THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department
Albany 1

April 1964

To: Junior and Senior High School Building Principals

<u>Sample Examination in Ninth Year Mathematics, Course I - Algebra</u>

The Department has prepared the enclosed sample terminal examination in Ninth Year Mathematics, Course I - Algebra, for optional use in the schools in June 1964.

The examination was prepared in cooperation with the Regents Examination and Scholarship Center under the supervision of Frank Hawthorne, State Supervisor of Mathematics Education, and his staff: Bruno B. Baker, Aaron L. Buchman, Agnes M. Higgins and John J. Sullivan, associates. The following mathematics teachers assisted:
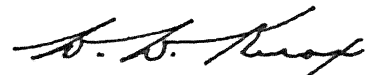
Emma Brown, Baldwin Junior High School
Robert G. Cromie, Gouverneur High School
Parke H. Wright, Cazenovia Central School

Sample copies of this examination are being distributed to each of the schools. Teachers may duplicate this test and use it in whole or in part as a terminal examination, or they may use it as a pattern of test construction and selection of content in the preparation of their local examinations.

Students should be provided with four-place tables of natural trigonometric functions for use on this examination. A supply of these may be obtained from the Department upon request.

We would be glad to receive any comments, suggestions, or reports from teachers who use the examination. These should be sent to:

Frank Hawthorne
Supervisor of Mathematics Education
State Department of Education
Albany 1, New York

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<u>Distribution for Information</u>
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THE UNIVERSITY OF THE STATE OF NEW YORK
The State Education Department

NINTH YEAR MATHEMATICS
Course I - Algebra
(Sample Examination)
June 1964

Name of pupil.......................Name of school.....................

Instructions

It is wise to divide your time so that you may complete the entire examination in <u>three hours</u>. Excess time may be used in reviewing your paper for errors.

Part I

Answer all 30 questions in this part. Write the answer to each question in the space provided at the right. No work need be shown for this part. Each correct answer will receive 2 credits. [60]

1 Express the fraction $\dfrac{2a + 8}{a^2 - 3a - 28}$ in its lowest

terms.   1.................

2 Subtract $2a - 3b - 2c$ from $6a + 2b - 7c$.   2.................

3 Divide $5x - 15x^2$ by $5x$.   3.................

4 Solve for n: $3n - (5n + 2) = 8$ 4.................

5 Solve for x: $\dfrac{5x}{8} + \dfrac{3}{4} = 7$ 5.................

6 If n articles cost c cents, write an expression
which represents the cost, in cents, of 40 articles.   6.................

7 Find the value of $2m^3$ when $m = -1$.   7.................

8 Given the formula $S = 2\pi rh$, express h in terms
of S and r.   8.................

9 A jet airplane travels 1.65 miles in 10 seconds. What is its speed in miles per hour?

9.................

10 Factor: $49 - 14x + x^2$

10.................

11 Solve for the <u>positive</u> value of x: $\frac{1}{3}x^2 = 12$

11.................

12 Solve for a: $4.6a - 2.8 = 11$

12.................

13 If $6x + 2y = ax + by$ is an identity, what is the value of ab?

13.................

14 Find to the <u>nearest</u> <u>tenth</u> the value of $\sqrt{41}$.

14.................

15 If the point $(2,k)$ lies on the graph of $x + 2y = 5$, find the value of k.

15.................

16 Express the sum of $\sqrt{8}$ and $\sqrt{50}$ as a single term in radical form.

16.................

17 If $a = 6 \tan 65°$, find the value of a to the <u>nearest integer</u>.

17.................

18 The average of two positive consecutive integers is $\frac{17}{2}$. Find the smaller of these two integers.

18.................

19 In the proportion $\frac{a}{b} = \frac{c + 1}{d}$, find c if $a = 7$, $b = 8$ and $d = 4$.

19.................

20 Which of the following fractions has the greatest value: $\frac{1}{2}$, $\frac{5}{8}$, $\frac{3}{5}$?

20.................

21 Perform the indicated operations and combine like terms: $3p - 2p(p - 4)$
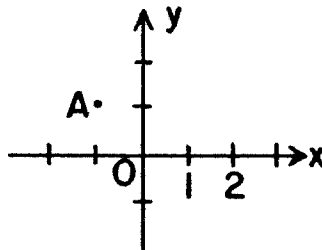
21.................

22 The base of an isosceles triangle is 10, and each
    of the equal sides is 13. Find the length of the
    altitude to the base. [The altitude to the base
    of an isosceles triangle bisects the base.]   22................

