

NINTH YEAR MATHEMATICS

Tuesday, June 18, 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

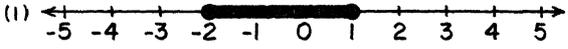
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet.

- 1 If on a map 1 inch represents 2 miles, how many inches will represent a distance of 3 miles?
 - 2 On a certain day at school 72 students were absent. This represents 9% of the enrollment. How many students were enrolled?
 - 3 Two numbers are in the ratio of 1:3 and their sum is 24. Find the *smaller* of the two numbers.
 - 4 Using the variable x to represent the number, write an equation which expresses the following sentence:
If a number is added to its reciprocal, the sum is 18.
 - 5 Find to the *nearest tenth* the positive square root of 71.
 - 6 What is the remainder when $2x^2 + x - 10$ is divided by $x + 2$?
 - 7 Given the equation $y = 3x^2 - 2x - 8$. Find the numerical value of y when $x = 0$.
 - 8 If y is a member of $\{1,2,3,4,5\}$, what is the solution set of the inequality $2y > 5$?
 - 9 Given $\frac{b}{10} = \sin 63^\circ$. Find b to the *nearest tenth*.
 - 10 If the base angles of an isosceles triangle are complementary, how many degrees are there in the *vertex* angle?
 - 11 Express the fraction $\frac{n^2 + n - 6}{2n + 6}$ in *lowest* terms.
 - 12 Solve for y : $4(y - 1) = 10$
 - 13 Find the solution set of $\frac{3x}{2} - \frac{2x}{3} = \frac{10}{3}$.
 - 14 Solve for y in terms of a , b , c , and x :
 $ax + by = c$
 - 15 If x is a variable whose domain is $\{2,3,5\}$, what is the largest value that the expression $10 - x$ may have?
 - 16 Express in *simplest form* the sum of
 $\frac{x - 4}{3}$ and $\frac{3x - 3}{4}$
 - 17 Solve the following system of equations for x :
 $x + 4y = 1$
 $2x - 2y = -8$
 - 18 Find the solution set of the equation
 $x^2 - 5x - 6 = 0$.
- Directions (19-30):* Write in the space provided on the separate answer sheet the *number* preceding the expression that best completes *each* statement or answers *each* question.
- 19 One side of a square is represented by $4s - 2$. The perimeter of the square in terms of s is

(1) $8s - 4$	(3) $16s^2 - 4$
(2) $16s - 8$	(4) $16s^2 - 16s + 4$
 - 20 If the hypotenuse of a right triangle is 6 and one of the legs is 5, then the length of the other leg is

(1) 1	(3) $\sqrt{11}$
(2) 11	(4) $\sqrt{61}$

- 21 The expression $\sqrt{48} - \sqrt{12}$ is equivalent to
 (1) 6 (3) $3\sqrt{2}$
 (2) 2 (4) $2\sqrt{3}$
- 22 An expression for the area of a rectangle whose length is 7 more than the number x and whose width is 1 less than the number x is
 (1) $x^2 - 7$ (3) $x^2 + 6x - 7$
 (2) $7 - x^2$ (4) $x^2 + 8x - 7$
- 23 Which is an equation whose graph does *not* pass through the point whose coordinates are (2,3)?
 (1) $x = 3$ (3) $2x - y = 1$
 (2) $y = 3$ (4) $3x - 2y = 0$
- 24 The equation $w^2 + 4w = w(w + 4)$ is an identity because it is an example of the
 1 commutative property of addition
 2 associative property of multiplication
 3 distributive property
 4 additive inverse property
- 25 Which is a rational number?
 (1) $\sqrt{8}$ (3) $6\sqrt{2}$
 (2) π (4) $5\sqrt{9}$

- 26 If the universal set $U = \{1,2,3,4,5\}$, which of the following is *not* a subset of U ?
 (1) $\{0\}$ (3) $\{1,2,3\}$
 (2) $\{\}$ (4) $\{1,3,5\}$
- 27 If the replacement set is the set of real numbers, then the solution set of $-2 < x \leq 1$ is shown by
 (1) 
 (2) 
 (3) 
 (4) 
- 28 The slope of the line whose equation is $3y = 2x + 6$ is
 (1) 6 (3) $\frac{2}{3}$
 (2) 2 (4) $\frac{3}{2}$
- 29 The product of $5x^4$ and $4x^5$ is
 (1) $9x^9$ (3) $9x^{20}$
 (2) $20x^9$ (4) $20x^{20}$
- 30 The value of $|3| + |-4| - |-2|$ is
 (1) 1 (3) -3
 (2) 9 (4) 5

