195TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, June 15, 1908—9.15 a. m. to 12.15 p. m., only

Answer eight questions, selecting at least two from each group.

Group I

1 Simplify the following:

$$\sqrt{-64}+\sqrt{-25}+\sqrt{-121}-\sqrt{225};$$

$$\sqrt{-\tfrac{1}{16}}\times\sqrt{-\tfrac{4}{25}}\div\sqrt{-\tfrac{9}{49}}$$

2 Solve the equation $ax^2+bx+c=0$; show the condition under which the roots are (*a*) real and unequal, (*b*) real and equal, (*c*) conjugate imaginaries, (*d*) rational, (*e*) surds.

3 Solve as a quadratic $3x^2-7+3\sqrt{3x^2-16x+21}=16x$

4 Solve $\begin{cases} x^3+y^3=243 \\ xy(x+y)=162 \end{cases}$

Group II

5 Find the cube root of

$$a^6-2a^5+\frac{22a^4}{3}-\frac{224a}{27}+\frac{44a^2}{3}-8a+8$$

State how the trial divisor is formed and give reasons.

6 If $a:b=c:d$, prove (*a*) $ma:nb=mc:nd$, (*b*) $ma+nb:ma-nb=mc+nd:mc-nd$

7 Three numbers are in arithmetic progression; the first divided by the second equals $\frac{2}{3}$ and the sum of the second and third equals 7. Find the numbers.

8 Derive the formula for the sum of a geometric progression. Adapt this formula to the infinite decreasing series.

Group III

9 Plot the graph of (*a*) $\begin{cases} 4x+5y=1 \\ 5x-4y=9 \end{cases}$

(*b*) $y=x^2-3x+12$

From the graphs determine the approximate values of the roots of (*a*).

10 Explain the meaning of (*a*) negative integral exponents, (*b*) fractional exponents, (*c*) zero exponents.

11 Form the equation whose roots are a and b and show the relation between these roots and the coefficients of the equation formed.

12 The sum of the terms of a fraction is 5, and the product of this fraction by another fraction whose numerator and denominator exceed the numerator and denominator of the first fraction by 4 and 5 respectively is $\frac{1}{2}$. Find the fraction.