University of the State of New York

1902 High School Examination

INTERMEDIATE ALGEBRA

Monday, June 17, 1907—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group. Give all operations (except mental ones) necessary to find results. Reduce each result to its simplest form and mark it Ans. Each complete answer will receive 12½ credits.

Group I

1 Prove that any number having zero for its exponent equals 1, and that any quantity with a negative exponent is equal to the reciprocal of the quantity with a like positive exponent.

2 Simplify *three* of the following: $(-8\sqrt{-7})(-12\sqrt{-10})$; $12\sqrt{-4}\div 6\sqrt{-2}$; $\sqrt{-24}\div\sqrt{-6}$; $(\sqrt{-8})(-\sqrt{-18})(\sqrt{-32})$; $\sqrt{-1}+\sqrt{-49}-\sqrt{-25}$

3 Factor *four* of the following:

$(x+y)^3+x+y$

$4m^2+9n^2-16+12mn$

$14x^2-5x-24$

$x^{12}+y^{12}$

$acx^2-bcx+adx-bd$

4 Four numbers are in proportion; the difference between the first and the third is $2\frac{2}{3}$; the sum of the second and third is $6\frac{1}{3}$; and the third is to the fourth as 4:5. Find the numbers.

Group II

5 A man invests \$2720 in railroad stock, a part at 95 yielding 2% and the balance at 82 yielding 3%; his income from both investments is \$70. Find the amount invested in each kind of stock.

6 Find the square root of $85+5\sqrt{120}$

7 A man borrowed \$1500, agreeing to pay principal and interest at 6% in four equal annual instalments. Find the sum to be paid each year.

8 The sum of three numbers in geometrical progression is 14 and their product 64; find the numbers.

Group III

9 Determine graphically the values of x and y in

$$\begin{cases} -2x+y=-3 \\ -3x+4y=8 \end{cases}$$

10 Find, by the binomial formula, the fifth term of the expansion of $(x-y)^n$

11 Solve $(x-1)^{\frac{1}{2}}+(x-1)^{\frac{3}{2}}=2$

12 Solve $\begin{cases} x^3-y^3=117 \\ x^2+xy+y^2=39 \end{cases}$