

The University of the State of New York

270TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, August 24, 1937 — 8.30 to 11.30 a. 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.

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) names of schools where you have studied, (b) number of weeks and recitations a week in intermediate algebra previous to entering summer high school, (c) number of recitations in this subject attended in summer high school of 1937.

The minimum time requirement is five recitations a week for half a school year after the completion of elementary algebra. The summer school session will be considered the equivalent of one semester's work during the regular session or five recitations a week for half a school year.

For those pupils who have met the time requirement the minimum passing mark is 65 credits; for all others 75 credits.

For admission to this examination attendance on at least 30 recitations in this subject in a registered summer high school in 1937 is required.

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

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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 Solve the equation $2x^2 - 6x - 1 = 0$ for values of x correct to the *nearest tenth*. [10]

22 Solve the following set of simultaneous equations and group the answers:

$$\begin{aligned} x^2 - y^2 &= 7 \\ 2x + y &= 5 \end{aligned} \quad [8, 2]$$

23 The tens digit of a two-digit number is 3 less than twice the units digit. If the digits are reversed, the new number is 18 less than the original number. Find the original number. [7, 3]

24 If $x = \frac{36.72 \times (1.76)^5}{975}$, find by the use of logarithms the value of x to *four* decimal places. [10]

25 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 Twice the smaller of two consecutive even numbers exceeds the larger by 18. Find the numbers. [5]

b Forty-five gallons of a 14% solution of copper sulphate are made by combining 10% and 19% solutions. How many gallons of each of the two solutions are used? [5]

c A man has \$10,000 in the bank on which he would receive \$200 a year in interest. He draws the \$10,000 out, investing a part in bonds paying 3% and the rest in stock that yields 4%. By making the change, his yearly income is increased by \$140. Find the amount he invests in bonds. [5]

d If the three sides of a triangle are 13, 20 and 21, find the length of the altitude on side 21. [5]

26 *a* If a newsboy saves \$1.50 the first month, \$2.50 the second month, \$3.50 the third month, and so on, how much does he save in 12 months? Solve by formula. [5]

b Each person has 2 parents, 4 grandparents, and so on. If there have been no inter-marriages, find how many ancestors a person has in 10 generations, beginning with the parents. Solve by formula. [5]

27 *a* Using the same set of axes, plot the graphs of $y = x^2 + x + 2$ and $3y + 2x = 6$ [6, 2]

b From the graphs made in answer to *a*, estimate as accurately as possible the values of x and y common to the two equations. [2]

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 Find the discriminant of the equation $2x^2 - 7x + 4 = 0$ Ans.....

2 If the discriminant of a quadratic equation in x is 1, the roots are (a) imaginary, (b) rational and equal, (c) rational and unequal or (d) irrational and unequal. Which is correct, (a), (b), (c) or (d)? Ans.....

3 Find, correct to the nearest tenth, the number whose logarithm is 2.7548 Ans.....

4 If $\log x = 9.7450 - 10$, find $\log \sqrt[3]{x}$ Ans.....

5 Write the third term of the expansion $(a - 2b)^6$ Ans.....

6 One root of the equation $x^2 - 2x + p = 0$ is $1 - \sqrt{2}$; what is the other root? Ans.....

7 Solve for x the equation $\frac{8}{\sqrt{x+7}} - 3 = 0$ Ans.....

8 The relation of the area, base and altitude of a triangle is expressed by the formula $h = \frac{2A}{b}$; if b increases, does h increase or decrease if A remains constant? Ans.....

9 Insert two arithmetic means between -1 and 11 . Ans.....

10 Find the ratio of the geometric progression if $a = \frac{3}{4}$, $l = 24$ and $n = 6$ Ans.....

11 In triangle ABC , angle $C = 90^\circ$, angle $B = 23^\circ$ and $AB = 1.2$; if the length of AC is represented by m , find the logarithm of m . Ans.....

12 Multiply $\sqrt{8} + 2\sqrt{6}$ by $2\sqrt{2} - \sqrt{6}$ and write the answer as a binomial. Ans.....

13 Find the value of the expression $8^{\frac{3}{2}} + 3^{-2} - \frac{1}{9}(10)^0$ Ans.....

14 What is the y -intercept of the graph whose equation is $2y = 5x + 4$? Ans.....

15 Without solving, state whether the values $x = 3$, $y = 2$ are roots of the simultaneous equations below.

$$\begin{aligned} 2x + y &= 8 \\ x^2 - y^2 &= 6 \end{aligned}$$

Ans.....

16 Factor $6x^{2n} - 11x^n - 2$ Ans.....

17 Write the linear equation the graph of which would pass through the points whose coordinates are given in the table below. Ans.....

x	0	2	3	-1
y	-3	1	3	-5

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18 A certain firm pays a clerk a weekly salary of d dollars and a bonus of 10% on the amount of his sales over \$100. Express in terms of d the amount that he earned in one week if his sales for the period totaled \$110.

Ans.....

19 Simplify $\frac{2-x}{x^2} \div (1 - \frac{4}{x^2})$

Ans.....

20 Two men, A and B, apply for a job digging a ditch. A can do the work alone in m days. If B works twice as fast as A, what part of the work can B do in one day?

Ans.....