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LEAVING CERTIFICATE EXAMINATION, 1933.

PASS.

MATHEMATICS
(ALGEBRA)

TUESDAY, 20*th* *JUNE*.—AFTERNOON, 3.30 TO 6 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. Using Tables, evaluate :

   $(24{\cdot}7)^{0{\cdot}68}$ and $(0{\cdot}49)^{-2{\cdot}37}$.

2. Solve the equations :

   (i) $$\left.\begin{aligned} x + \frac{1}{y} &= 1 \\ y + \frac{1}{x} &= 4 \end{aligned}\right\}$$

   (ii) $\sqrt{3x^2-7x+3} - \sqrt{3x^2-7x-2} = 1.$

3. A rectangular piece of tin is 5 ins. longer than it is wide. An open box whose volume is $\frac{13}{16}$ cubic ft. is made by cutting a six-inch square from each corner and turning up the sides : what are the dimensions of the box ?

4. Solve the equation $px^2+qx+r=0$, and show that the sum of the roots is $-\frac{q}{p}$ and their product is $\frac{r}{p}$.

If $x=-4{\cdot}7$ is one root of the equation $x^2-4{\cdot}9x+a=0$, where a is independent of x, find the value of a, and the other root of the equation.

5. Express the square root of $\frac{17}{12} - \sqrt{2}$ in the form $\sqrt{x} - \sqrt{y}$.

6. The n^{th} term of a series is $3-5n$: write down the first four terms and find the sum of n terms.

7. How many integral powers of 3 lie between 1 and 10,000,000 ? Show that the greatest of those powers is more than double the sum of all the others.

8. If $a+b+c=0$, prove that

(i) $a^3+b^3+c^3=3abc$.

(ii) $a^5+b^5+c^5=5abc(c^2-ab)$.

9. (*a*) Use the Binomial Theorem to write down the first four terms of the expansion of $(2a-b)^{20}$. Find the 15th term in its simplest form.

Or,

9. (*b*) Under what condition will the expression ax^2+bx+c have

(i) a *maximum* value ?

(ii) a *minimum* value ?

Find the minimum value of $3x^2-10x+5$.