

**AN ROINN OIDEACHAIS**  
(Department of Education)

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**LEAVING CERTIFICATE EXAMINATION, 1961.**

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**MATHEMATICS—Algebra—Pass.**

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*TUESDAY, 13th JUNE.—MORNING, 10 TO 12.30.*

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All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

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1. Solve the simultaneous equations

$$\left. \begin{array}{l} 2x-5y-3z=5 \\ 3x+2y+2z=11 \\ 5x+3y-5z=2 \end{array} \right\}$$

[25 marks.]

2. A man travelled a journey of 84 miles at a certain speed. If he had travelled 3 miles per hour faster, he would have done the journey in forty minutes less. At what speed did he travel ?

[25 marks.]

3. (a) Find the values of A, B, so that  $2x+1=A(x-1)+B(x-2)$  may be an identity.

(b) Factorise :

(i)  $(x+1)^2-7(x+1)(y-3)+12(y-3)^2$ ;

(ii)  $2x^3+x^2-12x+9$ .

[30 marks.]

4. (i) Find the sum of the first fifty terms of the arithmetical progression 3, 5, 7, .....

How many terms of the progression must be taken so that their sum is 840 ?

(ii) In a geometrical progression the second term is 20 and the eighth term is 45. Find the fifth term.

[30 marks.]

5. (i) If  $x = a + \sqrt{a^2 - 3}$ , express  $x + \frac{3}{x}$  in terms of  $a$  in simplest form

(ii) Prove that  $\log_c xy = \log_c x + \log_c y$ .

Find two numbers such that their sum is 25 and the sum of their logarithms to the base 10 is 2.

[30 marks.]

6. If  $\frac{a}{b} = \frac{c}{d}$ , prove  $\frac{a}{b} = \frac{a+c}{b+d}$ .

Given that  $\frac{3x}{2y} = \frac{5-3x}{3-2y}$ , express  $x$  in terms of  $y$ .

If  $\frac{1}{2a-b+1} = \frac{2}{2b-a-1}$ , prove  $\frac{a}{2a-b+1} + \frac{2b}{2b-a-1} = 3$ .

[30 marks.]

7. Draw a graph of the function  $x^3 - x^2 - 8x + 7$  for values of  $x$  from  $-3$  to  $+3$ .

Find from your graph, as accurately as you can, the ranges of values of  $x$  in that interval for which the function is (i) positive and increasing (ii) negative and decreasing, (iii) negative and increasing.

[30 marks.]