INTERMEDIATE ALGEBRA

Tuesday, August 23, 1955 — 12 m. to 3 p. m., only

Instructions

Part I is to be done first and the maximum time allowed for it is one and one half hours. At the end of that time, this part of the examination must be detached and will be collected by the teacher. If you finish part I before the signal to stop is given, you may begin part II.

Write at top of first page of answer paper to parts II and III (a) names of schools where you have studied, (b) number of weeks and recitations a week in intermediate algebra previous to entering summer high school, (c) number of recitations in this subject attended in summer high school of 1955 or number and length in minutes of lessons taken in the summer of 1955 under a tutor licensed in the subject and supervised by the principal of the school you last attended.

The minimum time requirement is four or five recitations a week for half a school year after the completion of elementary algebra. The summer school session will be considered the equivalent of one semester's work during the regular session (four or five recitations a week for half a school year).

For those pupils who have met the time requirement the minimum passing mark is 65 credits; for all others 75 credits.

For admission to this examination attendance on at least 30 recitations in this subject in a registered summer high school in 1955 or an equivalent program of tutoring approved in advance by the Department is required.

Part II

Answer three questions from this part. Show all work.

26 Find to the *nearest tenth* the roots of the equation $2x^2 + 3x = 8$. [10]

27 a On the same set of axes draw the graphs of the equations
$y = 1 + 4x - x^2$ and $2y = x - 2$. [5, 3]

b From the graphs made in answer to part a, determine the values of x and y that satisfy both equations. [Express to the *nearest tenth* any answers that are not integers.] [2]

28 Solve the following system of equations and check: [8, 2]
$$x^2 + 2xy = 3$$
$$x + y = 2$$

29 Using logarithms, find to the *nearest hundredth* the value of
$$\frac{(\tan 22°)^2 \times \sqrt{40.7}}{\sin 74°}. \quad [10]$$

The following questions, *30 and *31, are based upon optional topics in the syllabus, and one of them may be substituted for any one question in either part II or part III. Therefore one, but not both, of these questions may be included in the total of 5 required questions from parts II and III.

*30 Solve the following system of equations for x, y and z and check: [8, 2]
$$2x + 3y - z = 2$$
$$x - 2y + 4z = -4$$
$$3x - 4y = 5$$

*31 a Solve for x: $4^{2x-1} = 8^x$. [4]

b Solve for x to the *nearest tenth*: $19.5^{8x} = 86.1$ [6]

* Note. Be sure to read the directions immediately preceding *30. DO NOT ANSWER BOTH *30 and *31.

[1] [OVER]

Part III

Answer two questions from this part. In solving problems in this part, state what the letter or letters represent and show all work unless otherwise directed.

32 Write the equations that would be used in solving the following problems. [Solution of equations is not required.]

    a How many quarts of water should be added to 12 quarts of a 75% antifreeze solution to change it to a 45% antifreeze solution? [4]

    b If a man increases his usual average driving speed by 6 miles an hour, he can cover the 168 miles from his home to his summer camp in a half hour less time than he usually takes. Find his usual average driving speed. [6]

33 Jonathan takes twice as long as Henry to do a certain job. After both had worked together on the job for 2 hours, Henry was called away and Jonathan finished the job alone in one hour. How long would it have taken Jonathan, working alone, to do the whole job? [7, 3]

34 The units digit of a certain positive two-digit number is twice the tens digit. If the digits are reversed and if the new number is multiplied by the original number, the product is 1008. Find the original number. [6, 4]

35 The smaller of two numbers, the larger of these numbers and their sum, taken in that order, form an arithmetic progression. The smaller number, the larger number and their product, taken in that order, form a geometric progression. Find the two numbers. [5, 5]

[2]

Fill in the following lines:

Name of pupil..Name of school..

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed.

1 Factor $2x^2 + 5x - 12$.

1................

2 Reduce to simplest terms: $\dfrac{(a-b)^2}{a^2-b^2}$.

2................

3 Express as a single term the sum of $3\sqrt{-5}$ and $2i\sqrt{5}$.

3................

4 Express $\dfrac{1}{3-\sqrt{6}}$ as an equivalent fraction with a rational denominator.

4................

