

The University of the State of New York

267TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, August 25, 1936 — 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 1936.

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

For those pupils who have met the time requirement previous to entering summer high school 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 1936 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.

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 values of x in the equation $3x^2 - 7x - 1 = 0$ [10]

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

$$5x^2 - 2 = xy$$

$$2x + y - 5 = 0 \quad [8, 2]$$

23 a Find the sum of the first eight terms of the progression $\frac{1}{3}, -\frac{2}{3}, \frac{4}{3}, \dots$ [5]

b The seats in a semicircular auditorium are so arranged that each row above the lowest has 6 more seats than the one next below. If there are 20 seats in the lowest row and there are 11 rows, how many seats are there in the auditorium? [5]

24 Find by the use of logarithms the value of

$$\frac{\sqrt[3]{.264} \times (3.45)^5}{36.33} \quad [10]$$

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 The sum of the first and the second of three consecutive even numbers exceeds the third by 14. Find the numbers. [5]

b A grocer wishes to have a grade of coffee worth 22 cents a pound. How many pounds of the 25-cent grade must he mix with 15 pounds of the 18-cent grade in order to get the desired mixture? [5]

c A rectangular grass plot 15 feet by 20 feet is to be surrounded by a gravel walk of uniform width. If the area of the walk is to be 246 square feet, find its width. [5]

26 A motorist drove from A to B , a distance of 70 miles. On his return he drove at an average of 5 miles an hour faster and made the trip in 20 minutes less time. Find the average rate at which he drove from A to B . [7, 3]

27 a Plot the graph of the equation $y = x^2 - 4$ from $x = -3$ to $x = +3$ inclusive. [5]

b On the same set of axes draw a circle having its center at the origin and passing through the point $(3, 4)$. [2]

c Write the equation of the circle made in answer to b . [2]

d From the graph estimate, correct to the nearest tenth, the coordinates of one of the two real points of intersection. [1]

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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 Factor $2x^{2a} - 5x^a - 12$ Ans.....

2 Write the first three terms of the expansion of $(2 - x)^5$ Ans.....

3 Find the 4-digit number whose logarithm is 3.4658. Ans.....

4 Find the logarithm of x if the logarithm of x^3 equals $9.7615 - 10$ Ans.....

5 Express the following sum in terms of i : $\sqrt{-9} + 2\sqrt{-4}$ Ans.....

6 What is the name of the curve whose equation is $4x^2 - 9y^2 = 1$? Ans.....

7 What is the sum of the roots of the equation $2x^2 - 5x + 7 = 0$? Ans.....

8 If a is positive, are the roots of the equation $5x^2 - 6x - a = 0$ real or imaginary? Ans.....

9 Express $\frac{5\sqrt{3}}{\sqrt{3} - 1}$ as an equivalent fraction having a rational denominator. Ans.....

10 Find the value of $81^{\frac{1}{2}} \times 3^0 - 2^{-1}$ Ans.....

11 Write in terms of a and r the formula for the sum (S) of the terms in an infinite decreasing geometric progression. Ans.....

12 Find a in the arithmetic progression in which $l = 28$, $n = 49$ and $d = \frac{1}{2}$ Ans.....

13 What is the slope of the line whose equation is $2y - 4 = x$? Ans.....

14 Solve for x the equation $2x = \sqrt{4x^2 + 5x} - 1$ Ans.....

15 Simplify $\frac{a - \frac{4}{a}}{\frac{2}{a} - 1}$ Ans.....

16 Is the point whose coordinates are $(2, 5)$ common to the graphs of the two equations $3x - 1 = y$ and $x^2 + xy = 12$? [Do not plot the graphs.] Ans.....

17 A loan library rents books at a charge of 3 cents for each day the book is in use, except that no charge shall be less than 9 cents. What will be the charge for keeping a book n days if n is greater than 3? Ans.....

18 The first four sets of values of x and y given below represent coordinates of points on a straight-line graph. What must be the value of y corresponding to $x = 5$, if that point is also to be on the straight line? Ans.....

x	0	1	2	4	5
y	-1	2	5	11	?

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19 An airplane flying in a straight line rises 129 yards in going 976 yards. Find, correct to the *nearest degree*, the angle which the path of the plane makes with the horizontal.

Ans.....

20 If L represents the list price of a certain article and the merchant offers a discount of $r\%$ from the list price, represent the selling price in terms of L and r .

Ans.....