

The University of the State of New York

260TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, June 21, 1934—9.15 a. m. to 12.15 p. 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.

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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 2½ credits assigned to it; no partial credit should be allowed. Each answer must be reduced to its simplest form.

- 1 Divide x^{n+1} by x^{n-1} Ans.....
 - 2 Find the logarithm of the number .3874 Ans.....
 - 3 Given $\log \tan A = 9.8155 - 10$; find the acute angle A correct to the nearest degree. Ans.....
 - 4 What is the positive root of the equation $2x^2 - 3x = 9$? Ans.....
 - 5 Write in the form $x^2 + px + q = 0$ the quadratic equation whose roots are 3 and -5 . Ans.....
 - 6 What is the name of the curve represented by the equation $x^2 - y^2 = 36$? Ans.....
 - 7 In the equation $3x^2 - 2 = 4x$, what is the sum of the roots? Ans.....
 - 8 Solve for x the equation $\sqrt{x^2 - 9} = x - 1$ Ans.....
 - 9 Determine the nature of the roots of the equation $2x^2 - 3x + 4 = 0$ Ans.....
 - 10 Find the value of $27^{-\frac{2}{3}} + 2^0$ Ans.....
 - 11 Insert *two* geometric means between 3 and 192. Ans.....
 - 12 What is the slope of the line represented by the equation $3x + y = 7$? Ans.....
 - 13 Combine into one fraction $\frac{3}{2x-1} + 4 - \frac{x}{1-2x}$ Ans.....
 - 14 Express $\frac{4}{2\sqrt{3}-3}$ as a fraction with rational denominator. Ans.....
 - 15 The distance s in feet which a body falls during t seconds is given by the formula $s = \frac{1}{2}gt^2$; solve this formula for the positive value of t . Ans.....
 - 16 Write the first *three* terms of the expansion $(1 - y)^5$ Ans.....
 - 17 Find the sum of the infinitely decreasing series $4 + \frac{4}{3} + \frac{4}{9} + \dots$ Ans.....
 - 18 Write a linear equation expressing the relation between x and y as shown in the table below. Ans.....
- | | | | | | |
|-----|----|---|---|---|-----|
| x | 0 | 1 | 2 | 3 | ... |
| y | -1 | 1 | 3 | 5 | ... |
- 19 The graph of $x + y = 7$ passes through a point whose abscissa is 1; what is the ordinate of this point? Ans.....
 - 20 If a man can do a piece of work in 5 days, what fractional part of the work can he do in x days? Ans.....

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Write at top of first page of answer paper to part 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.

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 Find to the nearest tenth the roots of the equation $3x^2 - 5x = 6$ [10]

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

$$\begin{aligned} 3x^2 + y^2 &= 21 \\ 5x^2 - 2y^2 &= 2 \end{aligned} \quad [6, 3, 1]$$

23 The radius of a sphere in terms of its volume V is given by the formula $r = \sqrt[3]{\frac{3V}{4\pi}}$. If $V = 123.8$ cubic inches and $\pi = 3.14$, find r correct to the nearest tenth of an inch. [10]

24 Three numbers are in the ratio 2 : 4 : 3. If 6 is subtracted from the second number, the resulting numbers are in arithmetic progression. Find the original numbers. [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 equations not required]

a A and B working together can do a certain piece of work in 5 days. A alone can do the same piece of work in 12 days. How long will it take B working alone to do the work? [5]

b The area of a rectangular field is 100 square rods. If the length and the width are each increased by 5 rods, a new field is formed whose area is 150 square rods greater than the area of the original field. Find the dimensions of the original field. [5]

c The numerator of a certain fraction is 7 less than the denominator. If 2 is added to both numerator and denominator, the value of the resulting fraction is $\frac{2}{3}$ of the value of the original fraction. What is the original fraction? [5]

d A book dealer spent \$100 for a number of copies of a certain book. He sold all but two copies at a profit of \$1 a book, thereby realizing a profit of \$33 on the whole transaction. How many copies of the book did he buy? [5]

26 How many quarts of a 10% solution of salt and water must be added to 20 quarts of a 5% solution of salt and water to produce an 8% solution? [10]

27 a Draw the graph of the equation $y = 2x^2 - 4x - 1$ from $x = -1$ to $x = 3$ inclusive. [8]

b From the graph made in answer to a estimate, correct to the nearest tenth, the roots of the equation $2x^2 - 4x - 1 = 0$ [2]

*28 Solve the following problem graphically: [10]

A boat leaves New York at 10 a. m., sailing a straight course at the uniform rate of 10 miles an hour. At 4 p. m. the boat stops for one hour. It then resumes its original course at the rate of 15 miles an hour. At 3 p. m. another boat leaves New York, sailing the same course as the first boat at the rate of 20 miles an hour. At what time does the second boat overtake the first? How far from New York are they at this time?

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