INTERMEDIATE CERTIFICATE EXAMINATION, 1940.

MATHEMATICS (Algebra).

TUESDAY, 18*th JUNE*.—AFTERNOON, 3 P.M. TO 5.30 P.M.

The total number of questions answered should not exceed *seven*.

Mathematical Tables may be obtained from the Superintendent

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1. Express $\dfrac{1}{x^2-2x-3} - \dfrac{3}{3x^2+2x-1}$ as a single fraction in simplest form.

Check your result by putting $x=2$ in the original expression and in the answer.

[25 marks.]

2. Solve the following equations :
   (i) $\frac{1}{3}(\frac{1}{2}x+4\frac{1}{2})-\frac{1}{6}(\frac{2}{3}x-5)=3$;
   (ii) $5x+3y=1\frac{1}{5}$
   $6x-\ y=18$

[25 marks.]

3. (i) Express x as a percentage of y ;

   (ii) By what percentage does x exceed y ?

   (iii) By what percentage does a discount of x shillings in the pound exceed a discount of $y\%$?

   (iv) If a person walks x miles in y hours, how many yards would he walk in z minutes ?

[25 marks.]

4. Find, to *two* places of decimals, the roots of the equation

$$24x^2 - 68x + 35 = 0.$$

[25 marks.]

5. Factorise fully each of the following :

(i) $c^2 - (a^2 + b^2 - 2ab)$;

(ii) $2a^3 + 5a^2 - 2a - 5$;

(iii) $a^2(b-c) + b^2(c-a) + c^2(a-b)$.

[25 marks.]

6. AC is a diagonal of a rectangular field ABCD. Three boys, P, Q, R, started at the same time from A and ran at the same speed, P running along AC, Q along AB and BC and R along AD and DC. When P reached C, Q was on BC and 5 yards from B, while R was on DC and 40 yards from C. Find the length and the breadth of the field.

[30 marks.]

7. Solve the equation

$$\sqrt{9x+1} - \sqrt{4x-3} = \sqrt{2x-5},$$

and verify the positive solution you obtain.

[30 marks.]

8. A boy cycles 7 miles an hour faster than he walks. By cycling, rather than walking, from his home to his school, he saves 28 minutes. If his walking pace had been one mile per hour greater and his cycling speed two miles per hour less, he would save only 15 minutes by using the bicycle for the journey. Find at what rate he walks and how far his home is from the school.

[30 marks.]

9. (i) Find, as accurately as your Tables allow, the value of $\sqrt[10]{15}$;

(ii) Express in a form free from logarithms the equation $2\log_{10}(9x - 5) = 2 + \log_{10}(3x + 1)$, and find the integral value of x which satisfies the equation.

[30 marks.]

10. Draw the graph of $\frac{1}{10}x^3[=y]$ from $x=0$ to $x=4$, using 1 inch as unit.

Use your graph to evaluate $(2\cdot8)^3$ and $\sqrt[3]{40}$ approximately and show how you obtained these results.

[30 marks.]