AN ROINN OIDEACHAIS.

(Department of Education)

INTERMEDIATE CERTIFICATE EXAMINATION, 1961.

MATHEMATICS (Algebra).

TUESDAY, 13th JUNE.—MORNING, 10 TO 12.30.

All questions to be answered.

Mathematical Tables may be obtained from the Superintendent.

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1. (i) Solve the equation

$$\tfrac{1}{2}(a+3)-\tfrac{1}{5}(a-1)=5.$$

(ii) For what range of values of x is $2x+1$ greater than 3 and less than 11 ?

[28 marks.]

2. Find, correct to one place of decimals, the values of x which satisfy the equation $x^2-10x+3=0$.

[28 marks.]

3. Factorise

(i) $x^2-3x-40$,

(ii) $ab+ac-bc-a^2$,

(iii) x^3-4x^2+x+6.

For what range of values of x is $x^2-3x-40$ negative ?

[28 marks.]

4. A man walks a certain part of a journey and cycles the remainder. If he walks at 3 m.p.h. and cycles at 15 m.p.h., the journey takes him 3 hours. If he walks at 4 m.p.h. and cycles at 10 m.p.h., the journey takes him $3\frac{1}{2}$ hours. How far does he walk and how far does he cycle ?

[28 marks.]

5. Write down the values of 3^3, $16^{\frac{1}{4}}$, $\log_2 8$, $\log_3 3$.

If $\log_{10} x = 1+p$ and $\log_{10} y = 1-p$, show that $xy = 100$.

If $\log_2 a = m$ and $\log_3 b = n$, prove that

$$n\log_6 a + m\log_6 b = mn.$$

[28 marks.]

6. Draw a graph of $2x^2-3x-1 (=y)$ for values of x from -2 to $+3$.

Find from your graph, as accurately as you can,

(i) the roots of the equations $2x^2-3x=1$, $2x^2-3x=3$;

(ii) the value of y when $x=2{\cdot}7$, and what other value of x gives that same value to y.

[30 marks.]

7. If $x=2+\sqrt{3}$, what must be the value of y so that $(x+y)$ and xy will both be rational ?

If $x=2+\sqrt{3}$, write down (i) a value of y such that $(x+y)$ is rational and xy is not, (ii) a value of y such that xy is rational and $(x+y)$ is not.

[30 marks.]