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LEAVING CERTIFICATE EXAMINATION, 1929.

PASS

MATHEMATICS (I).

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

Seven questions may be answered. 7 (*a*) or 7 (*b*) may be answered, but not both. All questions carry equal marks.

Mathematical Tables may be obtained from the Superintendent.

1. Find the factors of:

(i) $a(4a^2 - 7a - 11) + 6a + 6$.
(ii) $(x - y - z)^3 - x^3 + y^3 + z^3$.

2. Solve the equations:

(i) $(3 - \sqrt{x})(5 + \sqrt{x}) = 7$.
(ii) $x^2 + xy = 6$.
$y^2 + 2xy = 5$.

and test the solutions.

3. What number must be added to $4x^2 - 7x - 2$ to make the result a perfect square? Find the least value of $4x^2 - 7x - 2$.

4. Prove a formula for finding the sum of n terms of the Arithmetical Progression whose first term is x and whose common difference is y.

The 19th term and the 36th term of an Arithmetical Progression are 29 and $54\frac{1}{2}$ respectively. Find how many terms of this series lie between 100 and 200.

5. A and B together can do a certain amount of work in x days, while B and C together take y days, and C and A together take z days to do it. Find how long it would take (i) A, B, C all working together, and (ii) A alone.

6. If $px^2+qx+r=0$, for more than *two* different values of x, show that $p=q=r=0$.

Hence (or otherwise) find A, B, C so that $\frac{9x}{(x+2)\ (x-1)^2}$ may be identically equal to $\frac{A}{x-1}+\frac{B}{(x-1)^2}+\frac{C}{x+2}$.

7 (*a*) Obtain a Binomial Expansion, suitable for calculation, which represents $(\cdot 992)^6$, and evaluate to *four* places of decimals.

Find the coefficient of x^2 in the expansion of $\left(x^2+\frac{1}{x}\right)^{10}$.

Or

7 (*b*) A ball dropped on a level floor from a height of 36 feet rebounds repeatedly, the height to which it rises after each rebound being $\cdot 45$ of the previous height. What is the length of the path through which the ball moves from the moment it is dropped until it comes to rest ?

8. AOB is a right angle in which OA $=2a$ and OB $=2b$. Circles of radii x and y respectively touch OA at A and OB at B and touch each other externally: show that

$$(x+2a)\,(y+2b)=2\,(a+b)^2.$$

9. With the same axes and the same scales trace the curves $y=x^2-x+1$ and $y=\frac{x-1}{x+1}$ and so find a value of x which satisfies the equation $x^3-x+2=0$.