23 If 3 is a root of the equation $x^2 - 5x + k = 0$,
    what is the value of k?   23................

Directions (24-29): Write on the line at the right of each of the
following the number preceding the expression that best completes the
statement or answers the question.

24 On the accompanying graph,
    the coordinates of point
    A are

    (1) (1,1)
    (2) (1,-1)
    (3) (-1,1)
    (4) (-1,-1)   24......

25 The product of $\frac{1}{2}x^3$ and $\frac{1}{2}x^3$ is

    (1) x^6 (3) x^9
    (2) $\frac{1}{4}x^6$ (4) $\frac{1}{4}x^9$ 25......

26 The expression $\dfrac{3}{x - 1} - \dfrac{1}{1 - x}$ is equivalent to

    (1) $\dfrac{2}{x - 1}$ (3) $\dfrac{2}{x^2 - 1}$

    (2) $\dfrac{2}{1 - x}$ (4) $\dfrac{4}{x - 1}$ 26......

27 If k represents an odd integer, which represents an
    even integer?

    (1) k + 2   (3) 2k - 1
    (2) 3k + 1   (4) 3k - 2   27......
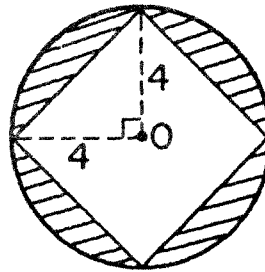
28 If one of the two factors of the expression
    $3x^2 - x - 2$ is x - 1, the other factor is

    (1) x + 2   (3) 3x + 2
    (2) x - 2   (4) 3x - 2   28......

29 A square is inscribed in circle O
whose radius is 4, as shown in
the diagram. The area of the
shaded portion is

(1) $16\pi - 16$
(2) $16\pi - 32$
(3) $8\pi - 16$
(4) $8\pi - 32$

29......

30 Construct a line perpendicular
to line AB at point C.

A

C

B

Part II

Answer <u>four</u> questions from this part. Show all work unless other-wise directed.

31 <u>a</u> Solve the equation $\dfrac{3y - 1}{2} - \dfrac{y + 1}{5} = 11$ and check.   [3,1]

<u>b</u> Solve the equation $\dfrac{1}{x} + \dfrac{x}{2} = \dfrac{3}{2}$ and check.   [4,2]

32 Write the equation or equations that may be used in solving problem <u>a</u>
and problem <u>b</u>. In <u>each</u> case, state what the letter or letters
represent. [Solution of equations is NOT required.]

<u>a</u> Two automobiles leave a certain place at the same time and travel
in opposite directions along a straight road. The speed of one
is three-fourths that of the other; and in 5 hours they are
315 miles apart. What is the speed of <u>each</u> automobile?   [5]

<u>b</u> The sum of the digits of a two-digit number is 7. If 9 is added
to the number, the result is a number with the digits of the
original number reversed. Find the original number.   [5]

33 In rectangle ABCD, diagonal AC is 20 inches long and makes an angle of 42° with the longer side of the rectangle. Find the

a length and width of the rectangle to the <u>nearest tenth</u>   [8]

b area of the rectangle to the <u>nearest integer</u>   [2]

34 The total weight of a satellite to be put into orbit is 650 pounds. This weight is made up entirely of the container, the regulating devices and the recording equipment. The container weighs two-thirds as much as the regulating devices, and the recording equipment weighs 50 pounds less than the container. Find the number of pounds in the weight of the container.
[Only an algebraic solution will be accepted.]   [5,5]

35 Solve graphically and check: [8,2]

$$3x + 2y = 0$$
$$2x - y = 7$$

36 The Junior Garden Club has $144 for its special project, which is the planting of a rose garden near the schoolbuilding. If the club will need 3 dozen rose bushes and has chosen two varieties, priced at $3.50 and $4.25 per bush, how many of each variety can be purchased?
[Only an algebraic solution will be accepted.]   [5,5]

*37 Given: A = {2, 4, 5, 7}

a How many different subsets of A can be formed to contain exactly two elements (or members) of A?   [2]

b List the elements of the subset of A which contains

(1) all the prime numbers in A   [2]
(2) all the multiples of 3 in A   [2]
(3) all the even numbers in A   [2]

c Write a set B which is equivalent to set A.   [2]

*This question, based on material beyond the scope of the syllabus, may be used as a <u>substitute</u> for any one of the questions in Part II by schools that have included this topic in the course.