The University of the State of New York

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REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Wednesday, January 25, 1967 — 1:15 to 4:15 p.m., only

The last page of the booklet is the answer sheet, which is perforated. Fold the last page along the perforation and then, slowly and carefully, tear off the answer sheet. Now fill in the heading of your answer sheet. When you have finished the heading, you may begin the examination immediately.

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet.

1 Solve for x: $10 - 3x = 5x + 2$

2 Find the value of $-5st^2$ when $s = -2$ and $t = 3$.

3 Solve for n: $1\frac{1}{2}n - 2 = 10$

4 The sum of two consecutive integers is 39. Find the value of the smaller integer.

5 Solve for a: $a(3a + 2) = 3a^2 + 5a - 6$

6 Express the product of $3x - 2$ and $2x + 5$ as a trinomial.

7 If the average of 2 and x is 7, find the value of x.

8 A boy has n nickels and d dimes. Express in terms of n and d the total number of cents he has.

9 Using the formula $A = p + prt$, find A when $p = 500$, $r = .04$, and $t = 2\frac{1}{2}$.

10 Solve for n: $15 : n = 12 : 16$

11 Find the positive root of the equation $x^2 + 8x - 20 = 0$.

12 Find the square root of 75 to the *nearest tenth.*

13 Combine into a single fraction: $\frac{1}{2x} + \frac{3}{x}$

14 Factor: $3x^2 + x - 2$

15 If 35% of a number is 70, find the number.

16 Subtract $a^2 - b^2$ from $a^2 + b^2$.

17 Divide $15x^2 - 10x$ by $3x - 2$.

18 Solve for x and y:

$$x + y = 4$$
$$2x + y = 10$$

19 If $h = 10 \sin 72°$, find the value of h to the *nearest tenth.*

20 Given the formula $V = \frac{Bh}{3}$. Express h in terms of V and B.

Directions (21–29): Write in the space provided on the separate answer sheet the *number* preceding the expression that best completes *each* statement or answers *each* question.

21 The reciprocal of $(a - b)$ is

(1) $\frac{1}{a - b}$ (3) $\frac{a - b}{ab}$

(2) $\frac{1}{a} - \frac{1}{b}$ (4) $\frac{ab}{a - b}$

22 When $\frac{x^2 - 9}{x}$ is divided by $\frac{x - 3}{5x}$, the quotient is

(1) $\frac{(x - 3)^2 (x + 3)}{5x^2}$ (3) $5(x + 3)$

(2) $5x(x + 3)$ (4) $5(x - 3)$

23 An airplane traveled 900 miles in h hours. The average speed for this trip may be expressed as

(1) $900h$ (3) $\frac{h}{900}$

(2) $\frac{900}{h}$ (4) $\frac{1}{900h}$

24 The expression $(-3a^3b)^2$ is equivalent to

(1) $6a^6b^2$ (3) $9a^6b^2$
(2) $-9a^6b^2$ (4) $9a^5b^2$

25 The graph of $2x + y = 8$ will intersect the x-axis at the point whose coordinates are

(1) (0,8) (3) (4,0)
(2) (0,4) (4) (8,0)

26 The measures in degrees of the three angles of a triangle are represented by x, $(x + 1)$, and $(x + 2)$, respectively. The number of degrees in the smallest angle of the triangle is

(1) 29 (3) 59
(2) 31 (4) 61

27 The expression $2(a + 1) - (1 + 2a)$ is equivalent to

(1) 1 (3) 0
(2) -1 (4) $4a$

28 In a right triangle, if the length of the hypotenuse is 10 and the length of one leg is 8, the length of the other leg is

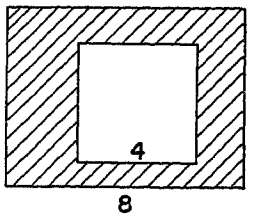
(1) 8 (3) 6
(2) 2 (4) 4

29 The expression $3\sqrt{48}$ is equivalent to

(1) $7\sqrt{3}$ (3) $48\sqrt{3}$
(2) $12\sqrt{3}$ (4) $4\sqrt{3}$

30 Answer *either* *a* or *b*, but *not* both:

a In the accompanying figure, the rectangle is 8 inches long and 6 inches wide. The side of the square is 4 inches. Find in square inches the area of the shaded portion.



OR

b *On the answer sheet,* using straightedge and compasses, construct the bisector of angle ABC.

Answers to the following questions should be written on paper supplied by the school.

