FOR THE EXAMINER

EXAM. NUMBER:

Total Marks:

Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION, 2012

MATHEMATICS – ORDINARY LEVEL – PAPER 1 (300 marks)

FRIDAY, 8 JUNE – AFTERNOON, 2.00 to 4.00

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:

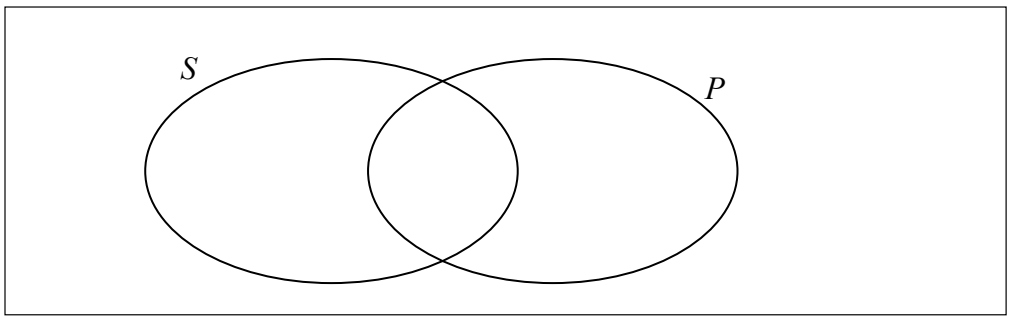
For Superintendent/Examiner use only:

Centre Stamp

Question	Mark	Adv. Exam.
1		
2		
3		
4		
5		
6		
Total		
Grade		

1. **(a)** $S = \{p, r, s, t, u\}$ $P = \{p, t, w\}$

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

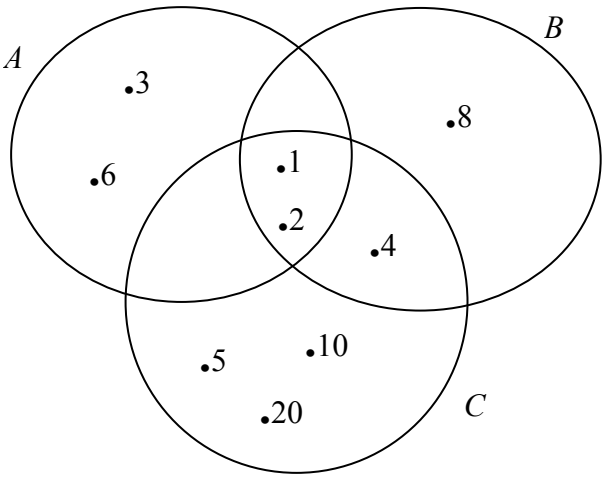


(b)

A = {1, 2, 3, 6} is the set of the divisors of 6.

B = {1, 2, 4, 8} is the set of the divisors of 8.

C = {1, 2, 4, 5, 10, 20} is the set of the divisors of 20.



List the elements of:

(i) $B \cup C$

(ii) $A \setminus (B \cup C)$

(iii) $B \cap C$

(iv) the common divisors of 6, 8 and 20.

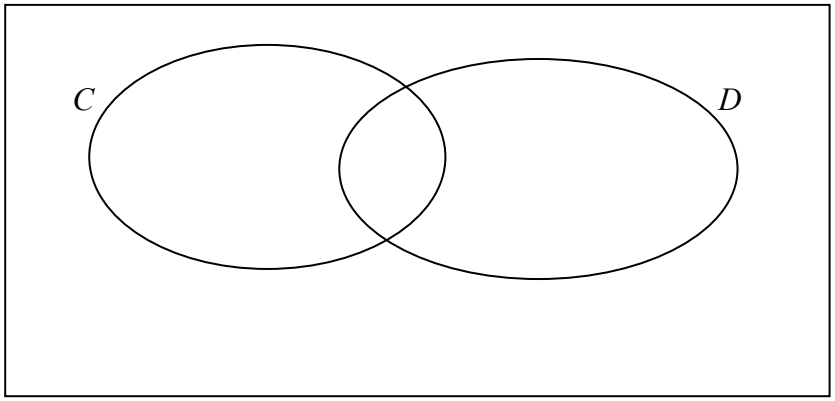
(c) In a survey, 60 households were asked if they had a cat (C) or a dog (D).

