An Roinn Oideachais

INTERMEDIATE CERTIFICATE EXAMINATION, 1962.

MATHEMATICS (Algebra).

WEDNESDAY, 13th *JUNE*.—Morning, 10 to 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

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1. (i) Show that $3(2x - 1)^2 - 12(2x - 1) = -9$ when $x = 1$ and also when $x = 2$.
Is that equation an identity? Give a reason for your answer.

(ii) Solve the following equation:

$$\tfrac{1}{2}(x + 3) = 7 - \tfrac{1}{3}(x - 1).$$

(28 marks.)

2. (i) Write the following statement as an equation :

the sum of x and a is three times the sum of y and a.

(ii) Four years from now A will be three times as old as B. Five years ago the sum of their ages was fifty years. Find the present ages of A and B.

(28 marks.)

3. (i) Find the values of x which satisfy the equation

$$x^2 - 6x = 216.$$

(ii) Find the value of x for which $(x + 0{\cdot}1)^2$ exceeds x^2 by $1{\cdot}01$.

(28 marks.)

4. Factorise

(i) $x^2 - 5x - 24$,
(ii) $a^2 - b^2 - 5a + 5b$,
(iii) $x^3 - 4x^2 - 7x + 10$.

Show that the sum of $(1363{\cdot}6)^3$ and $(736{\cdot}4)^3$ is a whole number.

(28 marks.)

5. Write down the values of 2^5, $27^{\frac{1}{3}}$, $\log_2 16$, $\log_2 1$.

Find the value of

$\log_{10} 2 + 3 \log_{10} 5 - \log_{10} 2{\cdot}5$, without using the Tables.

Using the Tables find, correct to one decimal place, the value of x for which $7^x + 7^{x+2} = 3000$.

(28 marks.)

6. Draw a graph of $y = 3 + 3x - x^2$ for values of x from -2 to $+4$.

Find from your graph, as accurately as you can, the range of values of x for which $3 + 3x - x^2$ is positive.

If the graph of $y = ax$ (a straight line, where a is a constant) cuts the above graph where $x = 2{\cdot}5$, find graphically the value of x at the other point where the two graphs intersect.

(30 marks.)

7. (i) Solve the equation $\sqrt{1 + x} + \sqrt{1 - x} = \frac{8}{5}$.

(ii) Show that $\sqrt{a} + \sqrt{b}$ is greater than $\sqrt{a + b}$, where a and b are positive.

(iii) For what range of values of y are $1 + y$ and $1 - y$ both positive ?

(30 marks.)