

LEAVING CERTIFICATE EXAMINATION, 1963.

MATHEMATICS—ALGEBRA—PASS.

WEDNESDAY, 12th JUNE -- Morning, 10 to 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

1. Solve each of the following equations, giving the answers correct to two decimal places:

(i) $5x^2 - x - 7 = 0,$

(ii) $5(1 - x)^2 - (1 - x) - 7 = 0.$

(25 marks.)

2. (a) Find the values of A, B, C so that

$$x^2 = A + B(x - 1) + C(x - 1)(x - 2)$$

may be an identity.

(b) Factorise:—

(i) $a(b^2 - c^2) + b(c^2 - a^2) + c(a^2 - b^2);$

(ii) $(a + b + c)^3 - a^3 - b^3 - c^3.$

(25 marks.)

3. Prove the formula for the sum of n terms of an arithmetical progression.The sum of the first five terms of an A.P. is -75 and the sum of the first twenty terms is zero; find the sum of the first thirty terms.

(30 marks.)

4. The hypotenuse of a right-angled triangle is 39 inches long and the perimeter is 90 inches. Find the area of the triangle.

(30 marks.)

5. (i) In a geometrical progression the sum of the first and second terms is 6 and the sum of the second and third terms is 3. Find the common ratio and the first term.

(ii) The second term of a geometrical progression is 20 and the eighth term is 45; find the fifth term.

(30 marks.)

6. Prove that $\log_b a = \log_c a \div \log_c b$.If $a = b^3$, prove that

$$3 \log_a 225 = 2 \log_b 15.$$

(30 marks.)

7. Draw the graph of the function $x(x^2 - 3)$ for values of x from -3 to $+3$.Write an account of how the function varies in sign and in magnitude as x varies from -3 to $+3$.

Use the graph to solve the equation

$$x(x^2 - 3) = 1,$$

as accurately as you can.

(30 marks.)