

The University of the State of New York

248TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, June 19, 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 Write the quadratic equation whose roots are 3 and -7 . | Ans..... |
| 2 Express $2\sqrt{-12}$ in terms of i and simplify. | Ans..... |
| 3 Simplify: $\frac{3x-4}{x-1} + \frac{2x-3}{1-x}$ | Ans..... |
| 4 Find the three factors of $x^{a+2} - x^a$ | Ans..... |
| 5 Write the binomial factor of $x^3 - 5x + 2$ | Ans..... |
| 6 Find the value of $2 \times 8^3 - 4 \times 16^{-1}$ | Ans..... |
| 7 Find the value of $\frac{\sqrt{a}}{\sqrt{a^3}} \times a^{-1}$ | Ans..... |
| 8 If $y = x^2 - 5x + 3$, does y increase or decrease as x increases in value from -1 to 2 ? | Ans..... |
| 9 Determine the character of the roots of $3x - x^2 = 4$ | Ans..... |
| 10 Factor $12x^2 - x - 6$ | Ans..... |
| 11 What is the value of y for the point where the graph of $3x - 2y = 8$ cuts the y -axis? | Ans..... |
| 12 Solve for c the formula $m = \frac{1}{2} \sqrt{2a^2 + 2b^2 - c^2}$ | Ans..... |
| 13 How many figures or digits are there in the number obtained by multiplying out 3^{90} ? [Log 3 = .4771] | Ans..... |
| 14 Solve for x the following equation: $4 = x + \sqrt{x^2 - 8}$ | Ans..... |
| 15 Rationalize the denominator of $\frac{11}{2\sqrt{5}+3}$ | Ans..... |
| 16 Express $\log(a\sqrt{b})$ in terms of $\log a$ and $\log b$. | Ans..... |
| 17 Find the sum of all the positive integers smaller than 1000 that are divisible by 3. | Ans..... |
| 18 Find the fifth term of the series $2, 3, 4\frac{1}{2}, \dots$ | Ans..... |
| 19 If the dividend is D , the divisor d and the remainder R , express the quotient Q in terms of D , d and R . | Ans..... |
| 20 From the following set of equations obtain a quadratic equation in x only: | Ans..... |
| $x^2 + y^2 = 10$ | |
| $x + y = 7$ | |

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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 A and B start from the same point and travel along roads that are at right angles to each other. A travels 4 miles an hour faster than B and at the end of two hours they are 40 miles apart. Find their rates. [6, 4]

22 Mr Smith inherited \$25,000, \$5000 of which is invested in bonds paying 4% annually. He invests part of the remainder in a mortgage that pays 6% annually and the rest in stock paying 7% annually. His total annual income from the three sources is \$1450; how much does he invest in the mortgage? [7, 3]

23 Find to the nearest tenth the roots of $3x^2 - 3x - 4 = 0$ [10]

24 Mrs Brown puts \$6990 into a savings bank that pays interest at the rate of 4% compounded semiannually. What amount to the nearest dollar will she have in the bank at the end of 7 years?

Use the formula $A = P(1 + r)^n$ where A is the amount, P the principal, n the number of interest periods and r the rate of interest for each period. [10]

25 Simplify $\frac{x - \frac{9}{x}}{\frac{6}{x^2} + \frac{1}{x} - 1} \times \left(\frac{2 - x^2}{3x + x^2} + 1 \right)$ [10]

26 Find three numbers in arithmetic progression such that the sum of the first and third is 12 and the product of the first and second is 24. [10]

27 A milkman has 1000 quarts of milk that tests 4% butter fat, but the city in which he sells his milk requires only 3% butter fat. How many quarts of cream testing 23% butter fat may he separate from the milk and still satisfy the city requirements? [8, 2]

28 a Form a table of values for $y = x^2 - 3x$ by giving x all integral values from -1 to 4 inclusive. [2]

b Draw the graph of the equation in a between the given limits. [5]

c Indicate on the graph by the letters P and Q the points from which the roots of the equation $x^2 - 3x = 2$ are read. Estimate these roots to the nearest tenth. [3]