University of the State of New York

High School Department

177TH EXAMINATION

ALGEBRA

Thursday, March 26, 1903—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 Divide $x^{3a+1}+x^{2a}-x^{a+1}+x^{a}$ by $x^{a+1}+x$

2 Factor *five* of the following: $4x^2-4x-3$, a^5+y^5, x^4+x, $c^2-cd+c-d$, a^8-b^8, $a^2-2ab+b^2-a^2b^2$, x^4-7x^2+1

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

4 Simplify

$$2\sqrt[3]{4}-\sqrt[6]{16}-(\sqrt{2})^{\frac{4}{3}};\ \frac{2+\sqrt{6}}{3+\sqrt{6}};\ (a\sqrt{a}+b\sqrt{b})\times(\sqrt{a}+\sqrt{b})$$

5 Solve $\begin{cases} 2x-4y-3z=-19 \\ 3x-2y+z=11 \\ x+3y-z=8 \end{cases}$

6 Expand by the binomial theorem the first *four* terms of $(2x^n-3)^7$, giving all the work for finding the coefficients.

7 Find the highest common factor (greatest common divisor) of $3x^4+7x^3-3x^2-9x+2$ and $3x^3+13x^2+17x+6$

8 A is $\frac{1}{2}$ as old as B, but 8 years hence A's age will be $\frac{2}{3}$ B's age; find the present age of each.

9 Solve $\frac{\sqrt{x+2}+\sqrt{x-3}}{\sqrt{x+2}-\sqrt{x-3}}=5$

10 Find the number of two digits which is equal to four times the sum of its digits and whose digits are reversed by adding 27 to the number.

11 Solve $\begin{cases} 3x-2y=13 \\ 3x^2+xy-2y^2=143 \end{cases}$

12 The sum of two numbers is 8; the square of the first minus twice the square of the second equals 7. Find the numbers.