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

a Solve graphically and check: [8,2]

$$\begin{aligned}2x + y &= 4 \\ x - 3y &= 9\end{aligned}$$

OR

b On the same set of axes, graph the following system of inequalities and label the solution set A : [10]

$$\begin{aligned}y &> -2x + 4 \\ y &> x + 2\end{aligned}$$

32 Part of \$2,500 is invested at 5% and the remainder at 4%. The total annual income from both investments is \$117. Find the number of dollars invested at each rate. Check. [Only an algebraic solution will be accepted.] [5,4,1]

33 Answer *both a and b*:

a At a point 45 feet from the foot of a vertical flagpole, the angle of elevation of the top of the flagpole is 36° . Find to the *nearest foot* the height of the flagpole. [5]

b A diagonal of a rectangle is 17 feet long. If the length of the rectangle is 13 feet, find to the *nearest foot* the width of the rectangle. [5]

34 Find three consecutive positive integers such that the product of the first integer and the third integer is 143. Check. [Only an algebraic solution will be accepted.] [5,4,1]

35 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 Working alone, Mr. Brown can mow his lawn in 2 hours. His son, working alone, can do the job in 3 hours. How long will it take them to do the job if they work together? [5]

b The length of a rectangle is 3 feet less than twice its width. If the perimeter of the rectangle is 42 feet, find its dimensions. [5]

36 Find *algebraically* the common solution to the following system of equations, and check: [8,2]

$$\frac{x}{2} + 3y = -15$$

$$\frac{x}{4} = 5y + 38$$

37 The replacement set of the variable x is $\{0,2,4,6,8,10,12\}$.

On your answer paper, write the letters a through e and next to each letter identify each set defined below by listing its elements or by describing it in words. [10]

a $\{x \mid x^2 = 64\}$

b $\{x \mid 2 = |x|\}$

c $\{x \mid x - 5 \leq 7\}$

d $\{x \mid x + 7 = 8\}$

e $\{x \mid 3x + 4 = 4x + 4\}$

FOR TEACHERS ONLY

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SCORING KEY

NINTH YEAR MATHEMATICS

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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 19–30, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

- | | | |
|----------------------------|----------------------------|--------|
| (1) $\frac{3}{2}$ | (11) $\frac{n-2}{2}$ | (21) 4 |
| (2) 800 | (12) $\frac{7}{2}$ | (22) 3 |
| (3) 6 | (13) {4} or 4 | (23) 1 |
| (4) $x + \frac{1}{x} = 18$ | (14) $\frac{c - ax}{b}$ | (24) 3 |
| (5) 8.4 | (15) 8 | (25) 4 |
| (6) -4 | (16) $\frac{13x - 25}{12}$ | (26) 1 |
| (7) -8 | (17) -3 | (27) 2 |
| (8) {3,4,5} or 3,4,5 | (18) {6,-1} or 6,-1 | (28) 3 |
| (9) 8.9 | (19) 2 | (29) 2 |
| (10) 90 | (20) 3 | (30) 4 |

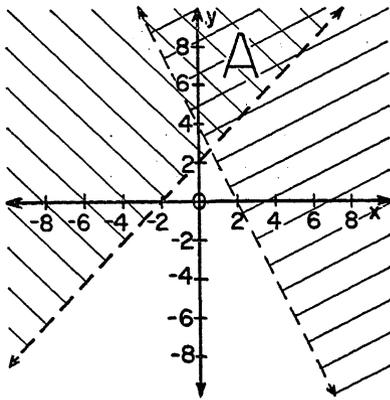
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NINTH YEAR MATHEMATICS — *concluded*

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.

(31) *b* [10]



(35) *a* x = number of hours required to mow the lawn working together

$$\frac{x}{2} + \frac{x}{3} = 1 \quad [5]$$

b w = number of feet in the width of rectangle

$$2(2w - 3) + 2w = 42 \quad [5]$$

(36) $x = 12$
 $y = -7$ [8]
 Check [2]

(32) Analysis [5]
 \$1,700 @ 5% [4]
 \$ 800 @ 4% [1]
 Check [1]

(33) *a* 33 [5]
b 11 [5]

(34) Analysis [5]
 11,12,13 [4]
 Check [1]

(37) Allow a total of 10 credits, 2 credits for each of the following:
a 8
b 2
c 0,2,4,6,8,10,12 or the replacement set
d the null set (also accept $\{ \}$ or ϕ)
e 0