EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Monday, September 15, 1913—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 Divide to *four* terms $m^6 - 4m^4 + m^2$ by $m^2 - 2m + 1$

2 Factor *each* of the following:

$a^4 - 8a - a^3 + 8$

$x^6 - 64$

$x^2 - 2x - 35$

$6a^2 + 25a - 9$

3 Simplify $\frac{ab}{a+b}\left(\frac{a+b}{a} + \frac{b}{a+b}\right)$

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

5 Solve $\begin{cases} x + 3y = 7a \\ 5x - 2y = 18a \end{cases}$

6 Simplify $\begin{cases} (12\sqrt{5} - 8\sqrt{15} + 3\sqrt{30})\, 6\sqrt{10} \\ \sqrt{20} - \sqrt{\frac{1}{2}} + \sqrt{\frac{5}{9}} + 4\sqrt{2} - 3\sqrt{5} \end{cases}$

7 What is the quotient if m divided by n gives a remainder of x?

8 Find the square root of $x^4 + 2x^3 + 5x^2 + 4x + 4$

9 The denominator of a fraction is 13 more than the numerator; if 7 is added to the numerator the value of the fraction will be $\frac{2}{3}$; find the numerator.

10 A boy's age is now $\frac{2}{5}$ of what it will be 12 years hence; how old is he?

11 A rectangle has the same area as one 10 ft longer and 6 ft narrower; it also has the same area as one 4 ft longer and 3 ft narrower. Find the dimensions of the rectangle.

12 The sum of two numbers is 19 and the sum of their squares is 193; find the numbers.