5 Find the value of $3a^{-\frac{1}{2}}$ when $a = 16$.

5................

6 Solve the equation $\sqrt{x^2-5} = 2$ for a positive value of x.

6................

7 Write in *simplest form* the sum of $\dfrac{a}{a-b}$ and $\dfrac{b}{b-a}$.

7................

8 Write an equation of the axis of symmetry of the graph of $y = x^2 - 2x$.

8................

9 In how many points does the graph of $x - y = 0$ intersect the graph of $xy = 12$?

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

10 Write an equation of the circle whose center is at the origin and which passes through the point $(0, 6)$.

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

11 If y varies directly as x and $y = 4$ when $x = 2$, find y when $x = \frac{1}{2}$.

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

12 Find the logarithm of 55.94

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

13 Find the number whose logarithm is 8.5594—10

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

14 A twenty-foot ladder standing on level ground reaches the top of a wall 18 feet high. Find, to the *nearest degree,* the angle that the ladder makes with the ground.

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

15 If $\log K = \log b + \log h$, express K in terms of b and h.

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

16 Three arithmetic means are inserted between 2 and 12. Find the common difference.

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

17 Two numbers whose sum is 20 are in the ratio $2:3$. Find the smaller of the two numbers.

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

[3]

[OVER]

Directions (18–25): Indicate the correct completion for *each* of the following by writing on the line at the right the letter *a, b* or *c.*

18 In the equation $ax^2 + bx + c = 0$, a, b and c are integers. If $b^2 = 4ac$, the roots of the equation are (*a*)imaginary (*b*)real and equal (*c*)real and unequal

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

19 The graph of the equation $y = 2x^2 - 3x + 1$ (*a*)intersects the x-axis (*b*)is tangent to the x-axis (*c*)does not intersect the x-axis

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

20 The graph of the equation $y = x - 3$ makes with the x-axis an angle of (*a*) $30°$ (*b*) $45°$ (*c*) $60°$

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

21 The point which is 4 units above the x-axis and 2 units to the left of the y-axis is the point (*a*) $(4, -2)$ (*b*) $(-4, 2)$ (*c*) $(-2, 4)$

21................

22 The sum of the infinite series 2^5, 2^4, 2^3, ... is (*a*) 2^6 (*b*) 2^4 (*c*) 1

22................

23 The sum and the product of the roots of the equation $x^2 - px + p = 0$ (*a*)are both negative (*b*)are equal (*c*)have different signs

23................

24 The ellipse whose equation is $9x^2 + 4y^2 = 36$ cuts the x-axis at the points (*a*) $(-2, 0)$ and $(2, 0)$ (*b*) $(-3, 0)$ and $(3, 0)$ (*c*) $(-6, 0)$ and $(6, 0)$

24................

25 The characteristic of the logarithm of $\left(3.72 \times 10^5\right)$ is (*a*) 4 (*b*) 5 (*c*) 6

25................

[4]

FOR TEACHERS ONLY

IA INSTRUCTIONS FOR RATING
INTERMEDIATE ALGEBRA

Tuesday, August 23, 1955 — 12 m. to 3 p.m., only

Use only *red* ink or pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use check marks to indicate pupil errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. In problems involving logarithms, answers should be left correct to four significant digits unless directions say otherwise. ·Units need not be given when the wording of the questions allows such omissions.

Part I

Allow 2 credits for each correct answer; allow no partial credit. For questions 18–25, allow credit if the pupil has written the correct expression instead of the letter a, b or c.

(1) $(2x - 3)(x + 4)$

(2) $\dfrac{a - b}{a + b}$

(3) $5i\sqrt{5} \text{ or } 5\sqrt{-5}$

(4) $\dfrac{3 + \sqrt{6}}{3}$

(5) $\frac{3}{4}$

(6) 3

(7) 1

(8) $x = 1$

(9) 2

(10) $x^2 + y^2 = 36$

(11) 1

(12) 1.7477

(13) .03626

(14) 64

(15) $K = bh$

(16) $2\frac{1}{2}$

(17) 8

(18) b

(19) a

(20) b

(21) c

(22) a

(23) b

(24) a

(25) b