The University of the State of New York

212TH HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Monday, January 18, 1915 — 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 elementary algebra. The minimum time requirement is five recitations a week for a school year.

Answer 12 questions, selecting five from group I, two from group II and five from group III. 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 $\dfrac{3(x-2)}{x+3} = \dfrac{36-4x}{x^2-9} - \dfrac{2+3x}{3-x}$ [12]

2 Factor *three* of the following:

$$x^4 - 8x^2 - 9$$
$$m^2 - 6mn - 16x^2y^2 + 9n^2$$
$$m^2d^2 + 3 - 3m - d^2$$
$$p^2q^2 - 12pqx + 35x^2$$ [12]

3 Solve $\sqrt{3+x} + \sqrt{x} = \dfrac{5}{\sqrt{x}}$ [12]

4 Solve $3(x-2)(x-4) = (x-5)^2$ [12]

5 *a* Simplify $2\sqrt{\tfrac{5}{3}} - \sqrt{60} - 5\sqrt{\tfrac{3}{5}}$ [6]

  b Simplify $\dfrac{a\sqrt{x} - 2b\sqrt{y}}{a\sqrt{x} + b\sqrt{y}}$ [6]

6 Solve $\begin{cases} x - 3y = 1 \\ xy + y^2 = 5 \end{cases}$ [12]

Group II

7 A man has $8000 which he wishes to invest in two enterprises so that his total income will be $425; if one enterprise pays $5\tfrac{1}{2}\%$ and the other 5%, how much must he invest in each? [10]

8 Separate a line 20 inches long into two parts such that the product of the whole line and one part shall equal the square of the other part. [Result contains a surd.] [10]

9 A rectangular ceiling has in it two skylights each $2\tfrac{1}{2}$ feet by 3 feet; the surface of the ceiling, not including the skylights, is 93 feet. If the length of the ceiling is 3 feet more than its width, what are its dimensions? [10]

ELEMENTARY ALGEBRA—*concluded*

Group III

10 If one of the factors of $6a^2x^2 - 4a^3x - 4ax^3 + x^4 + a^4$ is $a^2 + x^2 - 2ax$, what is the other factor? [4]

11 Write *three* different expressions of higher degree than the first degree whose H. C. F. is $x - y$. Find the L. C. M. of these expressions. [4]

12 A lady bought 5 doz. buttons at d cents a dozen and 3 yd cloth at k cents a yard; she gave a two-dollar bill in payment. How many cents should she receive in change? [4]

13 What is the value of $8x^2 - 6ax$ when $x = \dfrac{a - \sqrt{b}}{2}$? [4]

14 Find, correct to *two* decimal places, the solutions of $2x^2 + 6x - 3 = 0$ [4]

15 Write an expression that can be divided by $a - b$ and also by $2a + b$. [4]