186TH HIGH SCHOOL EXAMINATION

ALGEBRA

Monday, June 12, 1905—9.15 a. m. to 12.15 p. m., only

Answer the first four questions and four of the others but **no more.** *If more than four of the others are answered only the first four answers will be considered. 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.*

1 Divide

$6x^6-11x^5+14x^4-12x^3+6x^2-23x+5$ by $3x^3-x^2-2x-5$

2 Factor *five* of the following: $x^{12}-1$, a^3-ab+a^2-b, x^9+y^9, $a^4+2a^2b^2+9b^4$, $12a^2+14a-6$, x^7+y^7, $x^{2a}+x^a$

3 Solve $2x-\frac{3x^2}{a}=a-2x$

4 Solve $\sqrt{x+10}-\frac{6}{\sqrt{x+10}}=5$

5 Simplify

$\frac{7^{\frac{1}{2}}-5^{\frac{1}{2}}}{7^{\frac{1}{2}}+5^{\frac{1}{2}}}$; $\frac{3\sqrt{15}}{\sqrt{27}}\times\frac{5\sqrt{32}}{6\sqrt{105}}\div\frac{5\sqrt{6}}{2\sqrt{63}}$; $b\sqrt{a}-a^2b^2\sqrt{\frac{1}{ab^2}}+\sqrt{a^3b^2}$

6 Find the number that is $\frac{1}{12}$ less than its reciprocal.

7 Solve $\begin{cases}\frac{3}{2x}-\frac{3}{4y}=\frac{1}{2}\\ \frac{1}{3x}+\frac{1}{2y}=\frac{1}{3}\end{cases}$

8 Solve $\begin{cases}x^3+y^3=28\\ x^2y+xy^2=12\end{cases}$

9 Expand to *four* terms by the binomial theorem $(a-2b)^{13}$, giving all the work for finding the coefficients.

10 If the sides of an equilateral triangle are increased by 7 inches, 4 inches and 1 inch respectively, a right triangle is formed; find the length of a side of the equilateral triangle.

11 Two numbers are such that the product of the first and 1 more than the second is 117; the product of the second and 1 less than the first is 96. Find the numbers.

12 Find the cube root of $a^6+6a^5-40a^3+96a-64$