9 NINTH YEAR MATHEMATICS

Monday, January 27, 1969 — 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 Find the value of $\dfrac{rx - a}{r - 1}$ when $r = 3$, $x = 15$, and $a = 5$.

2 Express 3.45 rounded off to the *nearest integer*.

3 If half a number is added to twice that number, the result is 35. What is the number?

4 Find the value of s if $\dfrac{2s}{3} = \dfrac{s}{4} + \dfrac{5}{12}$.

5 Find to the *nearest tenth* the value of $\sqrt{74}$.

6 Solve for x in terms of c, a, and k:
$$c = ax + k$$

7 List the elements of the solution set for $3x - 5 > 1$ when the replacement set for x is $\{0,1,2,3,4,5\}$.

8 Solve for x: $2x - (x + 1) = 0$

9 If one factor of $2x^2 + x - 6$ is $x + 2$, what is the other factor?

10 The measures of two angles of a triangle are equal and the measure of the third angle is 80 degrees. Find the number of degrees in each of the equal angles.

11 Solve for x: $.15x = 1.65$

12 If $R = \{a,b,c\}$, what is the total number of subsets of R which contain exactly two members?

13 A train goes 40 miles in 50 minutes. At the same speed how many miles will it go in 60 minutes?

14 Subtract $2a^3 + 6a^2 - 9a$ from $2a^3 + 8a^2 - 5a$.

15 Solve the following system of equations for x:
$$x - 3y = 7$$
$$2x - 3y = 11$$

16 Express the product $(1 + 2x)(1 - 2x)$ as a binomial.

17 What is the multiplicative inverse of $-\tfrac{2}{3}$?

18 If the point $(3,k)$ is on the graph of $3x - y = 3$, find the value of k.

19 Express the fraction $\dfrac{4a - 12}{a^2 - a - 6}$ in *lowest* terms.

20 Given $\sin x = .8660$. Find $\tan x$, correct to four decimal places.

21 The hypotenuse of a right triangle is 5 and one leg is 2. The other leg of the triangle is

(1) $\sqrt{21}$

(2) $\sqrt{29}$

(3) 3

(4) $\sqrt{10}$

22 The expression $\sqrt{12} - 2\sqrt{3}$ is equivalent to

(1) 0

(2) -6

(3) $\sqrt{3}$

(4) $4\sqrt{3}$

23 The product of $\frac{1}{4}y^4$ and $\frac{1}{4}y^4$ is

(1) $\frac{1}{4}y^8$

(2) $\frac{1}{16}y^4$

(3) $\frac{1}{16}y^8$

(4) $\frac{1}{16}y^{16}$

24 The expression $\dfrac{3x}{2} + \dfrac{2x}{3}$ is equivalent to

(1) x

(2) $2x$

(3) $\dfrac{13x}{6}$

(4) $\dfrac{5x}{6}$

25 Which expression represents the number of *cents, c,* that a customer received in change from a one-dollar bill after buying *n* articles each costing 5 cents?

(1) $c = 1 - 5n$

(2) $c = 100 - 5n$

(3) $c = 95n$

(4) $c = 100 - \dfrac{n}{5}$

26 Which inequality is represented by the graph below?

(1) $-2 > x \geqq 3$

(2) $-2 < x > 3$

(3) $-2 < x \leq 3$

(4) $-2 < x \leqq 3$

27 If the sum of $(+5)$ and (-2) is subtracted from the product of $(+5)$ and (-2), the result is

(1) 13

(2) 6

(3) -13

(4) 0

28 The width of a rectangle is expressed as w. The length of the rectangle is 1 less than twice the width. The area of this rectangle in terms of w is

(1) $6w - 2$

(2) $2w^2 + w$

(3) $2w^2 + 1$

(4) $2w^2 - w$

29 Which statement is true?

(1) $|-5| < |+5|$

(2) $|+6| = |-6|$

(3) $|4| > |-4|$

(4) $|-3| - 2 = |-5|$

30 The solution set of the open sentence
$$y^2 - 5y - 14 = 0 \text{ is}$$

(1) $\{7,2\}$

(2) $\{7,-2\}$

(3) $\{-7,2\}$

(4) $\{-7,-2\}$

Part II

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

31 a On the same set of axes graph the solution set of the following system of inequalities: [8]

$$y < -1$$
$$y < 2x - 3$$

b Name an ordered pair in the solution set of this system.   [2]

32 Mr. Jones leaned a 36-foot ladder against a vertical wall of a building with one end placed 10 feet away from the wall on level ground.

a Find to the *nearest degree* the acute angle which the ladder makes with the ground.   [5]

b Find to the *nearest foot* the distance from the top of the ladder to the ground.   [5]

