

The University of the State of New York
247TH HIGH SCHOOL EXAMINATION
INTERMEDIATE ALGEBRA

Thursday, January 23, 1930—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.

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|---|----------|
| 1 Factor $x^{2a} - x^a - 6$ | Ans..... |
| 2 Simplify $(a + \frac{1}{b})(b - \frac{1}{a}) \div \frac{a^2 b^2 - 1}{3ab}$ | Ans..... |
| 3 If the equation $x + \frac{1}{x} = 2$ is cleared of fractions, what is the degree of the resulting equation? | Ans..... |
| 4 If $x^2 - 5x + 2 = 0$, by what amount does the sum of the roots exceed the product of the roots? | Ans..... |
| 5 Find the value of the discriminant of the equation $4x^2 - 3x - 1 = 0$ | Ans..... |
| 6 If one root of $x^2 - 2x + k = 0$ is zero, what is the value of k ? | Ans..... |
| 7 Are the roots of the equation $x(x-4) = 4$ equal?
[Answer yes or no.] | Ans..... |
| 8 Simplify $(\sqrt{2} - \sqrt{3})^2 + (\sqrt{2} + \sqrt{3})^2$ | Ans..... |
| 9 Simplify $8^3 \times 16^{-1} \times 2^0$ | Ans..... |
| 10 Find the value of $\log 7132 - \log 7.132$ | Ans..... |
| 11 Given $\log n = 9.3316 - 10$; what is the characteristic? | Ans..... |
| 12 If $x : y = 2 : 3$, find the value of $\frac{x^2}{y^2}$ | Ans..... |
| 13 Solve for s in the following formula: $t = \sqrt{\frac{2s}{g}}$ | Ans..... |
| 14 A man must travel a distance of 100 miles. During the first 2 hours he travels at the rate of m miles an hour. At what rate must he then travel to complete his journey in 3 hours more? | Ans..... |
| 15 The coordinates of a point P are $x = 3, y = 4$; what is the abscissa of the point? | Ans..... |
| 16 Does the graph of $y = x^2 + 1$ cut the x -axis? [Answer yes or no.] | Ans..... |
| 17 What is the fifth term of a geometric progression whose first and second terms are 2 and 6 respectively? | Ans..... |
| 18 In an arithmetic progression, what is the formula for s in terms of n, a and d ? | Ans..... |
| 19 Is the value of a positive fraction increased or decreased if the denominator is divided by 2? | Ans..... |
| 20 Is there any value of x for which $x^2 - 2x + 2$ is negative? [Answer yes or no.] | 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 (1) elementary algebra, (2) intermediate algebra.

The minimum time requirement is five recitations a week for half a school year, or the equivalent, 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.

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 If three times the larger of two numbers is divided by the smaller, the quotient is 6 and the remainder is 6. If five times the smaller is divided by the larger, the quotient is 2 and the remainder is 3. Find the numbers. [6, 4]

22 The inside dimensions of a picture frame are 18 inches by 24 inches. If the area of the frame is 184 square inches, find its width. [6, 4]

23 A ball starting from rest rolls down an inclined plane, passing over 3 inches during the first second, 5 inches during the second second, 7 inches during the third second, etc. How many seconds will it take the ball to pass over a distance of 120 inches? [10]

[No credit will be allowed for mere addition of successive distances.]

24 An edge of one cube exceeds an edge of another cube by 2 inches. If their volumes differ by 98 cubic inches, find an edge of each cube. [4, 6]

25 a Factor $x^3 - 17x - 40$ [6]

b Rationalize the denominator of the expression $\frac{\sqrt{5}}{\sqrt{5}-1}$ and compute its value to the nearest tenth. [2, 2]

26 The formula for the volume of a sphere is $V = \frac{4}{3}\pi R^3$. By the use of logarithms find the radius R of a sphere when $V = 2610$ cubic inches and $\pi = 3.142$ [10]

27 Solve the following graphically:

a Through point $P(3, 4)$ draw a straight line parallel to the x -axis. [3]

b Using the same axes as in a, draw the graph that represents the equation $2x - y = 4$ [5]

c From the graphs made in answer to a and b, determine the coordinates of their point of intersection. [2]

28 The combined area of two square pieces of tin is 25 square feet. A side of the larger square is 1 foot longer than a side of the smaller square.

a Using x and y as sides of the two squares, write the two equations that express the relations stated above. [2, 2]

b Using the same axes, draw the graphs of the equations formed in answer to a. [5]

c From the graphs drawn in answer to b, determine a side of each square. [1]