Part II

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

31 Solve graphically and check: [8, 2]

$$x = 2y + 3$$
$$y = 2x + 3$$

32 A plane made a trip of 1,800 miles. If the average speed had been increased by 50 miles per hour, the plane would have covered 2,100 miles in the same time. Determine the average speed of the plane. Check. [*Only an algebraic solution will be accepted.*] [6, 3, 1]

33 The length of a rectangle is 4 inches more than its width. The area is 140 square inches. Find the length and the width. Check. [*Only an algebraic solution will be accepted.*] [8, 2]

34 Solve the following system of equations for x and y and check in both equations: [8, 2]

$$\frac{x}{2} + \frac{3y}{4} = 8$$

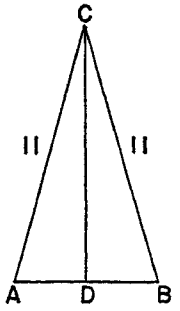
$$x + \frac{y}{4} = 6$$

35 The altitude of isosceles triangle ABC is CD and D is the midpoint of its base AB, as shown.

If $AC = CB = 11$ inches and $AB = 8$ inches,

a find to the *nearest degree* the measure of angle A [6]

b find to the *nearest inch* the length of CD [4]



36 Write an equation or a system of equations which can be used to solve *each* of the following problems. In each case state what the variable or variables represent. [*Solution of the equations is not required.*]

a A man invested some money at 5% and \$800 less at 3½%. He received a total of \$210 a year from these investments. How much was each investment? [5]

b A grocer wishes to mix cashew nuts selling at 95¢ a pound and peanuts selling at 65¢ a pound. How many pounds of each must he use to make a mixture of 30 pounds which will sell for 75¢ a pound? [5]

*37 *a* On the same set of axes graph the following system of inequalities and label the solution set A: [8]

$$y < 2x + 4$$
$$x + y > 0$$

b Choose a point within the solution set and show that its coordinates satisfy each inequality. [2]

*38 Write the letters *a* through *e* on your answer paper. After *each* letter, write the *number* preceding the expression that best completes the statement or answers the question. [10]

a The set of integers is *not* closed under the operation of

(1) addition
(2) subtraction
(3) multiplication
(4) division

b The product of a number, n, and its multiplicative inverse is

(1) 1
(2) $-n$
(3) $\frac{1}{n}$
(4) 0

c Which numeral represents a real number but *not* a rational number?

(1) −1.5
(2) π
(3) $\sqrt{9}$
(4) 0

d The set of rational numbers between $\frac{1}{15}$ and $\frac{5}{15}$ has

(1) 1 element
(2) no elements
(3) 3 elements
(4) an infinite number of elements

e If x is a positive integer, then the value of $|x|$ is

(1) 0
(2) x
(3) $-x$
(4) undefined

*These questions are based on material beyond the scope of the syllabus.

FOR TEACHERS ONLY

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SCORING KEY

NINTH YEAR MATHEMATICS

Wednesday, January 25, 1967 — 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. 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. In questions 21–29, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) 1

(2) 90

(3) 8

(4) 19

(5) 2

(6) $6x^2 + 11x - 10$

(7) 12

(8) $5n + 10d$

(9) 550

(10) 20

(11) 2

(12) 8.7

(13) $\frac{7}{2x}$

(14) $(3x - 2)(x + 1)$

(15) 200

(16) $2b^2$

(17) $5x$

(18) $x = 6$, $y = -2$

(19) 9.5

(20) $h = \frac{3V}{B}$

(21) 1

(22) 3

(23) 2

(24) 3

(25) 3

(26) 3

(27) 1

(28) 3

(29) 2

(30) a 32

[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.

(32) Analysis [6]
300 [3]

(33) $l = 14$
$w = 10$ [8]

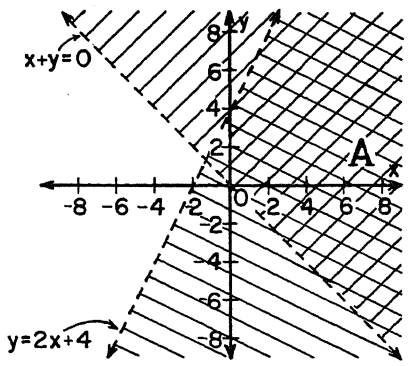
(34) $x = 4$
$y = 8$ [8]

(35) *a* 69° [6]
b 10 [4]

(36) *a* $x =$ amount invested @ 5%
$.05x + .035(x - 800) = 210$ [5]

b $x =$ number of pounds of cashew nuts
$.95x + .65(30 - x) = 22.50$ [5]

(37) *a* The region labeled A, boundary lines $x + y = 0$ and $y = 2x + 4$ excluded. [8]



(38) *a* 4 [2]
b 1 [2]
c 2 [2]
d 4 [2]
e 2 [2]