

AN ROINN OIDEACHAIS  
INTERMEDIATE CERTIFICATE EXAMINATION, 1969

M. 45

MATHEMATICS - LOWER COURSE - PAPER II  
MONDAY, 16th JUNE - Morning, 9.30 to 12

Six questions to be answered.  
All questions carry equal marks.  
Mathematical tables may be obtained from the Superintendent.

N is the set of natural numbers  
Z is the set of integers  
Q is the set of rational numbers.

1. Assuming that 1 kilogramme = 2.2 pounds, express, correct to the nearest whole number, 100 pounds in kilogrammes.  
A merchant bought cement at the rate of £0.8 for every 100 kilogrammes. He sold the cement in 100 pound bags at the rate of £0.45 per bag. Find to the nearest whole number his percentage profit.

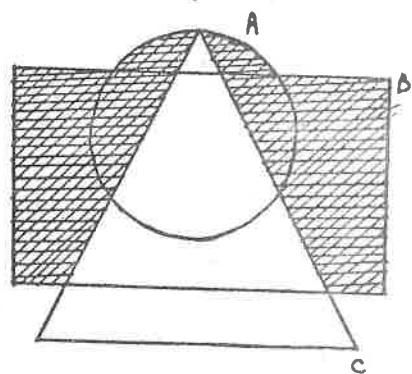
2. In how many years would £475 amount to £579.5 if invested at  $5\frac{1}{2}\%$  per annum simple interest?  
If this amount of £579.5 were divided between three people in the ratio 1 : 1 : 3, how much would each receive?

3. (a) In a given period 30 students read "Our Boys" and 12 students read "Young Citizen". If 9 students read both, how many read

- (i) "Our Boys" only?  
(ii) "Young Citizen" only?

(b) The disk, rectangle and triangle, as in diagram, represent the sets A, B, C, respectively. Which, if any, of the following is represented by the cross-shaded section?

- (i)  $(A \cap B) \cap (C \setminus B)$   
(ii)  $(A \setminus B) \cup (B \setminus C)$   
(iii)  $(A \cup B) \setminus C$



4. (a) Each of the following numbers is written in binary form. Evaluate (i) and (ii), giving your answers in binary form.

- (i)  $1,011,000 + 101,100 + 10,110$   
(ii)  $11,001 \times 110$

(b) There are 140 leaves of equal thickness in a book and the thickness of the book is 2.38 cm. Find the thickness of one leaf. Express your answer in the form  $a \cdot 10^n$  where  $1 \leq a < 10$  and  $n \in \mathbb{Z}$ .

5. (a) If  $A = \{-4, 3, -1, 2\}$ , write down the solution sets of

- (i)  $\{x \mid -x > 2, x \in A\}$   
(ii)  $\{x \mid x - 5 > -6, x \in A\}$

and graph each solution set on the number line.

(b) Graph on the number line the solution set of  $\{x \mid x - 5 \leq -1, x \in \mathbb{Z}\} \cap \{x \mid 4 - x < 3, x \in \mathbb{Z}\}$ .

6. (a) Find the factors of  $x^2 - 4x - 12$ .

(b) Find the solution set of  $\{x \mid 7 - 3x = 5(x - 3) + 2, x \in \mathbb{Q}\}$ .

7. (a) If  $v = u + ft$ , express  $t$  in terms of  $u$ ,  $v$  and  $f$ .

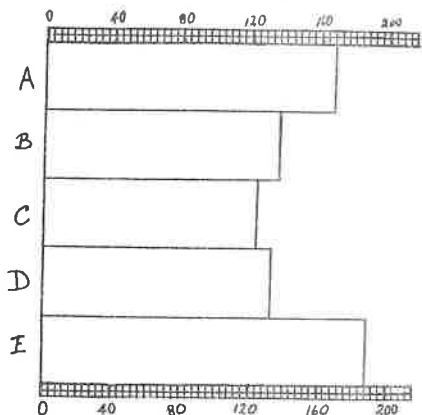
(b) Solve the simultaneous equations

$$\begin{aligned} x + 2y &= 7 \\ x &= 1 - y \end{aligned}$$

8. The bar-chart shows the number of times each of the five books A, B, C, D, E was borrowed from a library in a given period.

Use the bar-chart to answer each of the following:

- (i) Which book was most often borrowed?  
(ii) Which book was least often borrowed?  
(iii) If the library received 3 pence each time a book was borrowed, how much was received for the five books in the given period.



9. Find the missing components in the following set of couples (ordered pairs)  $\{(-2, -\frac{1}{2}), (-1, 0), (0, ?), (\frac{1}{2}, ?), (1, ?), (2, ?), (3, ?)\}$  given that each couple  $(x, y)$  satisfies the equation  $y = \frac{2}{x} + x - x^2$ .

Draw a graph of the couples.

Hence, or otherwise, solve the equations (i)  $x^2 - x - 2 = 0$ , (ii)  $x - x^2 = 0$ .

10. (a) The general term of a sequence is  $5n - 7$ . Write down the first five terms of the sequence. Which term of the sequence is 48?

(b) A student spent 72 pence in buying post-cards at 3 pence each and Christmas cards at 4 pence each.

If each post-card had been 1 penny dearer and each Christmas card had been 1 penny cheaper, the student would have spent 4 pence less. How many post-cards did the student buy?