

# AN ROINN OIDEACHAIS

(Department of Education).

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INTERMEDIATE CERTIFICATE EXAMINATION, 1953.

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## MATHEMATICS (Algebra).

MONDAY, 15th JUNE.—MORNING, 10 TO 12.30.

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The total number of questions answered should not exceed *six*.

Mathematical Tables may be obtained from the Superintendent.

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1. (i) Solve the equation  $\frac{1}{3}(x+5) - \frac{2}{5}(2x-3) = 1$ .
- (ii) Find, correct to two places of decimals, the values of  $x$  which satisfy the equation  $x^2 + 6x - 3 = 0$ .
- [30 marks.]

2. A man travels at 3 m.p.h. from A to B and at 5 m.p.h. from B to C, the journey from A to C taking him  $2\frac{1}{2}$  hours. He then returns, travelling at 6 m.p.h. from C to B and at 4 m.p.h. from B to A, the return journey from C to A taking him 2 hours. Find the distance from A to B and the distance from B to C.

[30 marks.]

3. Factorise as fully as you can :

- (i)  $2x^2 + x - 6$  ;
- (ii)  $(a^2 + ab - b)^2 - (a - ab - b^2)^2$  ;
- (iii)  $x^3 - 4x^2 + x + 6$ .

[30 marks.]

4. A buys  $x$  oranges at  $p$  pence per dozen and sells them to B at  $y$  pence each. Find A's profit in pence, and find his percentage profit in its simplest form.

If B were to sell  $m$  dozen of the oranges for  $n$  shillings, at what price each must he sell the remainder so as to make a profit of  $g$  pence on the transaction as a whole ?

[35 marks.]

P.T.O.

5. (i) Simplify  $\frac{\sqrt{x+1}+6\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}}$  by rationalising the denominator.

(ii) Solve the equation

$$\frac{\sqrt{x+1}+6\sqrt{x-1}}{\sqrt{x+1}-\sqrt{x-1}}=6\sqrt{x^2-1},$$

and test your solutions.

[35 marks.]

6. Solve the equations

(i)  $2 \log_{10} x = \log_{10} 2 + \log_{10} (5x-8)$  ;

(ii)  $10^{2x} - 10^{x+1} + 24 = 0$ .

[35 marks.]

7. Draw the graph of  $10x - 3x^2 - 2 [=y]$  for values of  $x$  from  $x=0$  to  $x=4$ .

Find from your graph, as accurately as you can :

(i) the values of  $x$  for which  $y=0$  ;

(ii) the values of  $x$  for which  $y=2$  ;

(iii) the greatest value of  $y$ .

[35 marks.]