University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Monday, September 14, 1914 — 9.15 a. m. to 12.15 p. m., only

Answer 10 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. Each complete answer will receive 10 credits. Papers entitled to less than 75 credits will not be accepted.

1 Solve $\begin{cases} 4x - 3y + z = 9 \\ 9x + y - 5z = 16 \\ x - 4y + 3z = 2 \end{cases}$

2 Factor *each* of the following:

$x^2 + x - 2$

$16x^4 - 81$

$2a^3 - 8ab^2$

$3x^2 - 21x - 54$

$a^5 - b^5$

3 Find the value of $1 + \dfrac{1}{a + \dfrac{1}{b + \dfrac{1}{c}}}$ if $a = 2$, $b = 3$, $c = \frac{1}{4}$

4 Solve and check $\begin{cases} \dfrac{x}{2} + \dfrac{y}{3} = 7 \\ \dfrac{x}{3} + \dfrac{y}{4} = 5 \end{cases}$

5 Simplify $\begin{cases} 2\sqrt{3} + 3\sqrt{1\frac{1}{3}} - 5\sqrt{\frac{1}{3}} \\ (7\sqrt{2} - 3\sqrt{3} + \sqrt{5})(2\sqrt{2} + 4\sqrt{3} - 3\sqrt{5}) \end{cases}$

6 Simplify $\dfrac{n^2 + 2n + 3}{n^2 - 2n - 3} \times \dfrac{n^2 + 1}{n^3 - 1} \div \dfrac{n^2 + 4n + 3}{n^2 - 4n + 3}$

7 Solve $\sqrt{x+1} + \sqrt{3x+1} - 2 = 0$

8 For how many dollars must I sell a horse that cost *d* dollars in order to make 7%?

9 Two stores consume a certain amount of coal in 12 days; the larger store alone would consume the same amount in 20 days. In how many days would the smaller store consume it?

10 Two persons start to travel from two stations 24 miles apart and one overtakes the other in 6 hours; if they had walked toward each other they would have met in 2 hours. Find their rates of travel.

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

12 Find two numbers whose sum is 95, such that if the greater is divided by the less the quotient will be 4 and the remainder 5.