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(Department of Education).

LEAVING CERTIFICATE EXAMINATION, 1954.

MATHEMATICS—Algebra—Pass.

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

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

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1. (*a*) Find the least common multiple of x^3+2x^2+7x+6 and $x^3-x^2+4x-12$.

(*b*) Find the factors of $bc(b-c)+ca(c-a)+ab(a-b)$.

[25 marks.]

2. Find an expression for the sum to n terms of the arithmetic series $a, a+d, a+2d, \ldots$

The sum of n terms of the series $32\frac{1}{2}, 29\frac{1}{4}, 26 \ldots$ is $178\frac{3}{4}$; find n. Account for the two solutions.

[25 marks.]

3. The difference of two numbers is 4 and the difference of their cubes is 988. Find the numbers.

[30 marks.]

4. (*a*) Solve the following equations (without using the tables):

$2^x=\frac{1}{4}$; $4^x=\frac{1}{8}$; $\log_4 x=\frac{1}{2}$; $\log_x 4=-\frac{1}{2}$.

(*b*) Find (without using the tables) the values of x and y which satisfy

$$2\log_{10}(x-1)+\log_{10}y=2-2\log_{10}5,$$
$$\log_{10}x+\log_{10}y=\log_{10}3.$$

[30 marks.]

5. If $E=1+\frac{2\sqrt{6}}{7}$, write $\sqrt{E}$ in the form $\sqrt{x}+\sqrt{y}$. Hence show that $\frac{1}{\sqrt{E}}=\frac{\sqrt{7}(\sqrt{6}-1)}{5}$.

[30 marks.]

6. The breadth, length and diagonal of a rectangle are in A.P. and the breadth, length and diagonal of another rectangle are in G.P. In each case, find the length of the diagonal when the breadth is one inch.

[30 marks.]

7. Draw the graph of the function $(2x-5)(x^2-4x)$ for values of x from 0 to $4\frac{1}{2}$.

Find from your graph for what range of values of x in the interval, 0 to $4\frac{1}{2}$, the function, (*a*) is increasing, (*b*) is positive, (*c*) is negative.

Find, also, from the graph, as accurately as you can, the values of x which satisfy the equation $(2x-5)(x^2-4x)=2$.

[30 marks.]