

## INTERMEDIATE CERTIFICATE EXAMINATION, 1971

MATHEMATICS—LOWER COURSE—PAPER II  
(150 marks)

TUESDAY, 15th JUNE—MORNING, 9.30 to 12

Six questions to be answered.

All questions are of equal value.

Mathematical tables may be obtained from the Superintendent.

1. At an auction a builder paid £2,200 for an old house, and he then paid the auctioneer 5% of this price as a fee. He spent a further £1,090 in repairing the house.

Compute his total outlay.

If he sells the house for £4,000 compute his percentage gain to one place of decimals.

2. (a) What value has  $n$  in each of the following:

(i)  $n \times 1.4 = 3.5 \times 6.4$ ;

(ii)  $0.019 = 19 \times 10^n$  ;

(iii)  $34.8 \times 10^{-2} = n \times 10^{-1}$ .

- (b) How many labels each weighing 0.04 ounces will it take to fill 480 boxes if each box will contain 6 ounces of labels?

3.  $X$ ,  $Y$  and  $Z$  are sets. The shaded set is empty.

- (i) Write the name of the shaded set in terms of  $X$ ,  $Y$  and  $Z$ .

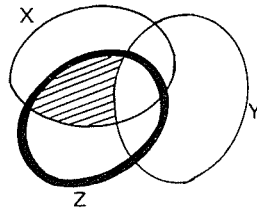
- (ii) Copy the diagram into your answer book and fill in four points  $p$ ,  $q$ ,  $x$  and  $y$  such that

(a)  $p \in X$ ,  $p \in Y$ ,  $p \in Z$ . (b)  $q \notin X$ ,  $q \notin Y$ ,  $q \notin Z$ .

(c)  $x \in Y \cap Z$ ,  $x \notin X \cap Z$ . (d)  $y \in Z'$ ,  $y \in Z \cup Y$ ,  $y \in X$ .

- (iii) say whether each of these is true or false:

(a)  $X \cap Y \subset Y$ ; (b)  $X \cap Y \subset Z$ ; (c)  $X \cap Z \subset Y$ .

[Note:  $Z'$  means the complement of  $Z$ .]

4. (i) Find the factors of

(a)  $x - y - a(y - x)$

(b)  $x^2 - 7x + 10$

- (ii) Solve for  $t$  :

$$(t - 1) = 1 - 3(1 - t)$$

- (iii) Dividing a number by 5 gives the same result as adding 24 to the number. What is the number?

5. (a) Solve the inequality

$$5x - 1 \leq 3x + 7$$

where  $x$  is a natural number.

- (b) Show that  $x = \frac{9}{4}$  is a solution of the equation

$$4x^2 - 10\sqrt{x} = x + 3.$$

- (c) Evaluate to one place of decimals:

$$\sqrt{18}; \sqrt{200}; \sqrt{108}.$$

You may use 1.41 as an approximation for  $\sqrt{2}$  and 1.73 as an approximation for  $\sqrt{3}$  if you wish.

6. Tom and John were each earning £100 per month. During the year each of them got two increases in wages as follows:

In January Tom got a rise of 5% and in July he got a further rise of 10% of his new salary.

In January John got a rise of 10% and in July he got a further rise of 5% of his new salary.

- (a) What was the monthly salary of each man in August?

- (b) Which of them earned the more money during the year?  
How much more?

7. (i) Solve for  $a$  and  $b$ :

$$6b - 2a = 5$$

$$b - a = 3b$$

- (ii) Graph  $y = x^2 - 2x$  for  $-2 \leq x \leq 3$ .

Use your graph to solve the equation  $x^2 - 2x = 4$ .

8. At an election 250 people were entitled to vote in a certain polling station. Voting began at 8 a.m. and ended at 9 p.m. Each column in the following table shows the number of persons who had voted at the station between the time voting began and the time entered in the column.

<i>Time</i>	9 a.m.	11 a.m.	1 p.m.	3 p.m.	5 p.m.	7 p.m.	9 p.m.
Number of persons	2	7	19	38	53	105	180

- (i) How many people did not vote at all?  
 (ii) How many people voted before 1 p.m.?  
 (iii) How many people voted between 1 p.m. and 5 p.m.?  
 (iv) Which time of day seems to be the most suitable voting time for those who voted?  
 (v) What percentage of those people who were entitled to vote in that station had actually voted?
9. The ratio of the height of a parallelogram to the length of its base is 3 to 7. If the base is 28 inches long compute  
 (i) the height of the parallelogram  
 (ii) the area of the parallelogram.  
 If the centre of the parallelogram shape is 10 inches from the nearest vertex of the parallelogram how far is it from the farthest vertex? (Give your answer to the nearest inch.)
10. (a) Write down the  $n$ th term of the arithmetical sequence  
 1, 4, 7, 10, .....
- Which term is 1027?
- (b) A motor car was bought for £1,250. Each year its value was reduced to  $\frac{3}{4}$  of its value the year before.  
 Compute its value at the end of 4 years.