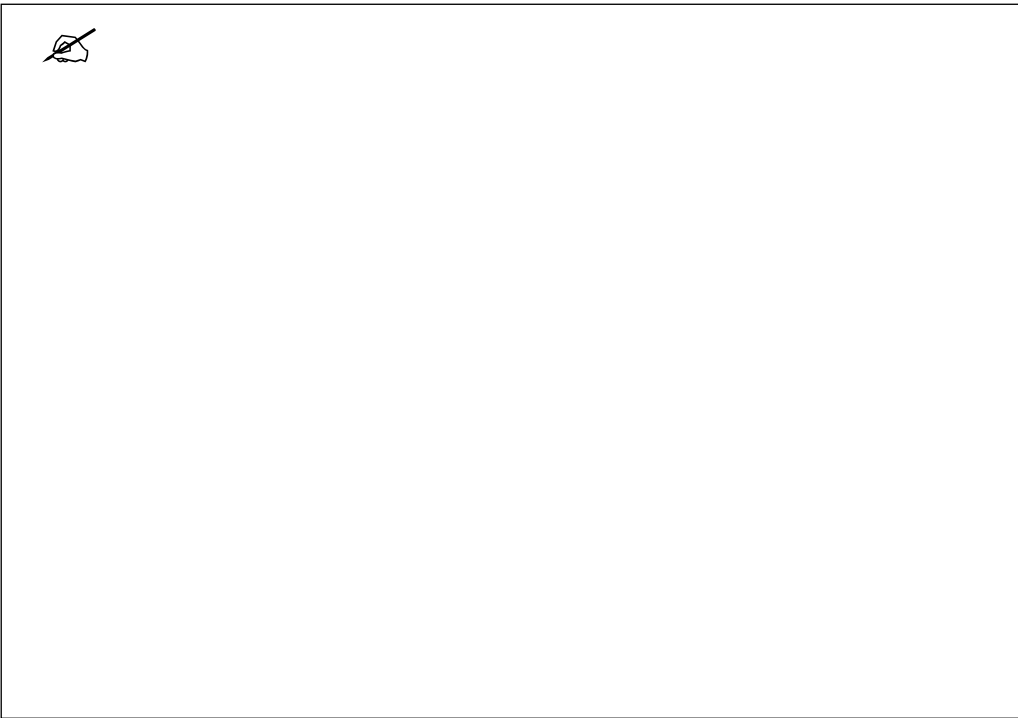
 (ii) $ax + 3ay + 4x + 12y$

(iii) $x^2 - 49$

- 5(c)** (i) Express $\frac{5x+1}{3} - \frac{x+6}{5}$ as a single fraction.
Give your answer in its simplest form.




- (ii) Verify your answer to part (i) by substituting $x = 4$ into $\frac{5x+1}{3} - \frac{x+6}{5}$
and into your answer to part (i).



- (iii) Solve the equation $x^2 - 4x - 21 = 0$.




6. (a) $f(x) = 4x - 5$. Find:

