191ST High School Examination

INTERMEDIATE ALGEBRA

Monday, January 21, 1907 — 9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others. 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. Papers entitled to 75 or more credits will be accepted if written by students in class A; those entitled to 60 or more credits will be accepted if written by students in class B.

1 Define symmetric equations, quadratic surd, geometric progression, coordinate axes, imaginary number.

2 Prove that $\left(a^{\frac{1}{m}}\right)^{\frac{1}{n}} = a^{\frac{1}{mn}}$ and that $a^m \times a^{-n} = a^{m-n}$

3 The 9th term of an arithmetic progression is $\frac{1}{6}$; the 16th term is $\frac{2}{3}$. Find the 1st term.

4 Write the first *five* powers of $\sqrt{-1}$

5 Determine under what conditions the roots of the equation $ax^2 + bx + c = 0$ will be (1) both positive, (2) both negative, (3) one positive and the other negative.

6 Solve $\begin{cases} x^2 + y^2 + x - y = 32 \\ xy = 6 \end{cases}$

7 Explain the meaning of $\frac{0}{0}$ and apply this meaning to explain the fallacy in the following:

$$7x - 35 = 3x - 15$$
$$7(x-5) = 3(x-5)$$
$$\therefore 7 = 3$$

8 A certain fraction plus its reciprocal equals $2\frac{1}{6}$; the numerator of the fraction minus the denominator equals 1. Find the fraction.

Or

Two numbers whose product is 28,350, consist of three places each; the hundreds' and units' digits of one are respectively 2 and 5, the corresponding digits of the other are 1 and 6, the tens' digit being the same in both numbers. Find the numbers.

9 Extract the square root of $38 - 12\sqrt{10}$

10 Construct the graph of the following function: $x^2 - 2x + 1$