The University of the State of New York

226TH HIGH SCHOOL EXAMINATION

ELEMENTARY ALGEBRA

Wednesday, January 18, 1922—9.15 a. m. to 12.15 p. m., only

Write at top of first page of answer paper (*a*) name of school where you have studied, (*b*) number of weeks and recitations a week in elementary algebra. The minimum time requirement is five recitations a week for a school year.

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.

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

$a^3b^2-81a^3$ [2]

$x^{2a}-18x^a+81$ [2]

$x^2+2x-24$ [2]

$4a^2-15ab-4b^2$ [2]

$a^2-x^2-9y^2+6xy$ [2]

b Divide $4m^4-9m^3+6m-1$ by $2m^2+3m-1$. Check, letting $m=2$. Division [4], check [2]

c Reduce to lowest terms: $\frac{3c^2-6c}{6c^2-24}$ [4]

d Simplify each radical and unite the results into a single term: $30\sqrt{\frac{1}{2}}-\frac{9}{2}\sqrt{8}+9\sqrt{\frac{169}{2}}$ [4]

e Multiply $3\sqrt{5}-2\sqrt{10}$ by $4\sqrt{5}+\sqrt{10}$ and write the result in the simplest form. [3, 1]

f Solve for x and y:

$ax+by=2$

$abx+aby=a+b$ [8]

g Solve for k:

$\frac{7k}{5}-\frac{1}{14}(k-11)=\frac{3}{7}(k-25)+34$ [8]

h Solve and check *one* of the results:

$\frac{x}{3(x-1)}=\frac{x-2}{2}$ [7, 1]

2 The difference between two numbers is 12, and seven times the smaller number exceeds the greater by 30; find the numbers. Equation [7], solution [3]

3 In the formula $T=2\pi R(R+H)$

a Solve for H in terms of the other letters. [5]

b Find the value of H to the *nearest* tenth if $\pi=3.14$, $R=10$ and $T=794.42$. [5] [No partial credit allowed on either part. Credit given *b* independent of *a*.]

4 Solve for x and y and group your answers:

$x^2-3y^2=13$

$1-x+2y=0$ [6, 2, 2]

5 Solve for x to the *nearest* hundredth: $x^2+11=7x$ [10]

6 A man starts from a certain place and walks at the rate of $3\frac{1}{2}$ miles an hour; two and a half hours later another man starts from the same place and rides in the same direction at the rate of $8\frac{1}{2}$ miles an hour. In how many hours will the second man overtake the first? Equation [7], solution [3]

7 *a* The three digits of a number are a, b and c. Represent the number. Represent the number with its digits reversed. [2, 1]

b A man earns e dollars a month and spends s dollars a month; how many dollars will he save in 3 years? [3]

c John is y years old now; write the equation showing that four times his age three years ago equals twice his age five years hence. [4]

8 The following table shows the earnings and spendings of a boy from April to October inclusive during a certain year:

Month	April	May	June	July	August	September	October
Earnings	$2.00	$3.20	$4.80	$10.40	$12.00	$4.40	$5.20
Spendings.....	3.20	3.60	2.40	2.00	1.60	8.40	4.00

a On the same diagram make *two* graphs, one of the earnings and the other of the spendings. [Use solid line to represent earnings and dotted line to represent spendings.] [6]

b Show on the drawing one place where the two graphs cross. Read this point and tell what it means. [3]

c During July and August the boy worked on a farm; how is this shown by the graph? [1]