The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Monday, June 18, 1962 — 1:15 to 4:15 p.m., only

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

Name of teacher.....

Part I

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

1 Solve for x: $\frac{1}{2x-3} = \frac{5}{4x+1}$ 1.....

2 Write an equation of the straight line which passes through (0, 5) and has a slope equal to —3. 2.....

3 Solve the following set of equations: $2x + y = 1$
$3x = 5 - y$ 3.....

4 Express in simplest form: $\dfrac{m - \frac{1}{m}}{m - 2 + \frac{1}{m}}$ 4.....

5 Form a quadratic equation which has the roots $\frac{3}{2}$ and $-\frac{1}{2}$. 5.....

6 Write in simplest form, using positive integral exponents:

$$\left(\frac{ay^2}{b^4}\right)^3 \left(\frac{b}{y^3}\right)^5$$ 6.....

7 Find to *four* decimal places the logarithm of 0.4552. 7.....

8 If $\log N = 2.7864$, find the value of N. 8.....

9 Express in terms of n the sum of the first n terms of the geometric progression: 1, 4, 16, ... 9.....

10 Solve for x: $\sqrt{2x+3} = x$ 10.....

11 Find the numerical value of $\frac{2 \sin 40°}{\cos 50°}$. 11.....

[OVER]

12 A purse contains x quarters, y dimes and no other money. The total value of the money is C cents. Express C in terms of x and y. 12.....

13 Write the sixth term of the expansion of $(a + 2b)^5$. 13.....

14 If $\log \sqrt{N} = 8.5441 - 10$, find $\log N$. 14.....

15 If $x = 4$, find the numerical value of $3x^0 (x)^{-\frac{1}{2}}$. 15.....

16 The first three terms of an arithmetic progression are 2, 5, 8. Find the 50th term of this progression. 16.....

17 If $x = \frac{1}{a}$, express $2x + 3$ as a single fraction in terms of a. 17.....

18 The force applied to stretch an elastic spring varies directly as the amount of elongation. If a force of 18 pounds determines an elongation of 1.5 inches, what is the constant of variation? 18.....

19 The sum of the squares of two consecutive integers is 85. Using n to represent the smaller of the two consecutive integers, express this statement in algebraic form. 19.....

20 If the identity $(a + b)^2 = a^2 + 2ab + b^2$ is used to determine the integer equal to 17^2, what is the numerical value of $2ab$ when $a = 10$? 20.....

Directions (21–30) : 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.

21 If $a = c$, then $\frac{a+b}{c+d}$ is equal to

(1) $\frac{b}{d}$ (3) $\frac{c+b}{c+d}$

(2) $1 + \frac{b}{d}$ (4) $\frac{1+b}{1+d}$ 21.....

22 The graph of $y = x^2 + 5x + 9$ intersects the y-axis in

(1) only one point (3) three distinct points

(2) two distinct points (4) no point 22.....

23 The number $1 + \sqrt{17}$ is

(1) integral (3) irrational

(2) rational (4) imaginary 23.....

24 The graph of $y^2 = 2x$ is

(1) a straight line (3) an ellipse

(2) a parabola (4) a hyperbola 24.....

25 Using the associative law of addition of real numbers, it is possible to conclude that

(1) $(2+4)+5=2+(4+5)$ (3) $2(4+5)=2(4)+2(5)$

(2) $(2+4)+5=5+(2+4)$ (4) $(2+4)+5=(4+2)+5$ 25.....

26 The solution of $\frac{1}{x}+\frac{1}{2x}=1$ is

(1) $\frac{1}{2}$ (3) $\frac{2}{3}$

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

27 The expression $\sqrt{-16}+\sqrt{-20}$ is equivalent to

(1) $4+2\sqrt{5}i$ (3) $(4+2\sqrt{5})i$

(2) $6\sqrt{5}i$ (4) $6i$ 27.....

28 Which table contains those number pairs, all of which taken together do *not* satisfy a linear equation?

(1)

x	1	2	3
y	2	4	6

(3)

x	0	1	2
y	1	2	4

(2)

x	1	2	3
y	0	1	2

(4)

x	4	5	6
y	3	4	5

28.....

