

9 NINTH YEAR MATHEMATICS

Wednesday, August 14, 1968—12:30 to 3:30 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 A vertical pole 6 feet in length casts a shadow 2 feet long on level ground. At the same time of day, what is the length of the shadow of a tree 24 feet high?
 - 2 Twice a certain number diminished by 4 is equal to 20. What is the number?
 - 3 Find $\sqrt{42}$ to the *nearest tenth*.
 - 4 Find the value of x which satisfies the equation

$$\frac{x}{3} + 2 = \frac{x}{6}.$$
 - 5 In the formula $p = 2m + n$, express m in terms of p and n .
 - 6 If the length of each of two sides of a triangle is represented by x and the third side is 3 more than either of these sides, express the perimeter of the triangle in terms of x .
 - 7 Solve for x : $.5x = 11 - .6x$
 - 8 The cosine of a certain angle is .8712. Find the angle to the *nearest degree*.
 - 9 Express as a single fraction in *simplest form*:

$$\frac{3N - 1}{2} + \frac{4N + 1}{3}$$
 - 10 Solve the following system of equations for x and y :

$$\begin{aligned} 4x + y &= 3 \\ x + y &= 12 \end{aligned}$$
 - 11 The dimensions of a rectangle are 7 feet and 24 feet. Find the number of feet in a diagonal of this rectangle.
 - 12 Find the solution set for: $2x - 5 = 4x + 7$
 - 13 A boy received 84 on a test. What must he receive on a second test in order to have an average of 87 for the two tests?
 - 14 Perform the indicated operations and combine like terms:

$$3x - 2(x - 3)$$
 - 15 An equation of a line is $3x - 2y = 9$. The abscissa of a point on this line is 5. What is the ordinate of this point?
 - 16 One root of the equation $x^2 - 16 = 0$ is 4. Find the other root.
 - 17 Factor: $x^2 - 11x + 24$
 - 18 Express in *simplest form*:

$$\frac{r + s}{s} \times \frac{2s}{r^2 - s^2}$$
- Directions (19–29):* Write in the space provided on the separate answer sheet the *number* preceding the expression that best completes *each* statement or answers *each* question.
- 19 The numerical value of $4x^2 - x$ when $x = \frac{1}{2}$ is

| | |
|--------------------|--------------------|
| (1) $\frac{1}{2}$ | (3) $2\frac{1}{2}$ |
| (2) $1\frac{1}{2}$ | (4) $3\frac{1}{2}$ |
 - 20 The additive inverse of 8 is

| | |
|-------------------|--------------------|
| (1) 1 | (3) $-\frac{1}{8}$ |
| (2) $\frac{1}{8}$ | (4) -8 |

- 21 Which number has exactly *three* significant digits?
 (1) 0.12 (3) 1.234
 (2) 12.4 (4) 1.203
- 22 If $3x \leq 6$, which of the following is *not* a member of the solution set?
 (1) 1 (3) -3
 (2) 2 (4) 5
- 23 If $9a^3$ is multiplied by $2a^4$, then the product is
 (1) $11a^7$ (3) $11a^{12}$
 (2) $18a^7$ (4) $18a^{12}$
- 24 If $12x^2 - 3x$ is divided by $3x$, the quotient is
 (1) $4x - x$ (3) $4x$
 (2) $4x - 1$ (4) $12x^2$
- 25 The expression $\frac{1}{2}\sqrt{28}$ is equivalent to
 (1) $\sqrt{14}$ (3) $\sqrt{7}$
 (2) $2\sqrt{7}$ (4) 7
- 26 What is 72 expressed as the product of prime factors?
 (1) (2)(3) (3) (2)(2)(2)(3)(3)
 (2) (2)(3)(12) (4) (8)(9)
- 27 The length of a rectangle is 5 inches more than its width w , and its area is 150 square inches. Which equation can be used to find w ?
 (1) $2w + 2w + 10 = 150$
 (2) $w(w + 5) = 150$
 (3) $w(5w) = 150$
 (4) $w + w + 5 = 150$
- 28 Which is an illustration of a distributive law?
 (1) $S(R + K) = SR + SK$
 (2) $R + K = K + R$
 (3) $S + (R + K) = (S + R) + K$
 (4) $S \cdot \frac{1}{RK} = \frac{S}{RK}$
- 29 In the set of integers, if $X + Y = 0$, then X is always
 (1) equal to Y
 (2) greater than Y
 (3) less than Y
 (4) equal to $-Y$
- Directions (30):* The solution set for this question is to be indicated on the separate answer sheet on the drawing of a numbered line.
- 30 Show on the graph the solution set of the inequality $-1 < x < 3$. [The replacement set is the set of real numbers.]

