University of the State of New York

201ST HIGH SCHOOL EXAMINATION

ADVANCED ALGEBRA

Thursday, June 9, 1910—9.15 a. m. to 12.15 p. m., only

Write at the top of the first page of your answer paper (*a*) the name of the school where you have studied, (*b*) the number of weeks and recitations a week that you have had in algebra.

Five recitations a week in algebra for two school years, in a recognized academic school, is the regular requirement, and any statement showing less or other than this should be accompanied by a satisfactory claim or explanation made by the candidate and certified by the principal; otherwise such paper will be returned.

Answer eight questions. No credit will be allowed unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient.

1 Extract the square root of $-12+16\sqrt{-1}$

2 Represent graphically and construct the sum of the following complex numbers:

$$\frac{1+18i}{3+4i} \text{ and } \frac{3-29i}{3-4i}$$

$[i=\sqrt{-1}]$

3 Factor the determinant $\begin{vmatrix} c & x & x \\ d & x & a \\ c & b & b \end{vmatrix}$

4 By determinants solve the following equations for y only:

$$5x-2y+2z=2$$
$$4x+5y-3z=7$$
$$5x-2y-3z=-4$$

5 How many different signals can be made with 10 flags, 2 red, 3 blue and the rest white, if all are used for each signal and are hoisted one above another?

6 Determine the number of positive, negative and imaginary roots of the following equation: $x^4+15x^2+7x-40=0$

7 Locate graphically the roots of the equation

$$x^4-2x^3-9x^2+10x+5=0$$

Determine approximately from the graph the minimum value or values of the first member of the equation.

8 One root of the equation $6x^4-13x^3-35x^2-x+3=0$ is $2-\sqrt{3}$; find the other roots.

9 Find by Horner's method, to *two* decimal places, the positive root of $x^3+3x^2+5x-178=0$

10 By the binomial formula find the cube root of 30 to *three* places of decimals.

11 Resolve into partial fractions

$$\frac{2x^2}{(x+1)^2(x^2+1)}$$

12 Given $\log 2=0.30103$; solve the exponential equation $4^{x-1}=\sqrt{10}$