The University of the State of New York

9

REGENTS HIGH SCHOOL EXAMINATION

NINTH YEAR MATHEMATICS

Thursday, January 25, 1968 — 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: $3(x + 2) = -3$

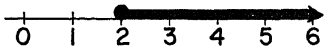
2 Subtract $2x^2 - 3x - 6$ from $7x^2 - 6x + 4$.

3 Find the value of $\sqrt{75}$ to the *nearest tenth.*

4 What is the solution set for $.8x + .8 = 8$?

5 Change the fraction $\frac{3}{1 - x}$ into an equivalent fraction whose denominator is $x - 1$.

6 Write an open sentence whose solution set is shown in the accompanying graph:



7 Find the average of $\frac{3}{4}$ and $\frac{7}{8}$.

8 For what value of x is the fraction $\frac{2x - 1}{x - 2}$ *not* defined?

9 Solve for t: $\frac{2t}{3} + \frac{t}{4} = 22$

10 Given the formula $R = st^2$. Express s in terms of R and t.

11 The hypotenuse of a right triangle is 13 feet long and one leg is 12 feet long. Find the number of feet in the length of the other leg.

12 If $\frac{x^2 - 9}{25}$ is multiplied by $\frac{5}{3x + 9}$, what is the product in its *lowest* terms?

13 Factor: $a - a^2$

14 Find the value of $4x^3 - 3x^2 + 5x$ if $x = 2$.

15 If the cosine of an angle is .8775, find to the *nearest degree* the measure of the angle.

16 Two triangles are similar and the sides of the first triangle are 3, 7, and 8. If the longest side of the second triangle is 24, what is the shortest side of this triangle?

17 Perform the operations indicated and combine like terms: $(a + 3)^2 + a(a - 3)$

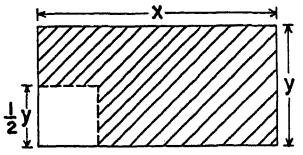
18 Two numbers are in the ratio of 5:2 and their sum is 28. What is the larger number?

19 Solve for x and y:
$3x - y = 7$
$2x + y = 8$

Directions (20–30): Write in the space provided on the separate answer sheet the *number* preceding the expression that best completes *each* statement or answers *each* question.

20 The accompanying figure shows a rectangle with a square cut from one corner. Expressed in terms of x and y, the area of the *shaded* region is

(1) $xy - \frac{1}{4}y^2$
(2) $xy - y^2$
(3) $x^2 - \frac{1}{2}xy$
(4) $y^2 - \frac{1}{2}xy$



21 A root of the equation $x^2 + 6x - 720 = 0$ is
(1) 12
(2) 24
(3) 40
(4) 60

22 The reciprocal of $\frac{1}{3}$ is
(1) $-\frac{1}{3}$
(2) $\frac{1}{9}$
(3) 3
(4) -3

23 The sum of $\sqrt{12}$ and $2\sqrt{27}$ can be expressed as
(1) $8\sqrt{6}$
(2) $7\sqrt{3}$
(3) $8\sqrt{3}$
(4) $3\sqrt{39}$

24 The product of $(-2xy^2)$ and $(3x^2y^3)^2$ is
(1) $-18x^4y^7$
(2) $-18x^5y^8$
(3) $36x^5y^7$
(4) $36x^6y^{10}$

25 When $8xy^2 + 12xy - 4x$ is divided by $4x$, the quotient is
(1) $2y^2 + 3y$
(2) $5y^3 - 1$
(3) $2y^2 + 3y - 1$
(4) $2y^2 + 3y - 4x$

26 The solution set of the open sentence $x + 1 = x + 2$ is
(1) $\{\ \}$
(2) $\{0\}$
(3) $\{-1\}$
(4) {all real numbers}

27 Which equation expresses the relationship between x and y as shown in the table below?

x	0	1	2	3	4
y	2	5	8	11	14

(1) $y = 3x$
(2) $y = 3x + 2$
(3) $y = 2x + 3$
(4) $y = x + 2$

28 The number of days in $3x$ weeks is
(1) $\frac{3x}{7}$
(2) $7x$
(3) 21
(4) $21x$

29 If the length of a rectangle is x and its width is y, the perimeter of the rectangle expressed in terms of x and y is
(1) xy
(2) $4xy$
(3) $x + y$
(4) $2x + 2y$

30 The solution set of the inequality $3x - 4 > 8$ is
(1) $\{x \mid x > 4\}$
(2) $\{x \mid x < 4\}$
(3) $\{x \mid x \geqq 4\}$
(4) $\{x \mid x = 4\}$

Answers to the following questions are to be written on paper provided by the school.

