

The University of the State of New York
 REGENTS HIGH SCHOOL EXAMINATION
INTERMEDIATE ALGEBRA
 Friday, June 13, 1958 — 1:15 to 4:15 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 Solve the following set of equations for *both* x and y :

$$\begin{aligned} 5x + 3y &= 3 \\ 2x + 3y &= 12 \end{aligned}$$

1.....

2 Express as a single term: $7i - \sqrt{-4}$

2.....

3 Find the value of $(x + 2)^0 + (9x)^{-\frac{1}{2}}$ when $x = 4$.

3.....

4 If the number 0.0000086 is written in the form 8.6×10^n , find the value of n .

4.....

5 Write the fraction $\frac{5}{3 - \sqrt{2}}$ as an equivalent fraction with a rational denominator.

5.....

6 Combine into a single fraction: $\frac{3}{x-2} - \frac{2}{x}$

6.....

7 Write in *simplest* form the *third* term *only* in the expansion of $(x + 2)^6$.

7.....

8 Simplify completely: $\frac{\frac{x}{x+1}}{1 - \frac{x}{x+1}}$

8.....

9 Multiply $\frac{x^2 - y^2}{2xy}$ by $\frac{x^2}{x - y}$. Express the result in simplest form.

9.....

- 10 Find the logarithm of 3.147. 10.....
- 11 Find the number whose logarithm is 9.7736 — 10. 11.....
- 12 In right triangle ABC , angle C is 90° . If BC is 15 and AC is 20, find angle A to the *nearest degree*. 12.....
- 13 The first term of an arithmetic progression is 3 and the sixteenth term is $\frac{27}{4}$. Find the common difference. 13.....
- 14 Find *two* numbers that, when inserted between 3 and 192, form with those numbers a geometric progression. 14.....
- 15 Find the sum of the infinite geometric progression $3, 2, \frac{4}{3}, \dots$ 15.....
- 16 If x varies inversely as y and $x = 8$ when $y = 3$, find x when $y = 2$. 16.....
- 17 Write an equation of the line whose slope is 2 and which passes through the point $(1, 2)$. 17.....
- 18 The graph of the equation $y = 3x^2 + x + K$ passes through the point $(1, 2)$. Find the value of K . 18.....
- 19 Find the sum of the roots of the equation $2x^2 - 6x + 7 = 0$. 19.....

Directions (20–25): Indicate the correct completion for *each* of the following by writing the letter a, b, c or d on the line at the right.

- 20 If $\log r = x$, then $\log \frac{r^2}{s}$ equals (a) $2x - s$ (b) $2x - 2s$
 (c) $2x - \log s$ (d) $\frac{2x}{\log s}$ 20.....
- 21 If the roots of an equation are real, rational and unequal, the discriminant of the equation may be (a) -9 (b) 0 (c) 9 (d) 13 21.....
- 22 In the equation $\sqrt{2x+3} - x = 0$, x is equal to (a) 3 only (b) -1 only
 (c) 3 and -1 (d) -3 and 1 22.....
- 23 If $\frac{1}{s} = \frac{1}{x} - \frac{1}{y}$, then x equals (a) $s + y$ (b) $\frac{sy}{s + y}$
 (c) $\frac{sy}{y - s}$ (d) $\frac{y + s}{sy}$ 23.....
- 24 If $y = \sqrt[3]{27x^{27}}$, then the value of y is (a) $3x^9$ (b) $3x^9$ (c) $9x^9$
 (d) $9x^9$ 24.....
- 25 The equation of the axis of symmetry of the graph of $y = 2x^2 - 3x + 7$ is
 (a) $y = -\frac{3}{4}$ (b) $y = \frac{3}{4}$ (c) $x = -\frac{3}{4}$ (d) $x = \frac{3}{4}$ 25.....

Part II

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

26 The area of a rectangle is 17 square inches. The width in inches is represented by x and the length in inches by $x + 3$.

- a* Write an equation that can be used to find the width of the rectangle. [2]
b Find to the *nearest tenth of an inch* the width of the rectangle. [8]

27 Solve the following system of equations and check both sets of answers: [8, 2]

$$\begin{aligned}x^2 - xy + y &= 5 \\2x + y &= 3\end{aligned}$$

28 *a* Draw the graph of $y = x^2 - 2x - 5$ from $x = -2$ to $x = 4$. [6]

b From the graph made in answer to *a*, estimate to *tenths* the roots of $x^2 - 2x - 5 = 0$. [2]

c Write an equation of the horizontal straight line which is tangent to the graph of $y = x^2 - 2x - 5$. [2]

29 Using logarithms, find to the *nearest hundredth* the value of

$$\sqrt[3]{\frac{94.7(\tan 59^\circ)^2}{3.14}}. \quad [10]$$

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 In how many years (n) will \$570 amount to \$965 if interest is compounded annually at 3%? [Use the formula $A = P(1 + r)^n$ and give your answer to the *nearest year*.] [10]

*31 Solve the equation $2x^8 - 3x^2 - 11x + 6 = 0$. [10]

Part III

Answer two questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 33–35.

- 32 Write the equation or 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 rate of a motor boat in still water is 10 miles per hour. The boat traveled 12 miles upstream and returned. The round trip required $2\frac{1}{2}$ hours. What was the rate of the current? [5]
- b* The units digit of a two-digit number exceeds the tens digit by 3. The number with the digits reversed is 20 less than twice the original number. Find the original number. [5]
- 33 Dave can mow his lawn in 20 minutes less time with his power mower than with his hand mower. One day his power mower broke down 15 minutes after he started mowing and it took him 25 minutes more to complete the job with his hand mower. How many minutes does it take Dave to mow the lawn with the power mower? [5, 5]
- 34 At a certain school the total receipts for a dance were \$150. If ten more couples had attended the dance, the price per couple could have been reduced a half dollar without causing any change in the total receipts. What was the price per couple? [5, 5]
- 35 A chemist has two acid solutions, one 20% acid and the other 75% acid. Find, to the *nearest integer*, the number of cubic centimeters of each solution he must use in order to produce 200 cubic centimeters of a solution that is 60% acid. [5, 5]

FOR TEACHERS ONLY

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INSTRUCTIONS FOR RATING INTERMEDIATE ALGEBRA

Friday, June 13, 1958 — 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 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 10 is not expressed to *four decimal places* and if the answer to question 11 is not expressed to *four significant digits*. For questions 20–25, allow credit if the pupil has written the correct answer instead of the letter *a*, *b*, *c* or *d*.

- | | |
|--|--------------------|
| (1) $x = -3, y = 6$ | (10) 0.4979 |
| (2) $5i$ or $5\sqrt{-1}$ | (11) 0.5937 |
| (3) $1\frac{1}{2}$ | (12) 37 |
| (4) -6 | (13) $\frac{1}{4}$ |
| (5) $\frac{5(3 + \sqrt{2})}{7}$ | (14) 12, 48 |
| (6) $\frac{x+4}{x(x-2)}$ or $\frac{x+4}{x^2-2x}$ | (15) 9 |
| (7) $60x^4$ | (16) 12 |
| (8) x | (17) $y = 2x$ |
| (9) $\frac{x(x+y)}{2y}$ or $\frac{x^2+xy}{2y}$ | (18) -2 |
| | (19) 3 |
| | (20) c |
| | (21) c |
| | (22) a |
| | (23) b |
| | (24) b |
| | (25) d |

