University of the State of New York

High School Department

171ST EXAMINATION

ALGEBRA

Tuesday, September 24, 1901 — 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 $\dfrac{\left(\frac{x}{y}+1\right)\left(\frac{x}{y^2}-\frac{1}{y}+\frac{1}{x}\right)}{\frac{x^2+y^2}{y(x-y)}-\frac{y}{x}}$

2 Factor *five* of the following: $a^2b+4ab^2+3b^3$, $ab+b-a-1$, $6a^2-13ab+6b^2$, $3x^2-12y^2$, a^4+4a^2+16, $x^3-3x^2y+3xy^2-y^3$, a^5-32

3 Simplify $ab-[2ab-\overline{ab+7b^2}-\{-b(5b-4a)-2b(a-\overline{a-b})\}]$

4 Solve $\begin{cases} x^2-xy=a^2+b^2 \\ xy-y^2=2ab \end{cases}$

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

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

7 In 6 hours A walks 2 miles more than B walks in 7 hours; in 9 hours B walks 11 miles more than A walks in 5 hours. Find the number of miles an hour that A and B each walk.

8 Solve $3x-\left(2x-\dfrac{x+7}{5}\right)=\dfrac{x+4}{6}+9$

9 Solve $3x^2-14x=24$

10 Find the square root of $16x^4-8x^2+\dfrac{16x^2y}{3}-\dfrac{4y}{3}+\dfrac{4y^2}{9}+1$

11 Solve $\begin{cases} 2x+3y-3z=15 \\ 4x-\ y-\ z=15 \\ x-2y+2z=\ 4 \end{cases}$

12 Solve $\dfrac{\sqrt{1+x}+\sqrt{1-x}}{\sqrt{1+x}-\sqrt{1-x}}=2$

13 Write out by the binomial theorem the first *four* terms of $\left(\dfrac{m}{2}-2\right)^7$, giving all the work for finding the coefficients.

14 The product of two numbers is 2; their sum is 1 greater than their product. Find the numbers.

15 Simplify $(2\sqrt{a}+5\sqrt{b})(4\sqrt{b}-\sqrt{a})$; $\sqrt{\dfrac{(x-y)^5}{8a^3}}\div\dfrac{2}{xy}\sqrt{\dfrac{x-y}{2a}}$; $1\frac{3}{5}\sqrt{20}-\sqrt{\dfrac{1}{5}}-\sqrt{45}$