University of the State of New York
210TH HIGH SCHOOL EXAMINATION
INTERMEDIATE ALGEBRA

Monday, January 19, 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.

Assign 12 credits to each question in group I and 16 credits to each question in groups II and III.

Group I

1 Factor, find the highest common factor and the lowest common multiple of \(a^4 + a^2b^2 + b^4\), \(4a^3 + 4b^3\), \(2a^2c - 2abc + 2b^2c\)

2 Simplify each of the following expressions:

\[ (a) \sqrt[6]{3} \times \sqrt[2]{2} \times \sqrt[5]{5}; \quad (b) \frac{3 + \sqrt[3]{2}}{2 - \sqrt[3]{2}}; \quad (c) \frac{\sqrt[6]{6}}{3 \sqrt[3]{2}} \]

[No partial credit will be granted on the answer to either (a) or (b) or (c).]

3 Reduce to lowest terms \(\frac{2x^3 + x^2 - 25x + 12}{3x^3 + 5x^2 - 34x - 24}\)

4 a Solve by the graphic method the equation \(x^2 = 2x + 3\)

b Solve by the formula the equation \(x^2 + x + 1 = 0\)

Group II

5 If the series \(\frac{2}{3}, \frac{4}{9}, \ldots\) is arithmetical, find the sum of the first 15 terms; if geometrical, find the 5th term.

6 Determine, without solving, the nature of the roots of the equation \(3x^2 - 5x + 3 = 0\)

7 a If \(x^{-\frac{2}{3}} : 2 = 1 : x^{\frac{1}{3}},\) what is the value of \(x?\)

b Simplify and express with positive exponents

\[\frac{a^{-1}b\sqrt{c}}{a^\frac{2}{3}} \div \sqrt[3]{a^\frac{2}{3}b^{-1}}\frac{c}{c^{-3}}\]

[No partial credit will be granted on the answer to b.]

Group III

8 a Form the quadratic equation whose roots are 5 and \(-\frac{3}{8}\).

b State the relation between the roots and the coefficients in a quadratic equation.

9 A merchant bought a number of barrels of apples for \$120; he kept two barrels and sold the remainder at an advance of \$2 per barrel, thereby gaining \$34. How many barrels did he buy?

10 A train traveled 273 miles at a uniform rate; if the rate had been 3 miles an hour less, the journey would have taken \(\frac{1}{3}\) hour longer. Find the rate of the train.