AN ROINN OIDEACHAIS AGUS EOLAÍOCHTA

JUNIOR CERTIFICATE EXAMINATION, 2002

MATHEMATICS - ORDINARY LEVEL

THURSDAY, 6 JUNE - MORNING, 9.30 to 12.00

PAPER 1 (300 marks)

Attempt **QUESTION 1** (100 marks) and **FOUR** other questions (50 marks each).

WARNING: Marks may be lost if necessary work is not clearly shown.
Mathematics Tables may be obtained from the Superintendent.

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1. **(i)** Mary pays for two tickets with €50. The cost of each ticket is €19.95.
How much change does she get?

(ii) A film starts at 19:40. The film ends at 22:15. How long is the film?
Give your answer in hours and minutes.

(iii) An item is bought for €25. It is sold at a profit of 22%. Find the selling price.

(iv) Solve for x:

$$x^2 - 9x + 14 = 0.$$

(v) Calculate the mean of the following numbers:

$$3,\ 4,\ 4,\ 1,\ 2,\ 4,\ 3.$$

(vi) When $a = 5$ and $b = 4$, find the value of

$$a^2 - 3\sqrt{b}.$$

(vii) Express p in terms of r and t when $5p - 3r = t$.

(viii) Find the value of $f(-3)$ when $f(x) = 2 - 5x$.

(ix) Show on the number line all the values of x for which

$$4x - 1 \leq 2x + 5, \ x \in \mathbf{N}.$$

(x) Write each of the following two numbers in scientific notation:

45 000

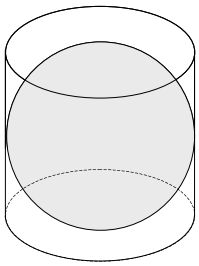
0.0313.

2. **(a)** Paul invests €3000 at 4% compound interest per annum.

(i) Calculate the amount of the investment at the end of one year.

(ii) At the beginning of the second year, he invests another €1000.
What is the total amount of the investment at the end of the second year?

(b) A sphere fits exactly inside an empty cylinder. The radius of the sphere is 3 cm.



(i) Find the volume of the sphere.
Take $\pi = 3.1$.

(ii) Write down the height of the cylinder.

(iii) Find the volume of the cylinder.
Take $\pi = 3.1$.

(iv) Find the volume of the empty space in the cylinder.

3. **(a)** Solve for x:

$$5(x-2) = 20.$$

(b) Factorise:

(i) $ax - ay - 2bx + 2by$

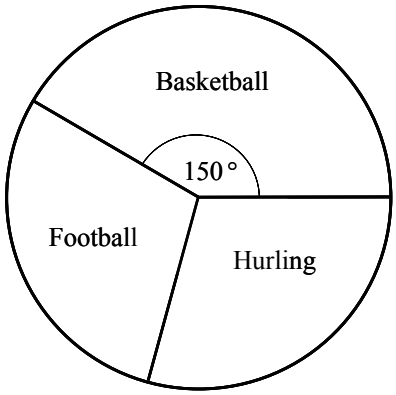
(ii) $5x^2 + 17x + 6$.

(c) **(i)** Multiply $x^2 - 3x + 1$ by $3x - 2$.

(ii) Solve the simultaneous equations:

$$2x - 3y = 1$$
$$3x + y = 18.$$

4. **(a)** The pie chart shows the favourite sport of 24 students.



Basketball is the favourite sport of how many students?

(b) The following list gives the number of bedrooms in each of 20 homes:

3	1	4	2	5
4	5	2	3	4
2	1	3	2	3
5	2	4	3	2

(i) Copy and complete the following frequency table:

Number of bedrooms per home	1	2	3	4	5
Number of homes					

(ii) Using graph paper, draw a bar chart to show this information.

(iii) How many homes have 3 or more bedrooms?

(iv) Calculate the mean number of bedrooms per home.

5. Using graph paper, draw the graph of the function

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

in the domain $-2 \leq x \leq 3, x \in \mathbf{R}$.

(i) Use your graph to find the value of $f(2.5)$.

(ii) Use your graph to find the values of x for which $f(x) = 0$.

(iii) Draw the axis of symmetry of the graph of $f(x)$.

6. **(a)** Write the following three numbers in order, starting with the smallest:

0.15 0.07 0.3

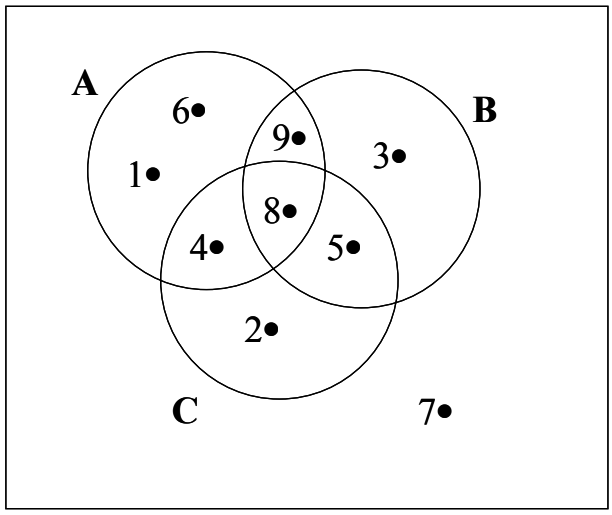
(b) List the elements in each of the following sets:

(i) A

(ii) A $\cap$ B

(iii) B′

(iv) (B $\cup$ C) \ A.



(c) Solve for x:

$$\frac{1}{x+4} - \frac{1}{x} = 1.$$