Part II

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

31 Solve graphically the following system of equations and check the solution set in each equation: [8,2]

$3x + 4y = -6$

$3x + y = 3$

32 The sum of the squares of two consecutive positive odd integers is 74. What are the integers? Check. [*Only an algebraic solution will be accepted.*] [5,4,1]

33 A telephone pole stands on level ground. A guy wire is attached to the pole at a point 30 feet above the ground. The guy wire makes an angle of 61° with the ground.

a To the *nearest foot,* how far from the base of the pole is the wire staked to the ground? [5]

b To the *nearest foot,* how long is the guy wire? [5]

34 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 The ratio of two adjacent sides of a rectangle is 3:4. If the area of this rectangle is 192 square feet, find the number of feet in the length and the width. [5]

b The sum of the digits of a two-digit number is 7. The number is 2 more than twice the number formed when the digits are reversed. Find the number. [5]

35 A part of $3,000 is invested at 3% and the rest at 5%. The annual income from the 5% investment is $70 more than the annual income from the 3% investment. How much was invested at each rate? Check. [*Only an algebraic solution will be accepted.*] [5,4,1]

36 *a* Find the solution set of the following equation and check: [5,1]

$$N + 2 - \frac{N - 1}{4} = 6$$

b The replacement set for the inequality $4 + 3x > -2$ is $\{-2, -1, 0, 1, 2\}$. Find the solution set. [4]

37 *a* In the coordinate plane, graph the solution set of the inequality $y < 2x - 8$. [6]

b Using the same set of axes used in *a*, graph the solution set of $y = |x|$. [4]

38 Each set of numbers below is followed by four properties of the set of real numbers. Each of these sets has only three of the four properties. Write the letters *a*, *b*, *c*, *d*, and *e* on your answer paper, and after each letter write the *number* preceding the property that the set of numbers does *not* have. [10]

a $\{1, 2, 3, 4, \ldots\}$

(1) Distributive property of multiplication over addition
(2) Commutative property of multiplication
(3) Multiplicative identity
(4) Multiplicative inverse

b $\{0, 1, 2, 3, \ldots\}$

(1) Associative property of addition
(2) Additive inverse
(3) Multiplicative identity
(4) Additive identity

c $\{\ldots -3, -2, -1, 0, +1, +2, +3, \ldots\}$

(1) Closure property under division
(2) Additive inverse
(3) Associative property of multiplication
(4) Additive identity

d $\{1, -1\}$

(1) Multiplicative inverse
(2) Multiplicative identity
(3) Closure property under multiplication
(4) Closure property under addition

e $\{-2, -1, -\frac{1}{2}, +\frac{1}{2}, +1, +2\}$

(1) Multiplicative inverse
(2) Multiplicative identity
(3) Additive identity
(4) Commutative property of addition

FOR TEACHERS ONLY

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SCORING KEY

NINTH YEAR MATHEMATICS

Thursday, January 25, 1968 — 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. For questions 20–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) -3

(2) $5x^2 - 3x + 10$

(3) 8.7

(4) {9} *or* 9

(5) $\frac{-3}{x-1}$ *or* $-\frac{3}{x-1}$

(6) $x \geq 2$

(7) $\frac{13}{16}$

(8) 2

(9) 24

(10) $s = \frac{R}{t^2}$

(11) 5

(12) $\frac{x-3}{15}$

(13) $a(1-a)$

(14) 30

(15) 29

(16) 9

(17) $2a^2 + 3a + 9$

(18) 20

(19) $x = 3, y = 2$

(20) 1

(21) 2

(22) 3

(23) 3

(24) 2

(25) 3

(26) 1

(27) 2

(28) 4

(29) 4

(30) 1

[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 [5]
5, 7 [4]
Check [1]

(33) *a* 17 [5]
b 34 [5]

(34) *a* x = width
y = length

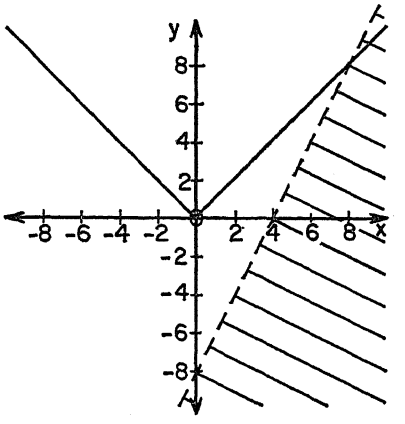
$$\frac{x}{y} = \frac{3}{4} \quad [5]$$
$$xy = 192$$

b u = units digit
t = tens digit
$t + u = 7$ [5]
$10t + u = 2(10u + t) + 2$

(35) Analysis [5]
$1,000 at 3%
$2,000 at 5% [4]
Check [1]

(36) *a* {5} [5]
Check [1]
b {—1, 0, 1, 2} [4]

(37) [6,4]



(38) *a* 4
b 2
c 1
d 4
e 3