22

University of the State of New York

Examination Department

126th examination

ALGEBRA

Wednesday, November 28, 1894—9 : 15 a. m. to **12** : 15 p. m., only

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100 *credits, necessary to pass,* 75

Answer questions 1-5 and five of the others but **no more.** *If more than five of these questions are answered only the first five of these answers will be considered. Division of groups is not allowed. 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 10 credits.*

1 Define *exponent, sign, coefficient, radical quantity, surd.*

2 Remove parentheses and simplify:

$$2\,[x+3\{-x+2y-(-2x-2y)+3x\}-4y]$$

3 Reduce to its simplest form $\frac{a-1}{1-a}+\frac{1-b}{b-1}$

4 Factor a^2-2a+1, a^2-a-2, $9-x^2$, $x^4+x^2y^2+y^4$, x^3-y^3

5 A man had a surplus of \$5000 after the purchase of a farm at \$150 an acre. Had the rate been \$180 an acre he would have needed \$1000 more for the purchase. How many acres were there in the farm?

6–7 Solve $ax+by=\frac{a^2}{2}+b^2$

$$\frac{2x}{a}+\frac{y}{b}=2$$

8 If the speed of a railway train should be increased 5 miles an hour the train would move 400 miles in 4 hours less time. What is the rate of the train?

9–10 Solve $x^2+y^2=5$

$x+y=3$ (Find two values of each unknown quantity.)

11 Simplify $\sqrt{\frac{a}{b}}$, $\sqrt{\frac{a}{2}}+\frac{\sqrt{2a}}{2}$, $\sqrt{a^3}\times\sqrt[3]{a^2}$, $\sqrt[3]{54}$, $(\sqrt{a^6})^{\frac{1}{2}}$

12 Find the cube root of $1+6a^2+6a^4+a^6-3a-7a^3-3a^5$

13 Expand by the binomial formula $(a^2-2b)^6$, indicating all computations for finding coefficients.

14–15 Multiply $x^{\frac{3}{6}}+x^{\frac{2}{6}}y^{\frac{1}{6}}+x^{\frac{1}{6}}y^{\frac{2}{6}}+y^{\frac{3}{6}}$ by $x^{\frac{3}{6}}+x^{\frac{1}{6}}y^{\frac{1}{6}}+y^{\frac{2}{6}}$