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(Department of Education).

INTERMEDIATE CERTIFICATE EXAMINATION, 1947.

MATHEMATICS (Algebra).

MONDAY, 16th JUNE.—Morning, 10 to 12.30.

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

Mathematical Tables may be obtained from the Superintendent.

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

$$5(x+y)+2(x-y)=19,$$
$$25(x+y)-3(x-y)=4.$$

[25 marks.]

2. Factorise as fully as possible :—

   (i) $ab+cd-ac-bd$;

   (ii) a^3-9a ;

   (iii) $x^2-y^2+9z^2-6zx$.

[25 marks.]

3. A man paid £8 altogether for a golf bag containing two wooden clubs and five iron ones. The bag cost him 2s. 6d. less than each wooden club and 5s. more than each iron one. Find the cost of each wooden club.

[25 marks.]

4. Solve the equation :—

$$\frac{(3x-2)(x-8)}{(x-2)(3x-4)}+\frac{5}{2}=0.$$

Verify your solutions.

[25 marks.]

5. State the Remainder Theorem.
   Show that $x-3$ is a factor of $x^3-4x^2-17x+60$, and find the other factors.

[25 marks.]

6. Find the square of x^2+px+5.
   Hence, or otherwise, find the value of k which makes
$$x^4-6x^3+19x^2-kx+25$$
a perfect square.

[30 marks.]

7. A train can save 12 minutes on a journey of 42 miles by travelling 5 miles an hour faster than usual. Find its usual speed.

[30 marks.]

8. Simplify

$$\frac{6}{2-\sqrt{2}}+\frac{2}{2\sqrt{5}+3\sqrt{2}}.$$

and then express the square root of the expression in its simplest surd form.

[30 marks.]

9. Solve the equations :—

(i) $\log_{10}(x+3)-\log_{10}x=1-\log_{10}5$;

(ii) $x(x-\log_{10}2)=(2x-1)\log_{10}5.$

[30 marks.]

10. Draw the graph of

$$y=(x+3)^2-(2x^2+1)$$

for values of x from $x=-2$ to $x=8$.

From your graph find, as accurately as you can,

(i) the values of x for which $y=0$,

(ii) the values of x for which $y=10$,

(iii) the greatest amount by which $(x+3)^2$ can exceed $(2x^2+1)$.

[30 marks.]