The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Monday, September 9, 1918—9.15 a. m. to 12.15 p. m., only

Answer eight questions. Credit will not be granted unless all operations (except mental ones) necessary to find results are given; simply indicating the operations is not sufficient. Each answer should be reduced to its simplest form. Papers entitled to less than 75 credits will not be accepted.

1 Find the prime factors of *each* of the following:

$5y^2-80y+300$

x^3+2x^2-x-2

$(x+a)^2-(x-a)^2$

$a^2-17a+72$

$a^6y^3+c^3$

2 Simplify $\frac{a^2-b^2}{a^2-ab-6b^2}\times\frac{2a^2-4ab-6b^2}{a^2-3ab+2b^2}\div\frac{2a^2+2ab}{a^2-4b^2}$

3 Solve and check $\sqrt{x+5}+\sqrt{x-8}=\sqrt{3}$

4 *a* A father is now twice the age of his son; if x represents the son's age now, express twice the sum of their ages 5 years ago.

b Two numbers differ by d; if the greater number is x, what is the lesser number?

5 Solve $\begin{cases}\frac{1}{x}+\frac{1}{y}=7\\ \frac{1}{x^2}+\frac{1}{y^2}=25\end{cases}$

6 Simplify $2\sqrt{125}-\sqrt{\frac{25}{16}}+\sqrt[3]{27}-\sqrt[3]{-512}-\sqrt{180}$

7 Two steamers ply between two ports 475 miles apart; one goes half a mile an hour faster than the other and requires 2½ hours less for the voyage. Find the rates of the steamers.

8 Extract the square root of

$$a^6-6a^5-20a^3+15a^4-6a+15a^2+1$$

9 Solve correctly to *two* decimal places $2x^2+5x=5$

10 Separate 32 into two parts such that the greater diminished by 11 shall be to the less increased by 5, as 4 is to 9.

11 Solve $\sqrt{x-1}+\sqrt{x}=\frac{2}{\sqrt{x}}$