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(Department of Education.)

INTERMEDIATE CERTIFICATE EXAMINATION, 1944.

MATHEMATICS (Algebra).

WEDNESDAY, 14TH 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. Solve the equation

$$\frac{3x+2}{3(x-3)} + \frac{3x-2}{3(x+3)} = \frac{2x^2+3x-11}{x^2-9}.$$

Verify your answer.

[25 marks.]

2. Factorise

(i) $15ac - 2bd + 3bc - 10ad$;

(ii) $5x^2 - 72x - 45$;

(iii) $x^3 + 2x^2 + 2x + 1$.

[25 marks.]

3. Express in terms of a , b the values of x , y in the simultaneous equations :

$$\begin{aligned} ax - by &= a^2 - b^2, \\ bx + ay &= 2ab. \end{aligned}$$

[25 marks.]

4. Solve the equations :

(i) $12x^2 + 5x = 2$;

(ii) $12(x-9)^2 + 5(x-9) = 2$.

[25 marks.]

5. A man paid £40 for a number of articles at the same price for each. He sold all but 5 of them for £36 at a profit of 8 shillings each. How many did he buy ?

[25 marks.]

6. If $x = \frac{4ab}{a+b}$,

prove that $\frac{x+2a}{x-2a} + \frac{x+2b}{x-2b} = 2$.

[30 marks.]

7. Two boys start together from the same point and run round a track with uniform speeds. If they run in the same direction they are together again after one has done 7 and the other 8 laps. If they run in opposite directions they meet when the faster has travelled 42 yards from the starting point. Find the length of the track.

[30 marks.]

8. Find one value of x which satisfies the equation :

$$\frac{2}{3}\sqrt{25-x^2} + \sqrt{5+x} = \sqrt{5-x}.$$

[30 marks.]

9. Prove $\log_a MN = \log_a M + \log_a N$.

If $a^2 + b^2 = 7ab$, prove that $\log(a+b) - \frac{1}{2}\log ab = \log 3$.

[30 marks.]

10. Draw graphs of x^3 and $10x-8$ from $x=-4$ to $x=+3$ and use them to solve the equation $x^3=10x-8$.

[30 marks.]