

The University of the State of New York

273D HIGH SCHOOL EXAMINATION

**INTERMEDIATE ALGEBRA**

Tuesday, August 23, 1938 — 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 1938.

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 admission to this examination attendance on at least 30 recitations in this subject in a registered summer high school in 1938 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 Find, correct to the *nearest tenth*, the roots of the equation  $2x^2 - 3x - 8 = 0$  [10]

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

$$\begin{aligned} xy - y^2 &= -6 \\ x + 2y &= 3 \end{aligned} \quad [7, 1, 2]$$

23 A plot of ground is in the form of a right triangle, the longest side being 25 rods. Of the two remaining sides, one is 5 rods longer than the other; find the length of each side. [6, 4]

24 By the use of logarithms find, correct to the *nearest tenth*, the value of

$$\frac{50.67 \sqrt[3]{0.865}}{\sin 42^\circ} \quad [10]$$

25 *a* By means of a formula find the sum of 10 terms of the series  $8 + 5 + 2 + \dots$  [4]

*b* The value of a refrigerator at the end of each year of use has depreciated one fifth of its value at the beginning of that year.

(1) Represent in terms of the cost  $C$  the value of a refrigerator at the end of the first year of use. [2]

(2) Using the proper progression formula, find the value at the end of three years, if the cost was \$150. [4]

26 A man bought 2 pounds of coffee and 3 pounds of butter for \$1.80. One month later the price of coffee had advanced 10% and that of butter 20% and a similar order came to \$2.10. Find the cost of a pound of each at the original price. [7, 3]

27 *a* Plot the graph of  $y = x^2 + x - 4$  [7]

*b* Using the same set of axes as in *a*, plot the graph of  $y - x = 1$  [1]

*c* From the graphs made in answer to *a* and *b*, determine, correct to the *nearest tenth*, the values of  $x$  and  $y$  common to the two equations. [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 The graph of  $x^2 + y^2 = 5$  is (a) an ellipse, (b) a hyperbola or (c) a circle. Which is correct, (a), (b) or (c)? 1.....

2 Does  $3a^0 + (x + y)^{-\frac{1}{2}}$  equal (a)  $3 + \frac{1}{\sqrt{x}} + \frac{1}{\sqrt{y}}$ ,

(b)  $3 + \frac{1}{\sqrt{x + y}}$  or (c)  $1 + \frac{1}{\sqrt{x + y}}$ ? [Answer (a), (b) or (c).] 2.....

3 If the discriminant of a quadratic equation is 5, the roots are (a) rational and equal, (b) rational and unequal or (c) irrational and unequal. Which is correct, (a), (b) or (c)? 3.....

4 What is the sum of the roots of the equation  $2x^2 - x - K = 0$ ? 4.....

5 Find the logarithm of 3826. 5.....

6 Find, correct to four decimal places, the number whose logarithm is  $9.7056 - 10$  6.....

7 If  $x = 29$ , find  $\log x^5$ . 7.....

8 Write the formula for the sum (S) of a geometric progression in terms of a, r and n. 8.....

9 Find the 25th term of an arithmetic progression if  $a = 6$  and  $d = \frac{1}{3}$  9.....

10 Write the first two terms of the expansion of  $(a - 2b)^6$  10.....

11 Solve for x the equation  $\sqrt{x^2 + 24} = x + 2$  11.....

12 Express as a single radical  $3\sqrt{\frac{2}{3}} - \sqrt{\frac{3}{2}} + \sqrt{24}$  12.....

13 What is the slope of the line whose equation is  $2y = 3x - 7$ ? 13.....

14 Is  $1 + \sqrt{3}$  a root of the equation  $x^2 - 2x = 2$ ? [Answer Yes or No.] 14.....

15 A contractor plans to build a 300-foot approach to a bridge. If the approach is to rise at an angle of  $10^\circ$ , how many feet from the bridge must it begin? [Leave answer correct to the nearest foot.] 15.....

16 Factor  $x^{2a} - 5x^a - 24$  16.....

17 Does x in the equation  $x = y - \frac{1}{y}$  increase or decrease as y increases from 1? 17.....

18 Write the equation of the straight line which passes through the points whose coordinates are given in the following table:

x	-1	0	2	4	5
y	-3	-1	3	7	9

18.....

19 Write the equation of the straight line that is parallel to the x axis and cuts the y axis at point (0, 3). 19.....

20 A working alone can do a piece of work in d days. If B works one half as fast as A, what part of the work can he do in 1 day? 20.....