

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTERMEDIATE ALGEBRA

Wednesday, August 20, 1958 — 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 Factor  $6x^2 + 5x - 6$ . 1.....
- 2 Express as a monomial in terms of  $i$ :  $-3i + \frac{1}{2}\sqrt{-64}$  2.....
- 3 Find the value of  $(1-a)^0 - (12a)^{-\frac{1}{2}}$  when  $a = \frac{1}{3}$ . 3.....
- 4 In the equation  $S = \frac{-t}{3} - 90$ , find the value of  $t$  when  $S = -100$ . 4.....
- 5 If  $5.3 \times 10^n = 53,000$ , find the value of  $n$ . 5.....
- 6 Write a linear equation expressing the relationship between  $x$  and  $y$  shown in the following table:  

$x$	-5	0	5	10
$y$	-6	-2	2	6

 6.....
- 7 Write an equation of the circle whose center is at the origin and which passes through the point  $(-4, 0)$ . 7.....
- 8 Solve the equation  $kx - 2y = ky$  for  $k$  in terms of  $x$  and  $y$ . 8.....
- 9 Solve for  $x$ :  $\sqrt{2x-3} - 5 = 0$  9.....
- 10 Express  $\frac{3}{2-\sqrt{2}}$  as an equivalent fraction with a rational denominator. 10.....

- 11 Simplify the complex fraction:  $\frac{2 + \frac{1}{x^2}}{2 - \frac{1}{x}}$  11.....
- 12 If  $y$  varies inversely as  $x$  and  $y = 9$  when  $x = \frac{1}{3}$ , find the value of  $y$  when  $x = 3$ . 12.....
- 13 Find the positive geometric mean between  $-3$  and  $-27$ . 13.....
- 14 Find the sum of the infinite geometric progression  $3, \frac{9}{4}, \frac{27}{16}, \dots$  14.....
- 15 One leg of a right triangle is 9 and the hypotenuse is 14. Find to the nearest degree the angle opposite the given leg. 15.....
- 16 Find the logarithm of 3.974. 16.....
- 17 Find the number whose logarithm is  $8.3972 - 10$ . 17.....

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

- 18 An equation of the axis of symmetry of the graph of  $y = 2x^2 - 6x$  is  
 (a)  $x = -\frac{3}{2}$  (b)  $x = \frac{3}{2}$  (c)  $y = -\frac{3}{2}$  (d)  $y = \frac{3}{2}$  18.....
- 19 The point which is 3 units below the  $x$ -axis and 4 units to the right of the  $y$ -axis has the coordinates (a)  $(-3, -4)$  (b)  $(-3, 4)$   
 (c)  $(4, 3)$  (d)  $(4, -3)$  19.....
- 20 Given the equation  $ax^2 + bx + c = 0$  in which  $a, b$  and  $c$  are positive integers. If the values of  $a, b$  and  $c$  are such that  $b^2 = ac$ , then the roots of the equation are (a) real and unequal (b) real and equal  
 (c) real and rational (d) imaginary 20.....
- 21 Which one of the following is the equation of a hyperbola?  
 (a)  $2y^2 = x^2 + 3$  (b)  $2y^2 = -x^2 - 3$  (c)  $2y = x^2 + 3$   
 (d)  $2y^2 = -x^2 + 3$  21.....
- 22 The sum of  $\frac{x+2}{-3}$  and  $\frac{x-3}{2}$  is equal to (a)  $\frac{x-13}{6}$   
 (b)  $\frac{13-x}{6}$  (c)  $\frac{x+13}{6}$  (d)  $-\frac{x+13}{6}$  22.....
- 23 The third term of the expansion of  $(x-y)^8$  is (a)  $28x^6y^2$   
 (b)  $-28x^6y^2$  (c)  $56x^6y^2$  (d)  $-56x^6y^2$  23.....
- 24  $\log 3x^2$  is equal to (a)  $6 \log x$  (b)  $2 \log 3x$  (c)  $\log 3 + 2 \log x$   
 (d)  $2 \log 9x$  24.....
- 25 If  $4\sqrt{5} = \sqrt{n}$ , the value of  $n$  is (a) 10 (b) 20 (c) 80 (d) 100 25.....

## Part II

Answer three questions from this part. Show all work.

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

$$\begin{aligned}x^2 - 2y^2 &= 1 \\x - 2y &= 7\end{aligned}$$

- 27 Solve
- graphically*
- the following set of equations. [Estimate answers to
- tenths*
- .] [6, 2, 2]

$$\begin{aligned}y &= x^2 + 2x \\x - y + 1 &= 0\end{aligned}$$

- 28 Find to the
- nearest tenth*
- the roots of the equation
- $2x - 3 = \frac{7}{x}$
- . [10]

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

$$\sqrt[3]{\frac{0.91 \times 735}{0.696 \times 2.72}}. \quad [10]$$

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 set of equations for
- $x$
- ,
- $y$
- and
- $z$
- and check: [8, 2]

$$\begin{aligned}x + 3y - z &= 6 \\3x + 2y - 2z &= 2 \\2x - y + z &= -8\end{aligned}$$

- \*31 Solve the equation
- $6x^3 + 25x^2 + 18x - 9 = 0$
- . [10]

Part III

Answer two questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 32–34.

- 32 A motor boat traveling at 18 miles per hour traveled the length of a lake in one-quarter of an hour less time than when traveling at 12 miles per hour. Find the length of the lake. [5, 5]
- 33 A chemical company has in storage a 15% solution and a 25% solution of a disinfectant. How many gallons of each should be used to make 50 gallons of a 22% solution? [5, 5]
- 34 In an arithmetic progression the 4th term is 8 and the 13th term is 14.  
*a* Find the first term. [5]  
*b* Find the sum of the first 28 terms. [5]
- 35 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* A number is equal to 16 more than the product of its digits. It also is equal to 7 more than three times the sum of its digits. Find the number. [5]  
*b* It takes John two hours longer than Dave to do a certain job. Together they can do the job in an hour. How long would it take Dave alone to do the job? [5]

# FOR TEACHERS ONLY

## IA

### INSTRUCTIONS FOR RATING INTERMEDIATE ALGEBRA

Wednesday, August 20, 1958 — 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. Do not allow credit if the answer to question 16 is not expressed to *four* decimal places, and if the answer to question 17 is not expressed to *four significant digits*. For questions 18–25, allow credit if the pupil has written the correct answer instead of the letter *a*, *b*, *c*, or *d*.

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

(2)  $i$

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

(4) 30

(5) 4

(6)  $5y = 4x - 10$

(7)  $x^2 + y^2 = 16$

(8)  $\frac{2y}{x - y}$

(9) 14

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

(11)  $\frac{2x^2 + 1}{2x^2 - x}$

(12) 1

(13) 9

(14) 12

(15) 40

(16) 0.5992

(17) 0.02496

(18)  $b$

(19)  $d$

(20)  $d$

(21)  $a$

(22)  $a$

(23)  $a$

(24)  $c$

(25)  $c$

