University of the State of New York

Examination Department

154TH EXAMINATION

ALGEBRA

Monday, June 13, 1898—9:15 a. m. to 12:15 p. m., only

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100 *credits, necessary to pass,* 75

Answer the first five questions and five of the others but **no more.** *If more than five of the others are answered only the first five 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 10 credits.*

1 Simplify $\left(\dfrac{\dfrac{a^2+b^2}{b}-a}{\dfrac{1}{a}-\dfrac{1}{b}}\right)\left(\dfrac{a^2-b^2}{a^3+b^3}\right)$

2 Factor $ax^2-4a^2x+4a^3$, x^2-y^2+x-y, $x^3-3x^2y+3xy^2-y^3$, $3a^2+a-2$, x^6-1

3 Solve $\dfrac{a}{x}-\dfrac{b}{y}=c$, $\dfrac{c}{x}+\dfrac{1}{y}=ab$

4 Solve $5x^2-12x=108$, and prove correctness of the result.

5 Solve $2x-1-\dfrac{2x-2}{2}=\dfrac{3x+1}{5}+\dfrac{x+1}{4}$

6 Simplify $x-[5y-\{x-(5z-\overline{2z-y})+2x-(x-2y-z)\}]$

7 Extract the square root of $a^4-a^3+\dfrac{a^2}{4}+4a-2+\dfrac{4}{a^2}$

8 A sum of money at simple interest amounted in 8 months to $496 and in 15 months to $510; find the sum and the rate of interest.

9 Write out by the binomial theorem the first *five* terms of $\left(\dfrac{x}{2}-2y^2\right)^7$

10 Solve $x-a+\sqrt{x^2-2ax}=b$

11 Solve $\begin{cases} x^2-y^2=8\frac{3}{4} \\ xy+y^2=\frac{7}{4} \end{cases}$

12 Simplify $\sqrt{x^3-2x^2y+xy^2}$, $5\sqrt{\dfrac{3}{5}}$, $\sqrt[6]{8a^3b^6}$, $\sqrt{a^3b-a^2}$, $(16a^4b^6-8a^6b^3)^{\frac{1}{3}}$

13 Divide $x-y$ by $x^{\frac{1}{2}}+y^{\frac{1}{2}}$

14 The difference of two numbers is 3; the difference of their cubes is 513; find the numbers.

15 Define *literal equation, surd, binomial, similar terms, power.*