

The University of the State of New York

257TH HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Thursday, June 22, 1933 — 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 $2\frac{1}{2}$ credits assigned to it; no partial credit should be allowed. Each answer must be reduced to its simplest form.

- 1 Factor $a^2 - .04$ Ans.....
- 2 Factor $3x^2 - 10x + 3$ Ans.....
- 3 Write $3\sqrt{-9}$ in terms of the imaginary unit i . Ans.....
- 4 In the formula $A = b^2$, if the value of b is doubled, by what number is the value of A multiplied? Ans.....
- 5 Find the value of $8^{-\frac{3}{2}} + 3 \times 4^0$ Ans.....
- 6 Find the value of x in the equation $x^{\frac{3}{2}} = 27$ Ans.....
- 7 Solve for h the formula $d = \sqrt{2rh}$ Ans.....
- 8 Find to the nearest degree acute angle A , if $\log \cos A = 9.9863 - 10$ Ans.....
- 9 Simplify $\left(\frac{m^2 - 4}{m}\right) \div \left(\frac{2}{m} - 1\right)$ Ans.....
- 10 Write the quadratic equation the sum of whose roots is $\frac{1}{2}$ and the product of whose roots is 3. Ans.....
- 11 Express $\frac{3}{\sqrt{2}}$ as a fraction with rational denominator. Ans.....
- 12 Write the equation whose graph is a circle having its center at the origin and its radius equal to 4. Ans.....
- 13 If the discriminant of a quadratic equation is -4 , are the roots equal or unequal? Ans.....
- 14 Find the value of $x^2 - 2x$ when $x = 1 - \sqrt{a}$ Ans.....
- 15 Write the equation of the straight line having the slope 2 and the y -intercept 3. Ans.....
- 16 If the graph of the equation $y = mx + b$ passes through the origin, is the value of b (1) greater than zero, (2) equal to zero or (3) less than zero? Which is correct, (1), (2) or (3)? Ans.....
- 17 The side of a square is the geometric mean between the length and the width of a certain rectangle. If the dimensions of this rectangle are 16 and 9, find the side of the square. Ans.....
- 18 Write the first two terms of the expansion $(a^2 - b^3)^6$ Ans.....
- 19 Find the sum of the infinitely decreasing series $1, \frac{1}{2}, \frac{1}{4}, \dots$ Ans.....
- 20 By eliminating l from the two equations $S = \frac{n}{2}(a + l)$ and $l = a + (n - 1)d$, find an equation that expresses S in terms of a, n and d . 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 $3x^2 - 5x = 4$ [10]

22 Solve the following simultaneous equations, correctly group your answers and check both sets:

$$\begin{aligned}x^2 + 2y &= 17 \\x - y + 1 &= 0 \quad [6, 2, 2]\end{aligned}$$

23 By the use of logarithms find the value of each of the following:

a $\sqrt[3]{18}$ to the nearest hundredth. [3]

b $\frac{(\sin 18^\circ)^2}{.3456}$ [7]

24 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 have sums of money in the ratio 5:3. If A gives B \$500, they will then have equal amounts. Find how much each had originally. [5]

b Two men, A and B, start at the same time from a certain point and walk east and south respectively. At the end of 5 hours A has walked 5 miles farther than B and they are 25 miles apart. Find the rate of each. [5]

c A number is expressed by two digits whose sum is 8. If 6 times the units digit is added to the number, the digits will be interchanged. Find the number. [5]

d A man bought a number of articles for \$180, paying the same price for each. He sold all but two at an advance of \$5 on the original cost of each, thereby gaining \$20 on the entire transaction. How many articles did he buy? [5]

25 A man desiring to pay a debt of \$340 in monthly payments finds that he can pay \$25 the first month and thereafter increase each monthly payment \$2 over that of the previous month. How long will it take him to pay his debt if the interest is not included? [10] [A purely arithmetical solution will not be accepted.]

26 How much water must be added to 50 pounds of a 10% solution of salt to reduce it to a $5\frac{1}{2}\%$ solution? Express your answer correct to the nearest pound. [7, 3]

27 Given the equation $y = 3x - x^2$

a Draw the graph of this equation from $x = -2$ to $x = +5$ [5]

b Indicate on the graph by the letter P the turning point of the graph. [1]

c Is this turning point a maximum or a minimum value? [1]

d Write the coordinates of this turning point. [1]

e Draw the axis of symmetry. [1]

f Write the equation of the axis of symmetry. [1]

*28 The height of a rectangular bin is 1 foot more than the width, and the length is 2 feet more than the width. If the capacity of the bin is 210 cubic feet, find the dimensions. [4, 6]

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