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INTERMEDIATE CERTIFICATE EXAMINATION, 1930.

MATHEMATICS (I).

FRIDAY, 13th JUNE.—MORNING 10 A.M. TO 12.30 P.M.

Each item (a), (b), (c), (d), (e), (f) in Section I. will be counted as a *half-question*. The total number of questions answered should not exceed *seven*, every pair of items from Section I. being counted as a whole question.

(Candidates should see that answers to questions in excess of *seven* are cancelled.)

Mathematical Tables may be obtained from the Superintendent.

SECTION I.

(Each item (a), (b), (c), (d), (e), (f) in this Section carries 13 marks.)

(a) Solve the equation
$$\frac{1}{4}(2x-1)(3x-1) - \frac{1}{4}(2x+1)(x-2) = (x-3)(x+1) - 3\frac{3}{4}.$$

(b) From the formulae $Pt = m(v-u)$; $Ps = \frac{1}{2}m(v^2 - u^2)$ find the value of s when $u=49$, $v=51$, $t=10$.

(c) Show that the expressions $(x+3)(4x^2-1)(4x^2-11x-3)$ and $(2x+1)(x^2-9)(8x^2-2x-1)$ are equal for all values of x .

(d) The expressions x^3-3x+2 and x^3+3x^2-4 have two common factors of which $x-1$ is one; find the other.

(e) Solve the equation $3x^2 - 11\frac{1}{2}x = 2$.

(f) If A gives B two-thirds of his money, B will then have £9. If, instead, B gives A three-quarters of his money, A will then have £9. How much money has each?

SECTION II.

1. Solve the equations :

(i) $\sqrt{4x+3} + \sqrt{2x-10}=6.$

(ii) $\sqrt{4x+3} - \sqrt{2x-10}=6.$

Verify your solutions.

[28 marks.]

2. If the factors of $6x^2 - xy - y^2$ are represented by a and b , express $6x^2 - xy - y^2 + 8x + y + 2$ in terms of a and b and hence factorize the expression.

[28 marks.]

3. Find, to two decimal places, by how much $\frac{2x+y}{x-y}$ is greater than $\frac{2x-y}{x+y}$ when $x = \sqrt{3} + \sqrt{2} - 1$ and $y = \sqrt{3} - \sqrt{2} + 1.$

[28 marks.]

4. Find the values of x and y which satisfy the equations $4(x-y)^2 - 5(x-y) = 21$ and $3x + y = 5.$

[28 marks.]

5. $\frac{1}{4}(2x^2 - 3x + 1)$ and $\frac{1}{5}(2x^2 + 3x - 7)$ are two positive consecutive integers of which the former is the greater. What integers are they? Could they be consecutive integers if the other were the greater?

[29 marks.]

6. A buys a horse for £100 and sells it to B at a profit. B sells the horse at £95, his percentage loss being 1 less than A's percentage profit. How much did B pay for the horse?

[29 marks.]

7. Given $\log 2 = .3010$ and $\log 3 = .4771$ deduce $\log 0.081.$

Deduce also a very close approximation to the value of $\log 7^4$, and hence find $\log 7$ with corresponding accuracy.

[29 marks.]

8. Plot the graph of $y = 2x^2 - 3x - 1$ for values of x between -1 and 3 . Use your graph to solve the equations $2x^2 - 3x = 3$ and $2x^2 - 3x = -1\frac{1}{2}$. Why cannot you solve the equation $2x^2 - 3x = -3$ by means of the graph?

[29 marks.]