20 said they had a cat.

25 said they had a dog.

12 said they had both a cat and a dog.

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



(ii) How many households had only a cat or a dog?

(iii) What percentage of households had neither a cat nor a dog?

2. **(a)** 3 packets of soup cost €3·51.

What would be the cost of 5 packets of the same soup?

(b) **(i)** By rounding each of these numbers to the nearest whole number, estimate the value of $\dfrac{24 \cdot 231}{15 \cdot 6 - 3 \cdot 78}$.

$\dfrac{24 \cdot 231}{15 \cdot 6 - 3 \cdot 78}$ is approximately equal to:

$$\frac{\square}{\square - \square} = \frac{\square}{\square} = \square$$

(ii) Using a calculator, or otherwise, find the exact value of $\dfrac{24 \cdot 231}{15 \cdot 6 - 3 \cdot 78}$.

(iii) Find the difference between the exact value in **(ii)** and the estimated value in **(i)**.

(c) **(i)** Using a calculator, or otherwise, multiply 450 000 × 7·8.

Then express your answer in the form $a \times 10^n$, where $1 \leq a < 10$ and $n \in \mathbb{N}$.

(ii) Write $\frac{a^7}{a^3}$ in the form a^n, where $n \in \mathbb{N}$.

Hence or otherwise evaluate $\frac{11^7}{11^3}$.

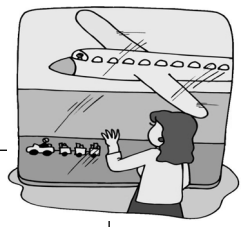
$\frac{a^7}{a^3} =$

$\frac{11^7}{11^3} =$

(iii) It takes three workers four days to build a wall.

How long would it take two workers to build the same wall?

3. **(a)** The cost of a holiday came to €2400.
This was made up of the cost of travel, accommodation and spending money.
$\frac{3}{5}$ of the cost was for travel and accommodation.



How much spending money was there?

(b) **(i)** Amanda borrows €1000.
She agrees to pay it back at €90 per month for a year.

How much interest will she pay?

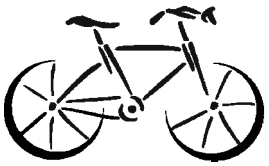
(ii) A computer is ordered online. It is advertised for €550 plus VAT at 23%.
There's a delivery charge of €7·50.

What is the total cost to be paid?

(c) **(i)** A work of art is priced at €6600. After VAT is added it costs €7491.

Calculate the amount of VAT and the rate of VAT.

(ii) Ronan was given a bicycle which was in need of repair.
For the repairs, he spent €60 on spare parts and €12 on paint.
When it was repaired he sold it for €95.



Calculate the profit he made as a percentage of his costs.
Give the percentage to the nearest whole number.

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

(i) $2a + b$

(ii) $ab - 3$

(b) $f(x) = 2x - 1$.

(i) Draw a graph of $f(x)$ in the domain $-1 \leq x \leq 1,\ x \in \mathbb{R}$.

(ii) Use your graph to estimate the value of x when $f(x) = 0$.

Answer to be written here:

(c) **(i)** Conor spent € y on a book.
He then spent € $(4y + 6)$ on a football jersey.
In total, he spent €61.

Write an equation in y to represent this information.

(ii) Solve your equation from **(i)** to find the value of y.

(iii) Solve the equation: $x^2 - 5x - 14 = 0$.

5. **(a)** Simplify fully $2(x + 1) + 5(2x + 3)$.

(b) **(i)** Factorise $5xy + 3y$.

(ii) Factorise $ax + 2ay + 3x + 6y$.

(iii) Solve for x and y: $2x + 5y = 19$
$3x - y = 3$

$x =$ $y =$

(c) **(i)** Write as a single fraction

$$\frac{x}{2}+\frac{3x}{8}.$$

(ii) Solve the equation $3(2x-7)-5(x-1)=0$.

Verify your answer.

Solve:

Verify:

6. **(a)** $P = \{(1, a),\ (2, a),\ (3, b),\ (4, c)\}$.

