The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Tuesday, January 21, 1958 — 9:15 a.m. to 12:15 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 the sum of $3i$ and $\sqrt{-36}$ as a monomial in terms of i. 1.....

2 Factor completely $3x^2 - 75$. 2.....

3 Solve for x: $2\sqrt{x-1} = 1$ 3.....

4 Express $\dfrac{3}{2-\sqrt{2}}$ as an equivalent fraction with a rational denominator. 4.....

5 Find the value of $(x-1)^{\frac{2}{3}} + 2x^0$ when $x = 9$. 5.....

6 Find the logarithm of 72.17. 6.....

7 Find the number whose logarithm is $9.5974 - 10$. 7.....

8 What is the slope of the line determined by the points $(-1, 2)$ and $(6, -3)$? 8.....

9 Write an equation which expresses the relation between x and y in the following table:

x	-2	0	3	8
y	-9	-5	1	11

9.....

10 Three numbers are inserted between 2 and 4 to form with these numbers an arithmetic progression. Find the common difference of this progression. 10.....

[OVER]

11 Find two numbers that, when inserted between 6 and 162, form with these numbers a geometric progression. 11.....

12 In right triangle ABC, angle $C = 90°$, angle $A = 44°$ and $AB = 60$. Find AC to the *nearest integer.* 12.....

13 Solve the following set of equations for y: $\begin{aligned} 2x + y &= -2 \\ x + 3y &= 9 \end{aligned}$ 13.....

14 Write in *simplest form* the third term *only* in the expansion of $(x + 2)^5$. 14.....

15 Given the formula $V = \frac{s^2h}{3}$. Express the positive value of s in terms of V and h. 15.....

16 Express $\log \frac{a}{\sqrt{b}}$ in terms of $\log a$ and $\log b$. 16.....

17 Combine into a single fraction: $\frac{5}{1-x} - \frac{1}{x}$ 17.....

18 If y varies inversely as x and if $x = 4$ when $y = 21$, find the value of x when $y = 6$. 18.....

19 If 0.0000286 is expressed as 2.86×10^n, what is the value of n? 19.....

20 The perimeter of a rectangle is $2s$ and its length is a. Express the area of the rectangle in terms of a and s. 20.....

Directions (21–25): Indicate the correct completion for *each* of the following by writing the letter *a, b, c* or *d* on the line at the right.

21 The sum of the roots of the equation $3x^2 - 5x + 2 = 0$ is (*a*) -5 (*b*) 2 (*c*) $\frac{5}{3}$ (*d*) $\frac{2}{3}$ 21.....

22 The roots of the equation $6x^2 - 11x + 4 = 0$ are (*a*) real, rational and equal (*b*) real, rational and unequal (*c*) imaginary (*d*) real, irrational and unequal 22.....

23 The value of $\sqrt{x^2 - 9}$ is a real, irrational number when x is equal to (*a*) 5 (*b*) 0 (*c*) -3 (*d*) 4 23.....

24 The graph of the equation $y^2 = 6x$ is (*a*) a circle (*b*) an ellipse (*c*) a hyperbola (*d*) a parabola 24.....

25 Which of the following points lies on the graph of the equation $x^2 - 2xy = 8$? (*a*) $(-4, 1)$ (*b*) $(-4, -1)$ (*c*) $(-1, -4)$ (*d*) $(1, 4)$ 25.....

Part II

Answer three questions from this part. Show all work unless otherwise directed.

26 Solve the following set of equations and check in both equations: [8, 2]

$$x^2 - 3y^2 = 6$$
$$x + 2y = -1$$

27 Find, to the *nearest tenth,* the roots of the equation $2x^2 - 5x = 6$. [10]

28 Solve *graphically* the following set of equations: [Estimate the answers to *tenths.*] [4, 4, 2]

$$x^2 + y^2 = 16$$
$$y = x^2 + 2$$

29 Using logarithms, find to the *nearest tenth* the value of d if

$$d = \sqrt{\frac{462 \times 4.87}{8.56 \tan 40°}}.$$ [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 Find the roots of the equation $2x^3 + x^2 - 13x + 6 = 0$. [10]

*31 Solve the following set of equations and check: [8, 2]

$$x + 2y - z = 5$$
$$2x + z = -1$$
$$3x - 4y - 2z = 7$$

[OVER]

Part III

Answer two questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 33–34.

32 Write the equations that would be used in solving the following problems. In each case state what the letter or letters represent. [*Solution of the equations is not required.*]

a The units digit of a two-digit number is one less than twice the tens digit. If the digits are reversed, the new number exceeds the original number by 27. Find the original number. [5]

b How many pounds of water must be added to 24 pounds of a 10% solution of salt to reduce it to a 6% solution? [5]

33 On a 75-mile trip Mr. Jones' average rate for the first 15 miles was 10 miles per hour less than his average rate for the remainder of the trip. His time for the entire trip was two hours. Find his average rate for the first 15 miles. [5, 5]

34 The sum of three positive numbers in an arithmetic progression is 18. If the third number is increased by 8, the numbers then form a geometric progression. Find the numbers in the arithmetic progression. [5, 5]

35 *a* Simplify: $\dfrac{x^2-3x}{x^2+3x-10} \div \dfrac{x^2-x-6}{x^2-4}$ [4]

b Solve for x: $\dfrac{x}{a} - \dfrac{a}{x-a} = \dfrac{x}{2a}$ [6]

FOR TEACHERS ONLY

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INSTRUCTIONS FOR RATING
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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. Do not allow credit if the answer to question 6 is not expressed to *four decimal places* and if the answer to question 7 is not expressed to *four significant digits*. For questions 21–25, allow credit if the pupil has written the correct answer instead of the letter *a, b, c* or *d*.

(1) $9i$

(2) $3(x+5)\ (x-5)$

(3) $1\frac{1}{4}$

(4) $\frac{3(2+\sqrt{2})}{2}$

(5) 6

(6) 1.8583

(7) 0.3957

(8) $-\frac{5}{7}$

(9) $y = 2x - 5$

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

(11) 18, 54

(12) 43

(13) $y = 4$

(14) $40x^8$

(15) $\sqrt{\frac{3V}{h}}$

(16) $\log a - \frac{1}{2}\log b$

(17) $\frac{6x-1}{x(1-x)}$

(18) 14

(19) -5

(20) $a(s-a)$

(21) c

(22) b

(23) d

(24) d

(25) b