29 The solution of $(1-\sqrt{2})y=3$ is

(1) $1-\sqrt{2}$ (3) $3+3\sqrt{2}$

(2) $1+\sqrt{2}$ (4) $-3-3\sqrt{2}$ 29.....

30 The product of $\sqrt[3]{a}$ and $\sqrt[3]{b}$, where a and b are real numbers, is

(1) $(ab)^{\frac{2}{3}}$ (3) $(ab)^{\frac{1}{9}}$

(2) $(ab)^{\frac{1}{3}}$ (4) $(ab)^{\frac{1}{6}}$ 30.....

Part II

Answer four questions from this part. Show all work unless otherwise directed. Only an algebraic solution will be accepted in 34 and 35.

31 Solve the following set of equations algebraically and group your answers: [10]

$$x^2 + y^2 = 13$$
$$xy = 6$$

32 Find to the *nearest tenth* the roots of the equation $2x^2 - 5x + 1 = 0$. [10]

33 Using logarithms, find to the *nearest hundredth* the value of k if $k = \dfrac{354 \sin 63°}{(8.52)^2}$. [10]

34 The perimeter of a triangle is 39 inches. The longest side is 7 inches less than the sum of the other two sides. The shortest side is 7 inches less than the longest side. Find the length of each side of the triangle. [5, 5]

35 A new schedule for a train requires it to travel 351 miles in one-fourth hour *less* time than before. To do this, the speed of the train must be increased by 2 miles per hour. What must be the average speed of the train in order to keep on the new schedule? [4, 6]

36 The volume of a circular cylinder varies directly as the square of the radius of its base and as its altitude; that is, $V = \pi r^2 h$. A certain cylinder is to contain 88 cubic inches.

a If the radius of the base of the cylinder can vary from 2 inches to 6 inches, inclusive, draw a graph of the relation of h and r. [Use the approximation $\pi = \frac{22}{7}$.] [7]

b If it is desired to have the height of this cylinder twice the radius of its base, find the number of inches in the radius. [Leave answer in radical form.] [3]

*37 *a* A sum of $25 is invested at 4% interest, compounded semiannually. Determine to the *nearest half year* the number of years required for the doubling of this sum.

$[A = P(1 + \dfrac{r}{2})^{2n}.]$ [8]

b Is the same time required for the doubling of $50, if it is invested under the same conditions as in part *a*? [Answer *yes* or *no*.] [2]

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

FOR TEACHERS ONLY

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INSTRUCTIONS FOR RATING

INTERMEDIATE ALGEBRA

Monday, June 18, 1962 — 1:15 to 4:15 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. For questions 21–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3 or 4.

(1) $\frac{8}{3}$

(2) $y = -3x + 5$

(3) $(4, -7)$

(4) $\frac{m+1}{m-1}$

(5) $4x^2 - 4x - 3 = 0$

(6) $\frac{a^8}{b^7 y^9}$

(7) $9.6582 - 10$

(8) 611.5

(9) $\frac{4^n - 1}{3}$

(10) 3

(11) 2

(12) $25x + 10y$

(13) $32b^5$

(14) $7.0882 - 10$

(15) $\frac{3}{2}$

(16) 149

(17) $\frac{2 + 3a}{a}$

(18) 12

(19) $n^2 + (n+1)^2 = 85$

(20) 140

(21) 3

(22) 1

(23) 3

(24) 2

(25) 1

(26) 4

(27) 3

(28) 3

(29) 4

(30) 2

[OVER]

Part II

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.

(31) $\begin{vmatrix} x & 2 & -2 & 3 & -3 \\ y & 3 & -3 & 2 & -2 \end{vmatrix}$ [10]

(32) 0.2 and 2.3 [10]

(33) 4.35 [10]

(34) Analysis [5]
9, 14, 16 [5]

(35) Analysis [4]
54 m.p.h. [6]

(36) *b* $\sqrt[3]{14}$ [3]

(37) *a* $17\frac{1}{2}$ [8]
b Yes [2]