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University of the State of New York

Examination Department

131st examination

ADVANCED ALGEBRA

Monday, June 10, 1895 — 9 : 15 a. m. to 12 : 15 p. m., only

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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 *converging series, diverging series, logarithm, geometric progression, numeric equation.*

2 Prove that the mantissa of the logarithm of any set of figures is independent of the position of the decimal point. State and prove the rule for finding the logarithm of the product when the logarithms of the factors are known.

3–4 Convert the fraction $\frac{1}{1-x}$ into a series by dividing the numerator by the denominator, and determine what values of x will make the series equal to the fraction and what values will make it unequal.

5 Derive the three principal formulas for solving problems in geometric progression. Show what must be known in general to make the solution in each case possible.

6–7 Prove that the binomial formula is true when the exponent of the power is any positive integer.

8–9 Resolve $\frac{x-2}{x^2+7x+10}$ into partial fractions by the method of indeterminate coefficients.

10 The sum of five numbers in arithmetic progression is 50 and the product of the first and last is 64; find the numbers.

11–12 Prove that the successive convergents of a continued fraction are alternately greater and less than the true value of the fraction.

13 Find the *first* figure of a root of $x^3-2x^2+x-20=0$. State the principle by which it is found and give all the work.

14–15 Find *all* the roots of $x^4+2x^3-7x^2-8x+12=0$