

The University of the State of New York

264TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, August 20, 1935 — 8.30 to 11.30 a. m., only

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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 1935.

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 1935 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 Solve the equation  $3x^2 - 7x = 2$  for values of  $x$  correct to the nearest tenth. [10]

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

$$y = 2x + 1$$

$$x^2 + y^2 = 16 - 6x \quad [7, 1, 2]$$

23 John plans to drive from his home to college, a distance of 75 miles. If he can average 5 miles an hour more than he made the last trip, he can cover the distance in one half hour less time. Find the average speed at which he must travel. [6, 4]

24 Approximately 300 years ago the island of Manhattan was bought from the Indians for \$24. If that sum had been put at 4% interest, compounded semiannually, what sum, correct to the nearest thousand dollars, would it amount to now? [Use the formula  $A = P(1 + \frac{r}{2})^{2n}$ ] [10]

25 a Find the sum of the even numbers from 2 to 50 inclusive. [Solve by formula.] [5]

b A boy starts a chain letter by sending a letter to each of three friends, each of them to send to three others, and so on. If the letters from the boy are considered as the first group, how many letters are written in the fourth successive group if the chain has not been broken? [Solve by formula.] [5]

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 equations not required]

a The difference of the squares of two consecutive numbers is 25; find the numbers. [5]

b The perimeter of a certain rectangle is 34 and the length of a diagonal is 13. Find the dimensions of the rectangle. [5]

c Jones has \$12,000 to invest. For safety he prefers bonds yielding 3% but since he wants a yearly income of \$500 from his money, he is forced to put part of it in stock yielding 5%. How much does he invest in bonds? [5]

d A firm has two printing presses, the first of which needs 10 hours and the second 15 hours to do a certain job. The first machine is started on the job and prints for two hours before the second machine is also put on. How many hours will the two machines together need to complete the work? [5]

27 a Plot the graph of  $x^2 - 5x + 3 = y$  from  $x = 0$  to  $x = 5$  inclusive. [7]

b Draw the axis of symmetry. [1]

c From the graph made in answer to a, estimate to the nearest tenth the roots of the equation  $x^2 - 5x + 3 = 0$  [2]

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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 Express  $\sqrt{-36}$  in terms of the imaginary unit  $i$ . Ans.....
- 2 Factor  $6x^{2a} - x^a - 2$ . Ans.....
- 3 Write the first *three* terms of the expansion  $(a - b^2)^7$ . Ans.....
- 4 Find, correct to the *nearest integer*, the number whose logarithm is 3.6997. Ans.....
- 5 Solve the formula  $S = \pi R(L + R)$  for  $L$  in terms of the other letters. Ans.....
- 6 Express  $\frac{a^{-1} b}{a^{-1} + 1}$  with positive exponents. Ans.....
- 7 Write the quadratic equation in one unknown the sum and the product of whose roots are 5 and 7 respectively. Ans.....
- 8 Express  $\frac{a}{a + \sqrt{b}}$  as an equivalent fraction having a rational denominator. Ans.....
- 9 If  $8^{\frac{3}{2}} \times (3a)^0 \times (\frac{1}{2})^{-4} = x^3$ , find  $x$ . Ans.....
- 10 Solve for  $x$  the equation  $\sqrt{4x^2 - 11} + 1 = 2x$ . Ans.....
- 11 Is 3 a root of the equation  $x^3 - 2x = 21$ ? Ans.....
- 12 Insert *two* arithmetic means between 8 and 17. Ans.....
- 13 Find the sum in a geometric progression where  $a = 1$ ,  $r = 2$  and  $n = 6$ . Ans.....
- 14 Write the equation of the straight line having a slope of 2 and passing through the point (0, 4). Ans.....
- 15 Does the graph of  $x^2 - 2x + 4 = y$  cut the  $x$ -axis? [Answer *Yes* or *No*; do not plot the graph.] Ans.....
- 16 In triangle  $ABC$ , angle  $C = 90^\circ$ , angle  $A = 72^\circ$  and  $AB = c$  feet; find, correct to the *nearest tenth of a foot*, the length of  $AC$  if  $\log c = 1.0536$ . Ans.....

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17 If  $y = 1 - \frac{1}{x+1}$  and  $x$  is positive, does  $y$  increase or decrease as  $x$  increases?

Ans.....

18 If  $90 = 10^{1.9542}$ , find the logarithm of  $\sqrt[3]{90}$

Ans.....

19 Write the linear equation passing through the points whose coordinates are

$x$	0	1	2	4	5
$y$	3	5	7	11	13

Ans.....

20 The night rate for telephoning from Albany to New York City is 45 cents for the first three minutes and  $n$  cents for each additional minute. Express in cents the cost of a five-minute call if the federal tax is 10 cents.

Ans.....

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