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(Department of Education)

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INTERMEDIATE CERTIFICATE EXAMINATION, 1935.

MATHEMATICS (Algebra).

TUESDAY, 18th JUNE.—AFTERNOON, 3.30 P.M. TO 6 P.M.

The total number of questions answered should not exceed seven
(Candidates should see that answers to questions in excess of
seven are cancelled.)

Mathematical Tables may be obtained from the Superintendent.

1. Subtract $\frac{2}{a-2}$ from the sum of the fractions $\frac{1}{a-1}$ and $\frac{1}{a-3}$.

Check the result by substituting 5 for a .

[25 marks.]

2. Solve the equations :

(i) $3x-7=33-7x$.

(ii) $(3x-7)^2=(33-7x)^2$.

and verify your results.

[25 marks.]

3. (a) A boy was k years of age in the year 1933 : in what year
will he be 25 years old ?

(b) A train travelled x yards in y seconds : express its speed in
miles per hour.

(c) If p eggs cost q pence, how many dozen could be got for £1 ?

[25 marks.]

4. Write down five consecutive odd numbers of which $2n-1$ is
the middle number.

Prove that (i) the sum of those numbers and (ii) the sum of their
cubes are both divisible by the middle number.

[27 marks.]

5. Goods which cost $\pounds x$ were sold for $\pounds y$, thereby realising a profit of 25%. If the cost price had been $\pounds 8$ more and the selling price $\pounds 6$ more the percentage profit would have been 15: calculate the values of x and y .

[27 marks.]

6. Factorise each of the following :

(i) $(9x^2 + 4x - 7)^2 - (3x^2 + 3x - 5)^2$.

(ii) $(x + y)^3 - (x - y)^3$.

(iii) $6x^3 - 7x^2 - x + 2$.

[28 marks.]

7. The following are squares one term of each of which is missing :

(i) $4x^2 \dots + 9$.

(ii) $25x^2 - 7x \dots$

(iii) $36 + 10x \dots$

Fill in the missing terms and write down the square root of each of the squares.

[28 marks.]

8. A, B, C, D are four houses standing on the same plane. B lies x miles south-east of A; C lies y miles south-west of B; D lies z miles west of C: express the distance from D to A in simplest form in terms of x, y, z .

Calculate the distance and find the direction from D to A when $x=2, y=4, z=5$.

[30 marks.]

9. Use your Tables to find the logarithms of the following :

$147.3, \frac{10}{147.3}, 0.6897, (0.6897)^3$.

Calculate the values of $\sqrt[3]{147.3}$ and $\sqrt[3]{0.6897}$.

[30 marks.]

10. Using squared-paper and scales as large as possible, draw accurately the graphs of $y=x^3$ and $y=3x-1$ from $x=0$ to $x=2$.

From your graphs find, correct to *one place* of decimals, *two roots* of the equation $x^3 - 3x + 1 = 0$.

[30 marks.]