The University of the State of New York

261st HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, August 21, 1934 — 8 30 to 11 30 a m , only

Instructions

Do not open this sheet until the signal is given

Answer all questions in part I and five questions from part II

Part I is to be done first and the maximum time to be allowed for this part 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 part I before the signal to stop is given you may begin part II However, it is advisable to look your work over carefully before proceeding to part II, since *no credit will be given any answer in part I which is not correct and reduced to its simplest form*

When the signal to stop is given at the close of the one and one half hour period, work on part 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

{1}

INTERMEDIATE ALGEBRA

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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

Part I

Answer all questions in this part   Each question has $2\frac{1}{2}$ credits assigned to it, no partial credit should be allowed   Each answer must be reduced to its simplest form

1 Multiply $2x^{n+1}$ by x^{-n} *Ans*

2 Find the value of $64^{\frac{2}{3}} - (3x)^0$ *Ans*

3 How many terms are there in the expanded form of $(a + b)^{15}$?   *Ans*

4 Find the number whose logarithm is $9\,8492 - 10$ *Ans*

5 Factor $y^{2n+1} - 9y$ *Ans*

6 Express $\dfrac{5}{2\sqrt[3]{4}}$ as an equivalent fraction having a rational denominator   *Ans*

7 Write the discriminant of the equation $x^2 - 6x = 5$ *Ans* ·

8 The discriminant of a quadratic equation in x is $- 4$, what is the nature of the roots?   *Ans*

9 Solve for x the equation $2\sqrt{x + 5} - 5 = 0$ *Ans*

10 In an arithmetic progression $n = 18$, $a = 2$ and $d = 3$, find S *Ans*

11 Express the decimal 2121 as a fraction in its lowest terms   *Ans*

12 The results of a series of experiments gave the data in the following table

d	0	1	2	4	5
c	3	5	7	11	13

Write a linear equation showing the relation between d and c *Ans*

13 Form the quadratic equation whose roots are $\frac{1}{2}$ and 3   *Ans*

14 Solve for S in terms of the other letters the formula $R = \dfrac{2AS}{L-2S}$ *Ans*

15 In triangle ABC, in which angle C is a right angle, angle $A = 32°$ and side $AC = 45\,6$ Using log tan $32° = 9\,7958 - 10$ and log $45\,6 = 1\,6590$, find side BC *Ans*

16 Simplify $\left(3 - \dfrac{x + 1}{x}\right) \times \left(\dfrac{x}{1 - 2x}\right)$ *Ans*

17 What is the name of the curve represented by the equation $xy = 4$?   *Ans*

18 The areas of two similar polygons vary as the squares of any two corresponding sides   If two similar hexagons have sides of 3 inches and 1 inch respectively and the area of the first hexagon is 36 square inches, what is the area of the second?   *Ans*

19 Write the equation of the line that has a slope of 2 and a y-intercept of $- 3$ *Ans*

20 What is the arithmetic mean between the roots of the equation $x^2 - 4x + p = 0$?   *Ans*

[2]

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Write at top of first page of answer paper (*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 1934

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 1934 is required

Part II

Answer five questions from this part   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

In the examination in intermediate algebra the use of the slide rule will be allowed for checking provided all computations with tables are shown on the answer paper

21 Solve the following equation for values of x correct to the *nearest tenth*
$$3x^2 - 7x - 5 = 0 \quad [10]$$

22 Find by the use of logarithms the value of $\dfrac{904\ 7 \times \sqrt[3]{643}}{\cos 12°}$ [10]

23 A man drove from A to B, a distance of 120 miles   On his return trip he drove, on an average, 6 miles an hour faster and reached A in 40 minutes less time than in going from A to B Assuming that he drove each way at a uniform rate of speed, find the rates   [6, 4]

24 Solve the following set of equations, group the results and check *one* set of answers
$$3x - y = 11$$
$$3x^2 - y^2 = 47 \qquad [7, 1, 2]$$

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 equations not required]

    a Three numbers are in the ratio 1 7 25   If 4 is added to each, the resulting numbers form a geometric progression   Find the numbers   [5]

    b $ABCD$ is a quadrilateral with the diagonal AC and a right angle at B If side AB is 10 and AC exceeds BC by 2, find BC [5]

    c A can do a piece of work in 12 days   After working 2 days he is joined by B and together they finish the work in 4 days   How long would it take B working alone to do the piece of work?   [5]

    d How much water must be added to 5 quarts of a 70% solution of alcohol to reduce it to a 40% solution?   [5]

26 A firm dealing in electric refrigerators offers to sell a certain type either at the regular price of \$98 or on the following terms   The purchaser agrees to pay 1¢ the day the refrigerator is installed, 3¢ the following day, 9¢ the next and so on until he has made 9 payments in all   Does the purchaser gain or lose by buying under the second plan and how much?   [10]

27 The number of degrees in the reading y of a thermometer for a certain period of time is expressed by the equation $y = x^2 - 5x + 3$ where x represents the number of hours after midnight

    a Plot the graph of the function from $x = 0$ to $x = 6$ inclusive   [7]

    b At what time was the temperature at the lowest point?   [1]

    c What was the temperature at 5 a m ?   [2]

*28 Solve the following set of equations

$$2x - y + 3z = 13$$
$$4x - 3y - 2z = 1$$
$$2y - 6x + z = -10 \qquad [10]$$

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

[4]