INTERMEDIATE ALGEBRA

Monday, June 15, 1914 — 9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in (1) elementary algebra, (2) intermediate algebra.

Answer seven questions, selecting three from group I and two from each of the other two groups. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form.

Group I

1 Solve and check: $2\sqrt{x-a}+3\sqrt{2x}=\dfrac{7a+5x}{\sqrt{x-a}}$

solution [10]; checking [2]

2 Solve and check: $4x^2+5x+2=0$

solution [10]; checking [2]

3 Solve $\begin{cases} x\ +y^2\ -8\ =0 \\ y^2+15x-16=0 \end{cases}$ [12]

4 Factor $x(x+1)(x-2)-3x-3$ [8]; a^4+4 [4]

Group II

5 On a certain day the temperature rose $\frac{1}{2}°$ hourly from 5 a. m. to 11 a. m. and the average temperature for that period was $8°$; what was the temperature at 9 a. m.? [16]

6 Find the common difference of the arithmetical progression whose 1st term is 3 and whose 2d, 4th and 8th terms are in geometrical progression. [16]

7 Without solving, show whether the roots of the following quadratics are (1) real and equal, *or* (2) real and unequal, *or* (3) imaginary: [16]

(*a*) $2x^2-4x-7=0$ (*c*) $-x^2+9x-1=0$

(*b*) $3x^2-4x+5=0$ (*d*) $12x^2-84x+147=0$

Group III

8 Expand and simplify, expressing the result with positive exponents: [16] $\left(2a^{-\frac{2}{3}}-a^{\frac{1}{3}}b^2\right)^4$

9 A rectangular field is 119 yards long and 19 yards wide; how many yards must be added to its width and how many taken from its length, in order that its area may remain the same while its perimeter is increased by 24 yards? [16]

10 Plot on the same sheet and with the same axes:

(*a*) $y=3x-2$ [4]

(*b*) $y=-2x+4$ [4]

(*c*) $y=-x-5$ [4]

Find from the graph the solution of $\begin{cases} y=-2x+4 \\ y=3x-2 \end{cases}$ [4]