INTERMEDIATE ALGEBRA

Friday, June 17, 1960 — 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 Express as a single term the sum of $6i$ and $\sqrt{-9}$.   1................

2 Find the positive root of the equation $2t^2 + 5t - 33 = 0$.   2................

3 Solve for t the formula $A = P(1 + rt)$.   3................

4 Express $\dfrac{2}{4 - \sqrt{7}}$ as an equivalent fraction with a rational denominator.   4................

5 Write in *simplest form* the second term *only* in the expansion of $(2a + b)^4$.   5................

6 Find log 0.6638.   6................

7 Find N if log $N = 0.4226$.   7................

8 Find to the *nearest degree* the angle of elevation of the sun when a 21-foot vertical pole casts a 30-foot shadow on level ground.   8................

9 If x varies inversely as y and if $x = 12$ when $y = 8$, find x when $y = 10$.   9................

10 Perform the indicated operations and express the result in *simplest form*:

$$\left(1 + \frac{1}{x}\right)\left(\frac{1}{x+1} - 1\right)$$

    10................

[1]

11 Find the 57th term of the arithmetic progression 20, 16, 12, ...

11..................

12 Insert two geometric means between 36 and $4\frac{1}{2}$.

12..................

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

13..................

14 If the roots of the equation $x^2 + kx + t = 0$ are $3 + \sqrt{2}$ and $3 - \sqrt{2}$, find the value of k.

14..................

15 Write an equation of the line which passes through the point $(0, -3)$ and which has the same slope as the line whose equation is $y = 2x + 6$.

15..................

16 Write an equation of the axis of symmetry of the graph of the equation $y = x^2 - 6x + 5$.

16..................

17 Solve for x: $x^{\frac{3}{2}} = 64$

17..................

18 Write a linear equation expressing the relationship between x and y shown in the following table:

x	-1	1	3	6
y	2	6	10	16

18..................

19 If $\log N^3 = 9.3643 - 10$, find $\log N$

19..................

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

20..................

21 If the sum of three consecutive numbers is S, express in terms of S the smallest of these numbers.

21..................

22 Find the sum of the infinite geometric progression

$2, \dfrac{2}{3}, \dfrac{2}{9}, \ \ldots$

22..................

Directions (23–30): Indicate the correct completion for *each* of the following by writing on the line at the right the *number* 1, 2, 3 or 4.

23 The equation $x + \sqrt{x-2} = 2$ has (1) both 2 and 3 as roots (2) 2 as its only root (3) 3 as its only root (4) neither 2 nor 3 as roots

23............

24 If $T = 10x^2$, then log T equals (1) $1 + 2$ log x (2) $1 + 2x$ (3) $10 + 2$ log x (4) 20 log x

24............

25 If the roots of the equation $2x^2 - 3x + c = 0$ are real and irrational, the value of c may be (1) 1 (2) 2 (3) 0 (4) -1

25............

26 An illustration of the distributive law is (1) $ab + ac = ac + ab$ (2) $(a + b) + c = a + (b + c)$ (3) $a(b + c) = ab + ac$ (4) $(ab)c = a(bc)$

26............

27 The graph of the equation $y = x^2 - 5x$ is (1) a circle (2) an ellipse (3) a parabola (4) a hyperbola

27............

28 The graphs of the equations $x^2 + y^2 = 25$ and $y = x^2$ are drawn on the same set of axes. The total number of points common to the graphs is (1) one (2) two (3) three (4) four

28............

29 Of the equations given below, the one which has the product of its roots equal to 4 is (1) $2x^2 - 3x + 4 = 0$ (2) $2x^2 - 8x + 5 = 0$ (3) $x^2 - 4 = 0$ (4) $2x^2 - 3x + 8 = 0$

29............

30 If t represents the tens digit and u represents the units digit of a two-digit number, the ratio of the number to the number with the digits reversed is (1) $\dfrac{tu}{ut}$ (2) $\dfrac{t + u}{u + t}$ (3) $\dfrac{10t + u}{10u + t}$ (4) $\dfrac{10u + t}{10t + u}$

30............

[3]

Part II

Answer four questions from this part. Show all work unless otherwise directed. Only algebraic solutions will be accepted in 31 and 35.

31 With respect to a certain rectangle and a certain square these facts are known: The sum of their areas is 68; the length of the rectangle is twice its width and a side of the square exceeds the width of the rectangle by 2. Find the dimensions of the rectangle and the length of a side of the square.   [5, 5]

32 Find to the *nearest tenth* the roots of the equation $3x^2 + 5x - 4 = 0$.   [10]

33 Solve the following set of equations, group your answers and check in both equations.   [7, 1, 2]

$$xy + y^2 = 3$$
$$2x + y = 1$$

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

   b From the graph made in answer to *a*, estimate to the *nearest tenth* the positive root of the equation $x^2 + 4x - 5 = -1$.   [2]

   c From the graph made in answer to *a*, find a value of k for which both roots of the equation $x^2 + 4x - 5 = k$ will be negative.   [2]

35 At 9 a.m. Mike started from home on a hike to a town 12 miles away. He took one hour for lunch and then returned home over the same route, arriving home at 5 p.m. If his average rate returning was one mile per hour *less* than his rate going, find his rate on the return trip.   [5, 5]

36 Given the formula $V = \pi r^2 h$. By means of logarithms, find to the *nearest tenth* the value of r when $V = 5340$ and $h = 14.6$. [Use the approximation $\pi = 3.14$.]   [10]

*37 Solve the following set of equations and check: [7, 3]

$$x + 3y + z = 0$$
$$x + 4z = -2$$
$$-6y + z = 1$$

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

[4]

FOR TEACHERS ONLY

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INSTRUCTIONS FOR RATING
INTERMEDIATE ALGEBRA
Friday, June 17, 1960 — 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. Do not allow credit if the answer to question 7 is not expressed to *four significant digits*. For questions 23–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3 or 4.

(1) $9i$ *or* $9\sqrt{-1}$

(2) 3

(3) $\dfrac{A-P}{Pr}$

(4) $\dfrac{2\,(4+\sqrt{7})}{9}$

(5) $32a^3b$

(6) 9.8221—10 *or* —0.1779

(7) 2.646

(8) 35

(9) 9.6

(10) —1

(11) —204

(12) 18, 9

(13) $8\frac{1}{4}$

(14) —6

(15) $y = 2x - 3$

(16) $x = 3$

(17) 16

(18) $y = 2x + 4$

(19) 9.7881—10

(20) $(1, -3)$ *or* $x = 1, y = -3$

(21) $\dfrac{S-3}{3}$

(22) 3

(23) 2

(24) 1

(25) 4

(26) 3

(27) 3

(28) 2

(29) 4

(30) 3

[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 realtive importance of the principle in the solution of the problem.

Part II

(31) Analysis   [5]
   8 by 4, 6   [5]

(32) 0.6 and —2.3   [10]

(33) Solution   [7]

x	2	$-\frac{1}{2}$
y	—3	2

[1]

Check   [2]

(34) *b* Allow 0.7, 0.8 *or* 0.9.   [2]

   c Any value less than —5 but greater than or equal to —9
   or any value —5 > k ≥ —9   [2]

(35) Analysis   [5]
   3 m.p.h   [5]

(36) 10.8   [10]

(37) (2, —⅓, —1)   [7]
   Check   [3]