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.

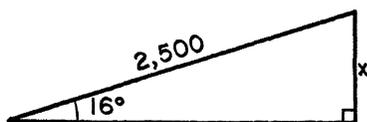
- 31 Solve graphically and check: [8,2]

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

- 32 How many pounds of coffee which sells for 75¢ a pound must a grocer mix with 20 pounds of coffee which sells for 95¢ a pound in order to make a mixture which will sell for 80¢ a pound? [Only an algebraic solution will be accepted.] [6,4]

- 33 Answer both a and b:

a A straight road is inclined upward at an angle of 16 degrees with the horizontal, as indicated in the accompanying figure.



If a man walked a distance of 2,500 feet up the road, find to the nearest foot his increase in altitude. [5]

b The sides of a rectangle are 30 inches and 24 inches. Find to the nearest degree the angle formed by a diagonal and one of the longer sides. [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 units digit of a two-digit number is three more than the tens digit. If the number is divided by the sum of the digits, the quotient is 4. Find the original number. [5]

b In triangle ABC, the measures of angles A and B are in the ratio 2:3. Angle C is 2° smaller than angle A. Find the number of degrees in each angle. [5]

- 35 There are 240 seats in the balcony of a theater. The number of seats in each row is 14 more than the number of rows. Find the number of rows. Check. [Only an algebraic solution will be accepted.] [5,4,1]

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

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

$$x + \frac{3y}{2} = 1$$

- 37 In the following chain of equalities, each step may be justified by some algebraic property, such as the commutative property under multiplication.

Write the letters a, b, c, e, and f on your answer paper, and after each letter write the number of the property, chosen from the list below, which justifies the corresponding step in the chain of equalities. [The reason for step d is given below.] [10]

Properties

- (1) Additive identity property
- (2) Additive inverse property
- (3) Associative property of addition
- (4) Associative property of multiplication
- (5) Commutative property of addition
- (6) Commutative property of multiplication
- (7) Distributive property

- a $[2(5 + y)] - 10 = [10 + 2y] - 10$
 b $[10 + 2y] - 10 = [2y + 10] - 10$
 c $[2y + 10] - 10 = 2y + [10 - 10]$
 d $2y + [10 - 10] = 2y + [10 + (-10)]$
 ...Definition of subtraction.
 e $2y + [10 + (-10)] = 2y + 0$
 f $2y + 0 = 2y$

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 19–29, allow credit if the pupil has written the correct answer instead of the number 1, 2, 3, or 4.

- | | | |
|---------------------------|------------------------------|--------|
| (1) 8 <i>or</i> 8 ft. | (11) 25 | (21) 2 |
| (2) 12 | (12) $\{-6\}$ <i>or</i> -6 | (22) 4 |
| (3) 6.5 | (13) 90 | (23) 2 |
| (4) -12 | (14) $x + 6$ | (24) 2 |
| (5) $\frac{p - n}{2}$ | (15) 3 | (25) 3 |
| (6) $3x + 3$ | (16) -4 | (26) 3 |
| (7) 10 | (17) $(x - 8)(x - 3)$ | (27) 2 |
| (8) 29 | (18) $\frac{2}{r - s}$ | (28) 1 |
| (9) $\frac{17n - 1}{6}$ | (19) 1 | (29) 4 |
| (10) $x = -3$ $y = 15$ | (20) 4 | (30) |



[OVER]

NINTH YEAR MATHEMATICS — *concludea*

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]
60 [4]

(33) a 689 [5]
 b 39 [5]

(34) a t = tens digit
 u = units digit
 $u = t + 3$
 $\frac{10t + u}{t + u} = 4$ [5]

b x = number of degrees in $\angle A$
 y = number of degrees in $\angle B$
 $\frac{x}{y} = \frac{2}{3}$
 $x + y + x - 2 = 180$ [5]

(35) Analysis [5]
10 [4]
Check [1]

(36) $x = -8$ [8]
 $y = 6$
Check [2]

(37) Allow a total of 10 credits, 2 credits for each of the following:
 a 7
 b 5
 c 3
 e 2
 f 1