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LEAVING CERTIFICATE EXAMINATION, 1928.

PASS

MATHEMATICS (I).

THURSDAY, 14*th JUNE.*—Morning, 10 a.m. to 12.30 p.m.

Seven questions may be answered. 9 (*a*) *or* 9 (*b*) may be answered, but not both. All questions carry equal marks.

Mathematical Tables may be obtained from the Superintendent.

1. The difference between two numbers is 5 and the excess of their product over their sum is also 5 : find the numbers.

Solve also the general case in which k is substituted for 5 in the above.

2. Solve (i) $\dfrac{10x - 11}{7x - 2} - \dfrac{14x - 16}{17x - 7} = 0$;

    (ii) $x\,(3x-y) = 1$,
        $y\,(3x-y) = 2$.

3. Evaluate

$$\frac{x+1+\sqrt{x^2-1}}{x+1-\sqrt{x^2-1}} \quad \text{when (i) } x=1\cdot68, \text{ (ii) } x=-1\cdot68.$$

Express as a difference of two surds $\sqrt{19-4\sqrt{21}}$.

4. What is an Arithmetical Progression ?

Prove that the series whose nth term is $an+b$, where a and b are given, is an A. P.

Find the sum of the first 50 terms in the case where $a=1$ and $b=-1$.

5. Draw on the same diagram on as large a scale as possible the graphs of $\dfrac{10x+19}{3}$ and $\dfrac{3}{x^2}$.

Hence solve the equation $10x^3+19x^2-9=0$, indicating the roots and their method of derivation from the graph.

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6. Express $2\,(x-y)\,(x-z)\,+2\,(y-z)\,(y-x)\,+2\,(z-y)\,(z-x)$ as the sum of three squares.

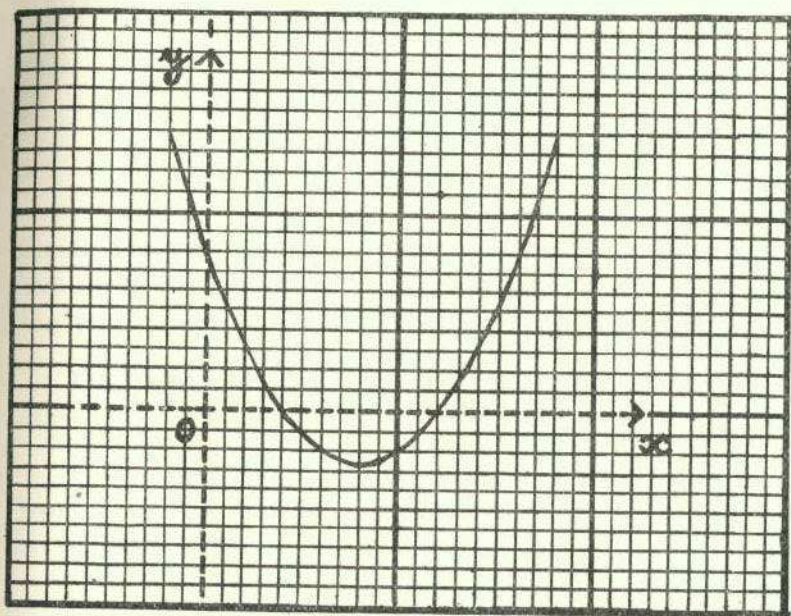If x, y, z are real what is the simplest relation between x, y and z when the above expression is zero ?

7. State and prove the Remainder Theorem and find the factors of x^3+2x^2-5x-6.

Solve the equation $1-2x-5x^2+6x^3=0$.

8. Prove that $\log_a MN = \log_a M + \log_a N$.

Solve the equation $\quad 25^{2x}\,2^{x+3} = 100$.

9. The figure represents the graph of ax^2+bx+c drawn to the scale of one unit to each small division : find a, b and c.

Or

9. When is a number said to be *rational* ?

By considering the number of factors equal to 2 in the integers m and n, discuss the truth of the equation $2n^2=m^2$.

What is meant by *irrational* ? Deduce that $\sqrt{2}$ is irrational. What is a *surd* ? Are all irrationals surds ?