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(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1946.

MATHEMATICS (Algebra).

WEDNESDAY, 12th JUNE.—MORNING, 10 TO 12.30.

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

Mathematical Tables may be obtained from the Superintendent.

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1. Find the values of x, y that satisfy the simultaneous equations :

$$3x+y=-1,$$
$$5x+3y=7.$$

Show that these values of x, y also satisfy the equation

$$15x^2+14xy+3y^2+7=0.$$

[25 marks.]

2. Find the H.C.F. and the L.C.M. of x^3-1 and x^3-x^2-x-2.

[25 marks.]

3. Factorise as fully as possible :

(i) $10x^2+17xy-6y^2$;

(ii) $(x+1)^3-(x+1)^2-6(x+1)$;

(iii) $a^4-b^4+2a^3b-2ab^3$.

[25 marks.]

4. A money prize is to be divided equally among a number of persons. If each person were to receive 15s. there would be £2 left undivided, and the prize is £1 4s. too small to give each person 16s. What is the value of the prize ?

[25 marks.]

5. Prove the identity

$$4b^2c^2-(b^2+c^2-a^2)^2=(a+b+c)(b+c-a)(c+a-b)(a+b-c).$$

[25 marks.]

6. Solve the equation

$$\sqrt{x+16}+x=14.$$

Test your solutions.

[30 marks.]

7. A motorist travels at 10 miles per hour faster than a cyclist. If it takes the motorist 2 hours longer to do 85 miles than it takes the cyclist to ride 21 miles, what are the two possible speeds of the motorist ?

[30 marks.]

8. Express the square root of $n-2\sqrt{n-1}$ in its simplest surd form.

Find, correct to two decimal places, the square root of $8-2\sqrt{7}$.

[30 marks.]

9. Prove that $\log_a m^n = n\log_a m$.

How many years, approximately, will it take a sum of money to double itself at 1% compound interest ?

[30 marks.]

10. Draw a graph of $y=x(x-1)(x+2)$ from $x=-2$ to $x=1\frac{1}{2}$ and use your graph to find, as accurately as you can, the values of x which satisfy the equation $x(x-1)(x+2)=1\frac{1}{2}$.

[30 marks.]