

The University of the State of New York
271ST HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Wednesday, January 26, 1938 — 9.15 a. m. to 12.15 p. m., only

Instructions

Do not open this sheet until the signal is given.

Group I

This group is to be done first and the maximum time allowed for it is one and one half hours. Merely write the answer to each question in the space at the right; no work need be shown.

If you finish group I before the signal to stop is given you may begin group II. However, it is advisable to look your work over carefully before proceeding, since *no credit will be given any answer in group I which is not correct and in its simplest form.*

When the signal to stop is given at the close of the one and one half hour period, work on group I must cease and this sheet of the question paper must be detached. The sheets will then be collected and you should continue with the remainder of the examination.

Group II

Write at top of first page of answer paper to group II (a) name of school where you have studied, (b) number of weeks and recitations a week in intermediate algebra.

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

The use of the slide rule will be allowed for checking but all computations with tables must be shown on the answer paper.

Fill in the following lines:

Name of school.....Name of pupil.....

Detach this sheet and hand it in at the close of the one and one half hour period.

Group I

Answer all questions in this group. Each correct answer will receive $2\frac{1}{2}$ credits. No partial credit will be allowed. Each answer must be reduced to its simplest form.

- 1 Write the equation of the circle whose center is at the origin and whose radius is 3. 1.....
- 2 Express in terms of the imaginary unit i the sum of $7\sqrt{-4}$ and $3\sqrt{-1}$ 2.....
- 3 Solve for x the equation $\sqrt{2x} - 5 = 0$ 3.....
- 4 What is the slope of all straight lines parallel to the line whose equation is $y = \frac{1}{2}x + 7$? 4.....
- 5 Write the first two terms of the expansion $(a + 2b)^5$ 5.....
- 6 Find the number whose logarithm is 3.2748 6.....
- 7 Express $\log \frac{x}{y}$ in terms of $\log x$ and $\log y$. 7.....
- 8 Factor $2x^2 + 5x - 3$ 8.....
- 9 What is the product of the roots of the equation $3x^2 + kx + 21 = 0$? 9.....
- 10 The roots of the equation $x^2 - 4x + 7 = 0$ are (a) real and equal, (b) imaginary, (c) real, unequal and rational or (d) real, unequal and irrational. Which is correct, (a), (b), (c) or (d)? 10.....
- 11 Find the value of $27^0 + 4^{-2}$ 11.....
- 12 Express the fraction $\frac{7}{\sqrt{5}-1}$ with a rational denominator. 12.....
- 13 An inclined road rises uniformly at an angle of 8° . If a man walks 2000 feet up the road, find, correct to the nearest foot, the vertical distance he has risen. 13.....
- 14 Simplify $\frac{a^{3m}}{a^m}$ 14.....
- 15 Given the formula $C = \frac{L-S}{S}$; solve for S . 15.....
- 16 Find the number of terms in an arithmetic progression when the sum is 247, the first term is 4 and the last term is 34. 16.....
- 17 Insert two geometric means between 9 and 72. 17.....
- 18 If x varies directly as y , and $x = 40$ when $y = 2$, find x when $y = 18$ 18.....
- 19 Write the linear equation expressing the relationship between x and y as shown in the following table: 19.....

x	3	5	7	9
y	11	19	27	35

20 A taxi driver rents a taxicab at the rate of \$2 per day plus 2 cents for each mile the cab is driven. Express in dollars the total amount of rent that the driver pays for a period of d days during which the cab is driven a total of m miles. 20.....

See instructions for group II on page 1.

Group II

Answer five questions from this group. Full 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. Purely arithmetical solutions for problems will not be accepted.

21 Find, correct to the nearest tenth, the roots of the equation $3x^2 - 2x - 9 = 0$ [10]

22 Solve the following pair of simultaneous equations, group your answers and check one set:

$$2x + y = 1$$

$$y^2 - 3x = 3 \quad [7, 2, 1]$$

23 Given the formula $r = \sqrt{\frac{3V}{\pi h}}$; by means of logarithms find the value of r correct to the nearest tenth, if $h = 115$, $V = 1710$ and $\pi = 3.142$ [10]

24 A rectangle is 8 inches by 15 inches. If each dimension is diminished by the same amount, a new rectangle will be formed whose area is less by 42 square inches than the area of the original rectangle. Find the dimensions of the new rectangle. [6, 4]

25 If the speed of an automobile is increased 8 miles per hour, it will take 2 hours less time to go 140 miles. What is its original speed? [6, 4]

26 Write the equations that would be used in solving any two of the following problems. In each case state what the unknown letter or letters represent. [Solution of the equations is not required.]

a A can work twice as fast as B. Working together they can complete a certain task in 4 days. How long would it take each to do the task alone? [5]

b When a certain number containing two digits is divided by the sum of the digits, the quotient is 8. The tens digit exceeds three times the units digit by 1. Find the number. [5]

c A broker sold a certain number of shares of stock for \$3150. Later, for \$3168, he bought 9 shares more than he sold, the price being \$6 less per share than in the first transaction. Find the number of shares sold. [5]

27 a Draw the graph of the equation $y = x^2 - 4x$ from $x = -1$ to $x = 5$ inclusive. [6]

b Using the same set of axes as in a, draw the graph of the equation $y = 2x - 5$ [2]

c From the graphs made in answer to a and b, determine the values of x and y common to both equations. [2]

*28 Solve the following set of equations for x , y and z :

$$5x - 4y + 4z = 29$$

$$2x + 5y - 10z = -14$$

$$x - 3y + 2z = 13 \quad [10]$$

* This question is based on one of the optional topics in the syllabus.