The University of the State of New York

224TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, January 17, 1921—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 (1) elementary algebra, (2) intermediate algebra.

The minimum time requirement is four recitations a week for half a school year, after the completion of elementary algebra.

Answer eight questions, including either question 4 or question 5. Credits 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 Find the prime factors of *each* of the following:

$x^{2a}-12x^a+36$ [2½]

$6a^2-17a+12$ [2½]

$32-y^5$ [2½]

$x^3-7x^2+7x+15$ [2½]

$8a^4-18b^4$ [2½]

No partial credit allowed on any part.

2 Find to the *nearest* hundredth the roots of

$x^2-51=4x$ [12½]

3 *a* Rationalize the denominator in $\frac{\sqrt{3}-\sqrt{6}}{\sqrt{8}}$ and simplify the result.

b Express *each* of the following as a single radical and simplify where possible:

$\sqrt[5]{4}\times\sqrt[5]{16}$; $\sqrt[5]{3}\div\sqrt[5]{24}$; $\sqrt[3]{\sqrt{128}}$

a [6½]; *b* [2], [2], [2]. No partial credit allowed on any part in *b*.

4 A farmer is cutting grain around a field 60 rods long and 40 rods wide; how wide a strip must he cut so that 5 acres remain? [160 square rods = 1 acre] Equation [8½], solution [4]

5 A man agrees to work for a builder on the condition that for each day he works he is to receive $6 and for each day he is idle he is to forfeit $2; at the end of 60 days he received $240. How many days was he idle? Equation [9], solution [3½]

6 By the use of logarithms find the value of

$$\frac{.03472\times\sqrt[3]{47.2}}{2.08}$$ [12½]

7 Find by the use of a formula the number of consecutive integers beginning with 10 that must be taken for the sum to equal 2035. Equation [7½], solution [5]

8 Solve for x and y, correctly group your answers and check:

$$x^2-xy+y^2=7$$
$$x^3+y^3=28$$

First solution [6], second solution [3], grouping [1], check [2½]

9 The roots of a certain equation are 3 and $-2\frac{1}{2}$. Form the equation by *two* different methods. Express the equation without fractions. Each method [5], writing equation [2½]

10 *a* If $y^{\frac{3}{4}}=4$ and $x=y^{-2}$, find x.

b Write the value of $\frac{2+2^{-1}}{5}+(-8)^0-4^{\frac{3}{2}}$

a Finding y [4], finding x [2]; *b* [6½]

No partial credit allowed in *a*.

11 If the cost of goods is C, the cost of doing business $b\%$ of the selling price and the profit $p\%$ of the selling price, find a formula for the selling price (S). [12½]

12 Using the same set of axes, plot the following equations and from the graph determine the solutions they have in common:

$$x^2+2y=17$$
$$x-y+1=0$$

First graph [8], second graph [2½], reading solutions [2]

13 Find by the binomial formula the first *five* terms of the expansion $\left(x-\frac{1}{x}\right)^9$ and write these terms in their simplest form. Expansion [9], simplifying [3½]