Write out the domain and range of P.

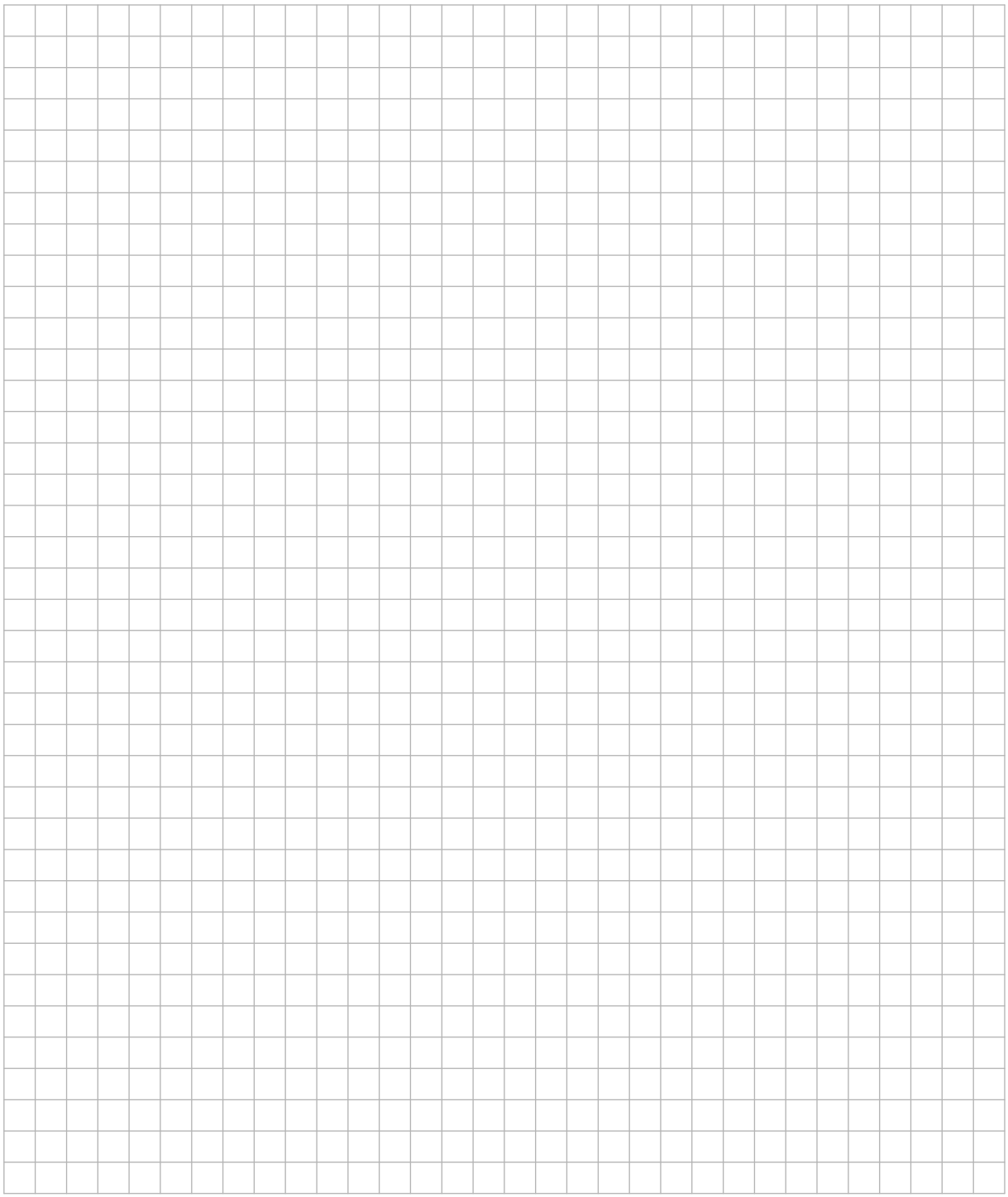
Domain =

Range =

(b) Draw the graph of the function

$$f : x \to 5 + 2x - x^2$$

in the domain $-2 \leq x \leq 4$, where $x \in \mathbb{R}$.



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

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

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

Space for extra work

Space for extra work

Space for extra work