The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, August 23, 1960 — 12 m. to 3 p.m., only

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 Express $\frac{3}{\sqrt{5}+1}$ as an equivalent fraction with a rational denominator. 1.....

2 Write in *simplest form* the value of $3x^0 + x^{\frac{2}{3}}$ if $x = 8$. 2.....

3 Find the logarithm of 29.06. 3.....

4 Find the number whose logarithm is 8.8472—10. 4.....

5 Write in *simplest form* the third term in the expansion of $(1-x)^6$. 5.....

6 Find the positive root of the equation $2x^2 - 3x - 2 = 0$. 6.....

7 If a root of the equation $x^2 - 6x + k = 0$ is 2, find the value of k. 7.....

8 Write an equation of the straight line which passes through the points whose coordinates are given in the table below.

x	0	2	5
y	—1	5	14

8.....

9 Find the coordinates of the point where the graph of the equation $2x + 3y = 12$ intersects the x-axis. 9.....

10 Find three numbers which, when inserted between 6 and 12, form with them an arithmetic progression. 10.....

[OVER]

11 Express as a fraction the sum of the infinite geometric progression 2, 0.2, 0.02, ... 11.....

12 If s varies directly as t and if $s = 10$ when $t = 12$, find the value of s when $t = 18$. 12.....

13 Solve for x: $\frac{1}{a} - \frac{1}{x} = \frac{1}{b}$ 13.....

14 Using the formula $C = \frac{5}{9}(F - 32)$, find F if $C = 80$. 14.....

15 If the number 0.0068 is expressed in the form 6.8×10^n, find the value of n. 15.....

16 The base of an isosceles triangle is 24 inches and one of the base angles is 53°. Find to the *nearest inch* the altitude drawn to the base. 16.....

17 What is the abscissa of the turning point of the graph whose equation is $y = x^2 + 6x + 8$? 17.....

18 Find the sum of the roots of the equation $x^2 + 2x + 5 = 0$. 18.....

19 Find the slope of the line whose equation is $x + 2y = 4$. 19.....

20 If a man travels y miles in x hours, express his average speed in miles per hour in terms of x and of y. 20.....

Directions (21–28): Write on the line at the right of *each* of the following the *number* preceding the expression that best completes the statement.

21 When expressed in terms of the imaginary unit i, $\sqrt{-3}$ is
(1) $i\sqrt{3}$ (2) $-i\sqrt{3}$ (3) $3i$ (4) $-3i$ 21.....

22 The expression $\dfrac{1}{1 + \dfrac{1}{x}}$ is equivalent to
(1) $\frac{x}{x+1}$ (2) $\frac{x+1}{x}$ (3) x (4) $\frac{1}{x}$ 22.....

23 The graph of $2x^2 + 3y^2 = 6$ is
(1) a circle (2) an ellipse (3) a hyperbola (4) a parabola 23.....

24 The equation $\sqrt{x} + 5 = 2$ has
(1) an integral root (2) an irrational root (3) an imaginary root (4) no root 24.....

25 If the discriminant of the equation $ax^2 + bx + c = 0$ is positive (a, b and c being integers), then the roots of the equation must be
(1) positive (2) rational (3) equal (4) real 25.....

26 Log $\frac{10}{x}$ is equal to

(1) $\frac{1}{\log x}$ (2) $1 - \log x$ (3) $\frac{1}{x}$ (4) $1 - x$ 26.....

27 The tens digit of a two digit number is twice the units digit. If the units digit is represented by x, the number can be represented by
(1) $3x$ (2) $12x$ (3) $21x$ (4) $30x$ 27.....

28 If the length of a side of a square is multiplied by 2,
(1) the perimeter is multiplied by 2 and the area by 4
(2) the perimeter is multiplied by 4 and the area by 2
(3) both the perimeter and area are multiplied by 2
(4) both the perimeter and area are multiplied by 4 28.....

Directions (29–30): Indicate whether the following statements are true for

a all real values of x,
b some, but not all, real values of x,
c no real values of x,

by writing *a*, *b* or *c* in the space provided.

29 $x^2 - 4 = (x + 2)(x - 2)$ 29.....

30 $x^2 + 4 = 0$ 30.....

[OVER]

Part II

Answer four questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 35 and 36.

31 Find to the *nearest tenth* the roots of the equation $2x^2 - 9x = 1$. [10]

32 Solve the following set of equations, group your answers and check them in both equations: [7, 1, 2]

$$x^2 - 3xy + 8y^2 = 9$$
$$x - 2y = 3$$

33 *a* Draw the graph of $y = x^2 + 3x - 2$, using all integral values of x from $x = -5$ to $x = 2$, inclusive. [6]

b Using the graph made in answer to part *a*, find to the *nearest tenth* the roots of the equation $x^2 + 3x - 2 = 1$. [4]

34 A formula for finding the base edge of a regular square pyramid is given by the equation

$$b = \sqrt[3]{\frac{6V}{\tan A}}.$$

Using logarithms, find b to the *nearest tenth* if $V = 98.7$ and $A = 23°$. [10]

35 A piece of wire 36 inches long is bent into the form of a right triangle. If one of the legs is 12 inches long, find the length of the other leg. [6, 4]

36 John left New York for a town in the mountains. He traveled 60 miles and then returned to New York over the same route. His average speed returning was 10 miles per hour more than his speed going. He spent a total of 5 hours traveling. What was his average speed in miles per hour on the return trip? [5, 5]

*37 Solve for x: $x^3 + x^2 - 8x - 12 = 0$ [10]

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

FOR TEACHERS ONLY

IA

INSTRUCTIONS FOR RATING
INTERMEDIATE ALGEBRA

Tuesday, August 23, 1960 — 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 checkmarks 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. Do not allow credit if the answer to question 4 is not expressed to *four significant digits.* For questions 21–28, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3 or 4.

(1) $\frac{3\sqrt{5}-3}{4}$

(2) 7

(3) 1.4633

(4) 0.07033

(5) $15x^2$

(6) 2

(7) 8

(8) $y = 3x - 1$

(9) (6, 0)

(10) $7\frac{1}{2}, 9, 10\frac{1}{2}$

(11) $\frac{20}{9}$

(12) 15

(13) $\frac{ab}{b-a}$

(14) 176

(15) —3

(16) 16

(17) —3

(18) —2

(19) $-\frac{1}{2}$

(20) $\frac{y}{x}$

(21) 1

(22) 1

(23) 2

(24) 4

(25) 4

(26) 2

(27) 3

(28) 1

(29) a

(30) c

[OVER]

Please refer to the Department's pamphlet *Suggestions on the Rating of Regents Examination Papers in Mathematics.* Care should be exercised in making deductions as to whether the error is purely a mechanical one or due to a violation of some principle. A mechanical error generally should receive a deduction of 10 percent, while an error due to a violation of some cardinal principle should receive a deduction ranging from 30 percent to 50 percent, depending on the relative importance of the principle in the solution of the problem.

Part II

(31) 4.6 and —0.1 [10]

(32) Solution [7]

x	3	2
y	0	$-\frac{1}{2}$

or (3, 0) and $(2, -\frac{1}{2})$ [1]

Check [2]

(33) *b* Allow —3.7, —3.8 *or* —3.9 and 0.7, 0.8 *or* 0.9. [4]

(34) 11.2 [10]

(35) Analysis [6]
9 inches [4]

(36) Analysis [5]
30 [5]

*(37) 3, —2, —2 [10]