April 1963

To: Junior and Senior High School Building Principals

Sample Examination in Ninth Year Mathematics, Course I - Algebra

The Department has prepared the enclosed sample terminal examination in Ninth Year Mathematics, Course I - Algebra, for optional use in the schools in June 1963.

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 Ruth L. Smith, associates. The following mathematics teachers assisted:
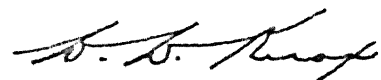
George M. Feldner, Warwick Valley High School
Elsie O'Hara, Bethlehem Central Junior High School

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

Warren W. Knox
Assistant Commissioner

Distribution for Information
Superintendents (City, Village, District and Diocesan)
Supervising Principals

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

NINTH YEAR MATHEMATICS
Course I - Algebra
(Sample Examination)
June 1963

_____

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 Perform the indicated operations and combine like
   terms: $4(d - 5) + (d + 1)(d - 2)$ 1................

2 Factor: $m^2 + m - 42$ 2................

3 Divide $x^2y^2 - xy$ by xy.   3................

4 Express the fraction $\dfrac{x^2 - 81}{2x + 18}$ in its lowest terms.   4................

5 Solve for y: $6(y + 2) - 2y = 15$ 5................

6 Solve for a: $\dfrac{2a}{3} - \dfrac{3a}{5} = 1$ 6................

7 A tennis court is 6 feet longer than twice its
   width w. Express in terms of w the number of feet
   in the length of the court.   7................

8 If $\dfrac{a + b}{b} = \dfrac{7}{2}$, find the value of $\dfrac{a}{b}$.   8................

24 If 2 is a root of the equation 3x - 1 = x + a, what
   is the value of a?   24................

Directions (25-29): Indicate the correct completion for each of the
following by writing on the line at the right the number 1, 2, 3 or 4.

25 Two circles are tangent to
   each other and to the sides
   of a rectangle as shown.
   The area of the shaded
   portion is
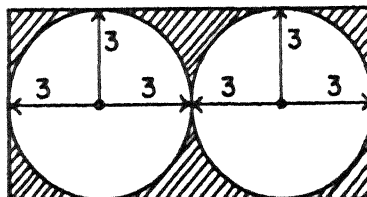
   (1) 36 - 6π
   (2) 36 - 12π
   (3) 72 - 6π
   (4) 72 - 18π   25......

26 The expression $1 - \dfrac{a - 1}{a + 1}$ is equivalent to

   (1) a + 1   (3) $\dfrac{2}{a + 1}$

   (2) 2   (4) $\dfrac{a - a^2}{a + 1}$ 26......

27 The product of $2x^3$ and $3x^2$ is

   (1) $6x^5$ (3) $5x^5$
   (2) $6x^6$ (4) $5x^6$ 27......

28 The expression $\sqrt{48} - \sqrt{27}$ is equivalent to

   (1) 1   (3) 3

   (2) $\sqrt{21}$ (4) $\sqrt{3}$ 28......

29 The ratio of the number of degrees in a right angle to the
   number of degrees in a straight angle is

   (1) 1:4   (3) 4:1
   (2) 1:2   (4) 2:1   29......

30 Construct the bisector of

angle ABC.

C

A

B

Part II

Answer **four** questions from this part. Show all work unless other-wise directed.

31 Solve the following set of equations algebraically for x and y, and check your answers in both of the equations: $\lceil 8,2 \rceil$

$$\frac{x + 3}{2} + \frac{y - 1}{3} = 5$$

$$\frac{x + 4}{3} - \frac{2y - 3}{5} = 2$$

32 **a** On graph paper locate the points A (-3,-5), B (9,-2), C (9,3), D (2,5) and draw the line segments AC and BD. $\lceil 2 \rceil$

b From the graph, determine the coordinates of

(1) point M, the intersection of AC and BD $\lceil 2 \rceil$
(2) point Q, the intersection of BD and the x-axis $\lceil 2 \rceil$
(3) point R, the intersection of AC and the y-axis $\lceil 2 \rceil$

c If AD and BC are extended to meet in point S, that point lies in quadrant (1) I   (2) II   (3) III   (4) IV. $\lceil 2 \rceil$

33 Write the equation or equations that may be used in solving problem **a** and problem **b**. In each case, state what the letter or letters represent. $\lceil$Solution of equations is NOT required.$\rceil$

a A chemist has 10 cubic centimeters of a 10% solution of acid. He wishes to add enough water to produce an 8% solution. How many cubic centimeters of water must he add? $\lceil 5 \rceil$

b The units' digit of a two-digit number exceeds the tens' digit by 2. The number is 4 times the sum of its digits. Find the number. $\lceil 5 \rceil$

34 The perimeter of a triangle is 63 inches. The longest side exceeds the shortest side by 6 inches. The sum of the lengths of the longest and the shortest side is twice the length of the third side. Find the lengths of the sides of the triangle. [5,5]

35 Answer both <u>a</u> and <u>b</u>:

<u>a</u> A wire 65 feet long extends from the top of a vertical pole to level ground and makes an angle of 70° with the ground. Find to the <u>nearest foot</u> the number of feet in the height of the pole. [5]

<u>b</u> When a tree 45 feet high on level ground casts a shadow 81 feet long, what is the angle of elevation of the sun, to the <u>nearest degree</u>? [5]

36 There are three positive consecutive odd integers such that twice the square of the smallest diminished by 19 is equal to the product of the other two. Find the three consecutive odd integers. [4,6]

*37 Given: A = {-2,3}
            B = {1,2,3}
            C = {-1,1,2}

<u>a</u> Find A ∩ C. [2]
<u>b</u> Find B ∪ C. [2]
<u>c</u> Find A x B. [3]
<u>d</u> Write an equation which has A for its solution set. [3]

*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 <u>included</u> this topic in the course.