High School Department

172D EXAMINATION

ALGEBRA

Monday, January 27, 1902—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 each step of solution. Reduce fractions to lowest terms. Express final result in 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 Simplify $\dfrac{a-\left(b-\dfrac{b^2}{a}\right)}{\dfrac{a^3+b^3}{a(a-b)}}-\dfrac{a+b}{a-b}$

2 Factor a^3+8, $4x^2-7xy+3y^2$, $ac-3a-2bc+6b$, a^8-b^8, $a^{2n}+6a^n+9$

3 Solve $x^2=3bx-2b^2$

4 Write out by the binomial theorem the first *four* terms of $(2a-b)^5$, giving all the work for finding the coefficients.

5 Divide $a^{x+1}-a^{x-2}b^3$ by $a-b$

6 Find the greatest common divisor (highest common factor) of $2a^4-3a^3+7a^2-12a-4$ and $2a^3-11a^2+11a+4$

7 A square grass plot would contain 73 square feet more if each side were one foot longer; find the side of the plot.

8 Solve $\begin{cases} \dfrac{m}{x}+\dfrac{n}{y}=a \\ \dfrac{n}{x}+\dfrac{m}{y}=b \end{cases}$

9 Solve $\begin{cases} x+y=7 \\ x^3+y^3=133 \end{cases}$

10 Simplify $(a-\sqrt{ab}+b)(\sqrt{a}+\sqrt{b})$; $\frac{1}{2}\sqrt{3}-\sqrt{\frac{1}{3}}+\sqrt{\frac{3}{16}}-\sqrt{\frac{1}{12}}$; $(x-y)\div(\sqrt{x}+\sqrt{y})$

11 Solve $\dfrac{20}{\sqrt{15+x}}-\sqrt{x}=\sqrt{15+x}$

12 The sum of two numbers is 16; the sum of their squares minus 67 equals the product of the two numbers. Find the numbers.