The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Monday, September 11, 1916—9.15 a. m. to 12.15 p. m., only

Answer all the questions in group I and two from group II. 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.

Group I

Answer all the questions in this group.

1 Find the H. C. F. and the L. C. M. of the following: $12a^3+4a^2-120a$, $54a^3-600$, $6a+20-3a^3-10a^2$

2 Solve $\begin{cases} \frac{x}{3}+3y=\frac{11}{12} \\ \frac{x}{4}-2y=-\frac{3}{8} \end{cases}$

3 *a* Write the following in good English without using symbols: $3ab(a+b)-(2a+3b)+\frac{2ab^2}{3c}=x^3y^2$

b Extract the square root of

$$1+5x^2+2x^4+x^6-4x^5+2x^3+2x$$

4 *a* Simplify $\sqrt{75}-4\sqrt{243}+2\sqrt{108}$

b Simplify $5\sqrt{\frac{3}{8}}-12\sqrt{\frac{5}{3}}+6\sqrt{60}-30\sqrt{\frac{1}{5}}$

5 Solve $x+\sqrt{a^2+x^2}=\frac{5a^2}{\sqrt{a^2+x^2}}$

6 Solve $\begin{cases} \frac{x+y}{y}=a \\ xy=b \end{cases}$

Group II

Answer two questions from this group.

7 A man bought two farms for $3600 each; the larger contained 15 acres more than the smaller, but the smaller cost $8 per acre more than the larger. How many acres did each contain?

8 Find two numbers such that if 7 is added to each they will be in the ratio of 2 to 3, and if 2 is subtracted from each they will be in the ratio of 1 to 3.

9 Prove by means of letters that in any proportion consisting of four quantities the product of the means is equal to the product of the extremes.

10 *a* A girl has x dollars and y dimes; if she spends 50 cents, how many dimes has she left?

b A man is now n years old; how old was he m years ago and how long must he live to be y years old?

c If $(n+1)$ represents any odd integer, express the next odd integer.

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