The University of the State of New York

EXAMINATION FOR QUALIFYING CERTIFICATES

ELEMENTARY ALGEBRA

Tuesday, September 7, 1920—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.

1 *a* Divide $20a^3-4+18a^4+18a-19a^2$ by $2a^2-3a+4$ Check.

b Factor *each* of the following:

$x^2-a^2+y^2-2xy$

$25+49x^2-70x$

$6x^2+11x-10$

$16x^2y^6-36x^4y^8$

c Simplify $\frac{b^2-11b+30}{b^3-6b^2+9b} \times \frac{b^2-3b}{b^2-25} \div \frac{b^2-9}{b^2+2b-15}$

d Simplify $\frac{ax^2+b}{2x-1}+\frac{2(bx+ax^2)}{1-4x^2}-\frac{ax^2-b}{2x+1}$

e Add and check

$3a+b,\quad 5a-c,\quad 2a+b+4c,\quad 2c-3b-2a$

f Solve $\frac{4x-a}{2x-a}-1=\frac{x+a}{x-a}$

g Solve and check $\begin{cases} \frac{5}{x}-\frac{3}{y}=7 \\ \frac{15}{y}+\frac{60}{x}=16 \end{cases}$

h Simplify $3\sqrt[3]{54}-2\sqrt{18}+5\sqrt[3]{\frac{1}{4}}+5\sqrt{\frac{1}{4}}$

i From the formula $\frac{wl}{4}=\frac{sbh^2}{6}$ find the value of h.

j Simplify $2x-3(x-1)-[x-2(2x-1)]$

2 *a* If m pounds of sugar cost a cents, how much will c pounds cost?

b A has d dollars and B has 5 dollars less than four times as many dollars as A. How many dollars has B?

c The product of two numbers is x. If one number is y, what is the other number?

3 Into what two parts may $1000 be divided so that the income from one part at 6% shall equal the income from the other part at 4%?

4 Solve for V the formula $E=\frac{MV^2}{2}$. If $E=19\frac{1}{2}$ and $M=\frac{1}{4}$, find the value of V to the *nearest hundredth*.

5 Extract the square root of $x^4-2x+\frac{1}{9}+\frac{20x^2}{3}-6x^3$

6 A requires 3 hours longer than B to walk 30 miles, but if A should double his pace he would require 2 hours less than B; find the rate of walking of each.

7 A rectangle has an area of 400 square feet; if its width had been 2 feet more, the width would have been $\frac{4}{5}$ of the length. Find its dimensions.

8 In an examination the number of candidates who were successful was four times the number of those who failed; if there had been 14 more candidates and 6 fewer failures, the number of those who passed would have been 5 times the number of those who failed. Find the number of candidates.

9 At 7 a. m. a man started for a town 18 miles distant, walking at the rate of 4 miles an hour; after walking for two hours he rested half an hour, continuing in this manner till he reached his destination. Draw a graph of his journey and from the graph determine at what hour he reached his destination.