

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. 6
2. Show how to form a quadratic equation when its roots are given and demonstrate the principles involved. 4
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
4. Find the factor that will rationalize  $a^{\frac{1}{x}} - b^{\frac{1}{x}}$ . 4
5. Let  $p$  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
6. Separate  $\frac{4x-2}{2x^2-2x-12}$  into partial fractions. 6
7. State Sturm's theorem. What is its object? 3
8. Find, by the differential method, the sum of  $n$  terms of the series  $1^2, 2^2, 3^2, 4^2$ , etc. 4
9. If  $\log a - \log b = 2$ , and  $b = 15$ , what is the value of  $a$ ? 3