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University of the State of New York

## Examination Department

127th examination

## ADVANCED ALGEBRA

Monday, January 21, 1895 — 9 : 15 a. m. to 12 : 15 p. m., only

100 credits, necessary to pass, 75

Answer 10 questions but no more. If more than 10 questions are answered only the first 10 of these answers will be considered. Division of groups is not allowed. 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 Define characteristic of a logarithm, converging series, permutation, recurring series, numeric equation.

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

4-5 Write and solve the general equation of the second degree. Deduce the conditions that will render its roots positive or negative, equal or unequal, real or imaginary.

6-7 Complete and prove the following theorem: if any number of quantities are in proportion the sum of all the antecedents is to the sum of all the consequents as . . .

8-9 Write three terms of the expansion of  $[a + b]^n$  and prove that it is true when  $n$  is any positive integer.

10 Given logarithm of 3 is .477 and logarithm of 5 is .699 to find the logarithm of  $\frac{(9 \times 15)^2}{\frac{1}{5} \times \frac{25}{7}}$

11 Find three numbers in geometric progression such that their sum shall be 104 and the last shall exceed the first by 64.

12-13 Resolve  $\frac{5x-19}{x^2-8x+15}$  into partial fractions.

14-15 Prove that if the coefficients of an equation are real quantities imaginary roots will enter by pairs if they enter at all.