22a
University of the State of New York

Examination Department

124th examination

ADVANCED ALGEBRA

August 1894 — Three hours, only

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100 *credits, necessary to pass,* 75

Answer 10 questions but **no more.** *Division of groups is not allowed. If more than 10 questions are answered only the first 10 of these answers will be considered. Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans. Each complete answer will receive 10 credits.*

1 State and illustrate four theorems concerning inequalities.

2 Solve $\sqrt{x-1} + \sqrt{x+3} = \sqrt{4x+1}$.

3–4 Derive a formula for finding the roots of the general quadratic equation of one unknown quantity and show its application by solving a numeric equation.

5–6 Two lights of given intensities are situated at a given distance apart. Find the point on the line joining them where the lights will give equal illumination. (Illumination varies inversely as the square of of the distance.)

7–8 The logarithm of 2 is .301 and that of 6 is .778; find the logarithms of 3, 4, .8, .09, and 1.2 respectively. Write the characteristic of the logarithm of each of the following numbers, 125, .0023, 8, 48.237.

9–10 Derive the formula for the number of permutations of n things taken r at a time.

11–12 In the following equation find the value of x in terms of y by reverting the series. (Find three terms of result.) $y = x + x^2 + x^3 +$ etc.

13–14 Find the 12th term of the series 2, 6, 12, 20, 30 . . . by a general method and demonstrate the soundness of the method.

15 State Descartes' rule of signs.