The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Monday, September 13, 1921—9.15 a. m. to 12.15 p. m., only

Answer question 1 and five of the others. 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.

Fifty credits will be assigned to question 1.

1 *a* Factor *each* of the following:

$6ax^2+13ax-5a$

x^4y^4-81

$\frac{1}{4}-x+x^2$

$12b+13ab+a^2b$

b Of what expression is x^2-2x+3 the square root?

c Simplify:

$3\{16x-4[3+2(3x-2)-\frac{1}{4}(8+4x)]-20\}$

d Solve for x and check the results:

$3x^2=25x+18$

e Simplify $3\sqrt[3]{16}-3\sqrt{12}+2\sqrt[3]{54}-5\sqrt{27}$

f Solve

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

$$\frac{5}{2x}-\frac{1}{3y}=\frac{7}{3}$$

g By substituting a numerical value, other than 1, for x, find whether $\frac{3x}{x^2-1}-\frac{4}{x-1}+\frac{1}{x+1}$ equals $\frac{8}{1-x^2}$

2 One baseball team has won 6 out of the 11 games played while another team has won 10 out of 11 games; how many consecutive games must the first team win from the second in order that their averages of games won may be equal?

3 Extract the square root of $x^4+2x^3-x+\frac{1}{4}$

4 The sum of two numbers is 55 and the less is contained in the greater two times with a remainder of 1; find the numbers.

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5 *a* A boy earns c cents in d days and spends an average of s cents a day; how much will he have saved at the end of the d days?

b If b men can do a piece of work in m days, what is the average portion of the work done by each man per day?

c A is 2 years younger than B; if B is x years old now, what will be A's age 7 years hence?

6 Solve and group the answers:

$2x-3y=2$

$(x-y)^2=y^2-7$

7 *a* Solve for a the formula $S=\frac{n}{2}(a+l)$

b Find the value of a to the *nearest tenth* if $S=83.3$, $n=7$ and $l=15.43$.

8 A girl has a composition of 1344 words to copy; by using a typewriter she can write an average of 26 words more a minute than she can write with a pen and it will take her 52 minutes less to copy the composition. Find her rate per minute with the typewriter.

9 *a* Make a graph of the formula $S=\frac{1}{4}C$ where S and C represent selling price and cost respectively.

b If a certain article costs $7, show on the graph how the selling price is found.