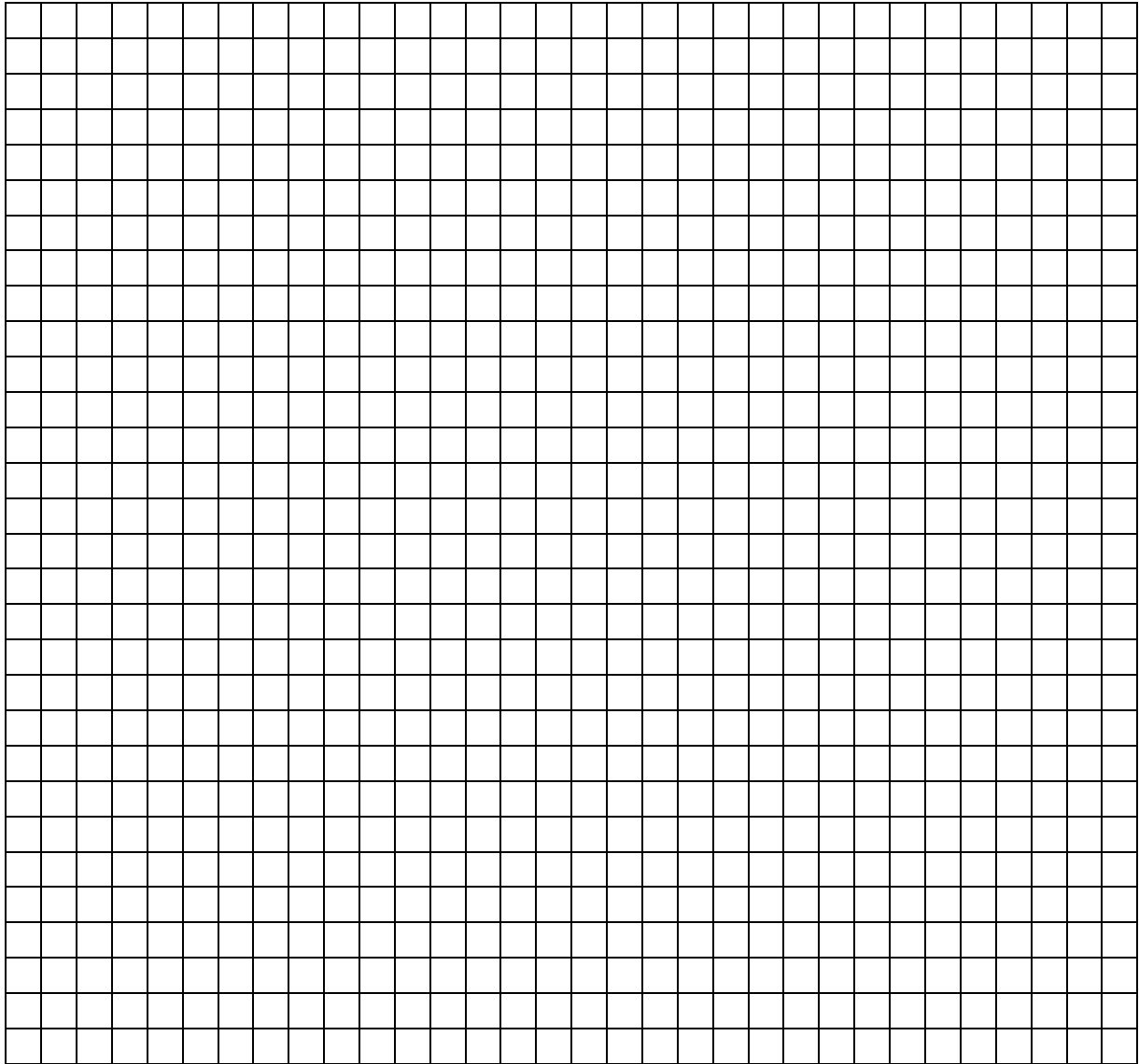
	(i) $f(3)$
	(ii) $f(-2)$

6(b) Draw the graph of the function

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

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





6(c) Use the graph drawn in **6(b)** to estimate:

(i) the values of x for which $x^2 - 2x - 1 = 0$



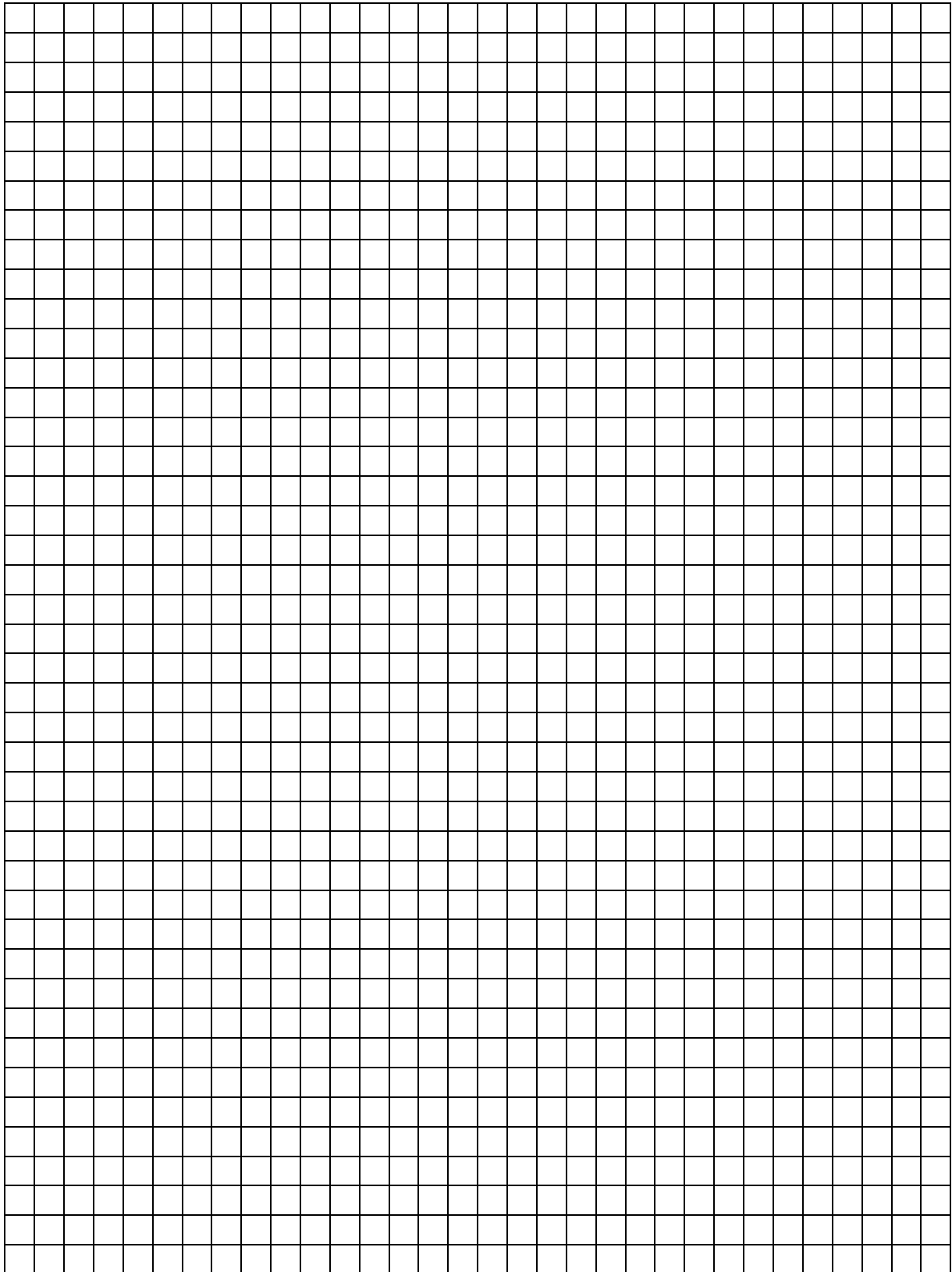
Work to be shown on the graph and answer to be written here.

(ii) the value of $f(x)$ when $x = 1.5$.



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