33 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 One number is three times as large as another number. The sum of their reciprocals is 2. Find the numbers.   [5]

b The sides of a right triangle are consecutive even numbers. Find the lengths of the three sides.   [5]

34 A freight train starts a trip at 12 noon. At 1 p.m. a passenger train starts from the same place and travels over the same route at a speed 10 miles per hour faster than the freight train. If the passenger train overtakes the freight train at 5 p.m., find the rates of the two trains. [*Only an algebraic solution will be accepted.*]   [6,4]

35 Answer *both* a and b:

a Express the quotient in *simplest* terms: [6]

$$\frac{9x^2 - 1}{3x + 1} \div \frac{6x - 2}{6x^2 + 2x}$$

b Find the solution set for n: [4]
$$n^2 = 3n$$

36 The length of a rectangle is 2 inches more than its width. If the length is increased by 4 inches and the width is decreased by 3 inches, the area is unchanged. Find the length and width of the original rectangle. [*Only an algebraic solution will be accepted.*]   [6,4]

37 Below are five statements about graphs. *On your answer paper*, list the letters *a* through *e* and next to *each* letter write the *number* of the expression which best completes that statement.   [10]

a The y-intercept of the line $2y = 3x + 4$ is
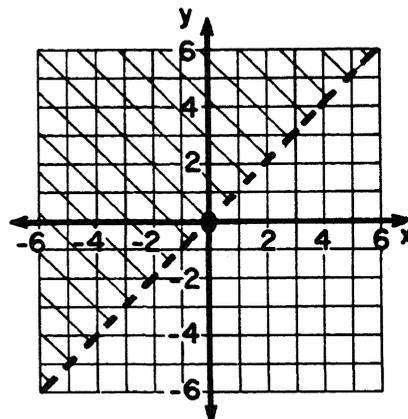(1) $\frac{3}{2}$ (3) 3
(2) 2   (4) 4

b The slope of the graph of the equation $y = -4$ is
(1) 1   (3) -4
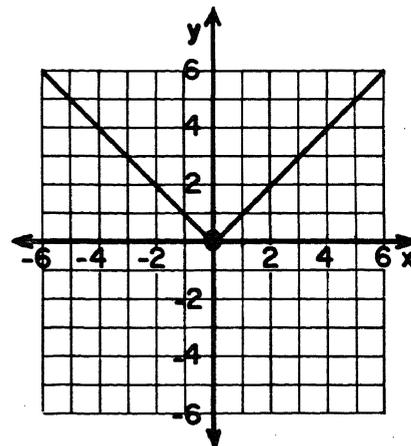(2) 0   (4) 4

c The line whose equation is $x = 5$
(1) is parallel to the y-axis
(2) is parallel to the x-axis
(3) passes through the origin
(4) has a slope of 5

d The graph shown below is the graph of

(1) $y > x$
(2) $y < x$
(3) $y \geqq x$
(4) $y \leqq x$

e The graph shown below is the graph of

(1) $y = x$
(2) $y = -x$
(3) $y = x^2$
(4) $y = |x|$

FOR TEACHERS ONLY

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SCORING KEY
NINTH YEAR MATHEMATICS

Monday, January 27, 1969 — 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 21–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

(1) 20	(11) 11	(21) 1
(2) 3	(12) 3	(22) 1
(3) 14	(13) 48	(23) 3
(4) 1	(14) $2a^2 + 4a$	(24) 3
(5) 8.6	(15) 4 *or* $x = 4$, $y = -1$	(25) 2
(6) $\dfrac{c - k}{a}$	(16) $1 - 4x^2$	(26) 4
	(17) $-\frac{3}{2}$	(27) 3
(7) {3,4,5} *or* 3, 4, 5	(18) 6	(28) 4
(8) 1		(29) 2
(9) $2x - 3$	(19) $\dfrac{4}{a + 2}$	(30) 2
(10) 50	(20) 1.7321	

[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) *a* .74   [5]
     b 35   [5]

(33) *a* x = second number
$$\frac{1}{x} + \frac{1}{3x} = 2 \qquad [5]$$

     b x = a leg of a right triangle
$$x^2 + (x+2)^2 = (x+4)^2 \qquad [5]$$

(34) Analysis   [6]
     40, 50   [4]

(35) *a* $x(3x + 1)$ *or* $3x^2 + x$ [6]
     b {0,3} *or* 0,3   [4]

(36) *a* Analysis   [6]
     b 20, 18   [4]

(37) Allow a total of 10 credits, 2 credits for each of the following:
     a 2
     b 2
     c 1
     d 1
     e 4