University of the State of New York
Examinations Department
81st examination
ADVANCED ALGEBRA

Monday, June 13, 1892—9:15 a. m. to 12:15 p. m., only

40 credits, necessary to pass, 30

Note.—Give each step of solution. Reduce fractions to lowest terms. Express final result in its simplest form and mark it Ans.

1. Define and illustrate (a) permutation, (b) undetermined coefficients, (c) recurring series.

2. Show how to form a quadratic equation when its roots are given and demonstrate the principles involved.

3. The sum of the squares of the extremes of four numbers in arithmetic progression is 234, and the sum of the squares of the means is 170; what are the numbers?

4. Find the factor that will rationalize \( \frac{1}{a^2} - \frac{1}{b^2} \).

5. Let \( \rho \) represent the principal, \( i \) the interest, \( r \) the rate, \( t \) the time and \( a \) the amount; derive two formulas by which any two of the terms named can be found when the other three are given. Show the application of the formulas by solving a numeric example.

6. Separate \( \frac{4x^2 - 1}{2x^2 - 2x - 1} \) into partial fractions.

7. State Sturm's theorem. What is its object?

8. Find, by the differential method, the sum of \( n \) terms of the series \( 1^2, 2^2, 3^2, 4^2, \) etc.

9. If \( \log a - \log b = 2 \), and \( b = 15 \), what is the value of \( a^2 \)
