NINTH YEAR MATHEMATICS

Tuesday, August 16, 1966 — 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 Solve for x: $3x + 6.3 = 12.6$

2 Solve for x: $5x - 4 = 3x + 8$

3 Solve for x: $\frac{3}{5}x = 48$

4 A man travels at an average speed of r miles per hour for 6 hours. Express in terms of r the distance traveled.

5 Given the formula $y = 2m + b$. Find the numerical value of m when $y = -2$ and $b = 4$.

6 The sum of two consecutive odd integers is 40. Find the value of the smaller integer.

7 If $8ab$ is one of a pair of factors of $56ab^3$, what is the other?

8 Solve for x in the following proportion: $1 : \frac{3}{4} = 8 : x$

9 Subtract $3x^2 - 8$ from $7x^2 + 5$.

10 Express as a *binomial* the perimeter of an equilateral triangle whose side is represented by $(b - 3)$.

11 If $a = 3b$ and $b = 2c$, express a in terms of c.

12 Factor completely: $3x^2 - 48$

13 Find the *positive* root of the equation
$n^2 + 2n - 15 = 0$.

14 Combine into a single fraction: $\dfrac{4x + y}{2} + \dfrac{2x - y}{3}$

15 Solve the following set of equations for x and y:
$x + 6y = 28$
$x - 2y = -4$

16 Express the value of $\sqrt{48}$ to the *nearest tenth*.

17 If $\tan A = \frac{3}{4}$, find angle A to the *nearest degree*.

18 Express in radical form the length of the hypotenuse of a right triangle whose legs are 1 and 3.

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 sum of $2x^2$ and $(2x)^2$ is equal to
(1) $8x^2$ (3) $4x^2$
(2) $6x^2$ (4) $2(2x^2)$

20 In money value, x nickels is equivalent to
(1) $\dfrac{x}{5}$ cents   (3) $2x$ dimes
(2) $5x$ cents   (4) $\dfrac{x}{10}$ dimes

21 The product of $(x + y)$ and $(x - y)$ when $x = y$ is
(1) 0 (3) $2y^2$
(2) $2x^2$ (4) $-2y^2$

22 If w represents any whole number, which of the following must be an odd number?
(1) $w + 1$ (3) $2w + 1$
(2) $w - 1$ (4) $3w$

23 Given the formula $p = 2l + 2w$, an expression for l in terms of p and w is

(1) $\dfrac{p - 2w}{2}$

(3) $\dfrac{p}{w}$

(2) $\dfrac{2w - p}{2}$

(4) $p - w$

24 On a graph, the points $(-3,2)$ and $(-1,6)$ are joined by a line segment. If this segment is extended so as to intersect the x-axis, it does so at the point

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

25 The expression $(x - 3)^2$ is equivalent to

(1) $x^2 + 9$ (3) $x^2 - 3x + 9$
(2) $2x - 6$ (4) $x^2 - 6x + 9$

26 The fraction $\dfrac{a^2 + 2ab + b^2}{a^2 - b^2}$ is equivalent to

(1) $-2ab$

(3) $\dfrac{a + b}{a - b}$

(2) $2ab$

(4) $\dfrac{a - b}{a + b}$

27 When -15 is subtracted from 45 and the difference is divided by -5, the result is

(1) 6   (3) 12
(2) -6 (4) -12

28 The expression $\sqrt{200}$ is equivalent to

(1) $2\sqrt{10}$ (3) $8\sqrt{5}$
(2) $4\sqrt{5}$ (4) $10\sqrt{2}$

29 When $x^2 - 2x - 4$ is divided by $x + 1$, the remainder is

(1) 1   (3) -3
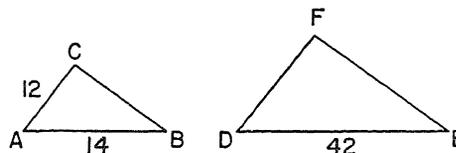(2) -1 (4) -7

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

  a In the similar triangles ABC and DEF, as shown in the accompanying figure, $\angle B = \angle E$, $\angle C = \angle F$, $AC = 12$, $AB = 14$, and $DE = 42$.

  Find the length of DF.

  OR

  b On the answer sheet, using straightedge and compasses, construct the perpendicular bisector of line segment XY.

Answers to the following questions are to 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]
$x + 2y = 8$
$3x - y = -11$

32 A boy emptied his bank, which contained only nickels, dimes, and quarters. The bank contained an equal number of nickels and dimes and 10 more quarters than nickels. If the total value of the coins was $12.50, how many nickels were there? Check. [6, 3, 1]

33 The numerator of a fraction is 7 less than the denominator. If 3 is added to the numerator and 9 is subtracted from the denominator, the resulting fraction has a value of $\frac{3}{2}$. Find the value of the original fraction. Check. [5, 3, 2]

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

$$\frac{3x}{2} + \frac{y}{5} = 6$$

$$\frac{x+2}{4} - \frac{y-3}{6} = 2$$

35 a From a point 100 feet from the foot of a cliff, the angle of elevation of the top of the cliff is 60°. Find the height of the cliff to the *nearest foot*. [5]

b One side of a rectangular plot is 48 feet, and the distance along its diagonal is 52 feet. Find the length of the other side. [5]

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 freight train and an express train travel toward each other from points 740 miles apart. If the freight train which travels at 40 miles per hour starts 1 hour earlier than the express train which travels at 60 miles per hour, how many hours will *each* train have traveled when they meet? [5]

b The length of a rectangular park exceeds the width by 5 miles. If the area of the park is 24 square miles, find the number of miles in the length and the width of the park. [5]

*37 On the same set of axes, graph the following system of inequalities and label the solution set A: [10]
$y \geqq 2x + 1$
$y < 3$

*38 Each of the equations in questions a through e below illustrates one of these properties:
(1) Commutative property of addition
(2) Commutative property of multiplication
(3) Associative property of addition
(4) Associative property of multiplication
(5) Distributive property of multiplication over addition
(6) Additive identity property
(7) Additive inverse property
(8) Multiplicative identity property
(9) Multiplicative inverse property

Write the letters a through e on your answer paper, and after *each* letter write the *number* of the property illustrated by that equation. [10]

a $(-3x^2 + 7x) + (3x^2) = -3x^2 + (7x + 3x^2)$
b $-3x^2 + (7x + 3x^2) = -3x^2 + (3x^2 + 7x)$
c $(-3x^2 + 3x^2) + 7x = (-3 + 3)x^2 + 7x$
d $(-3 + 3)x^2 + 7x = 0 \cdot x^2 + 7x$
e $0 + 7x = 7x$

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

FOR TEACHERS ONLY

9

SCORING KEY

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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) 2.1	(9) $4x^2 + 13$	(17) 37	(25) 4
(2) 6	(10) $3b - 9$	(18) $\sqrt{10}$	(26) 3
(3) 80	(11) $6c$	(19) 2	(27) 4
(4) $6r$	(12) $3(x + 4)(x - 4)$	(20) 2	(28) 4
(5) —3	(13) 3	(21) 1	(29) 2
(6) 19	(14) $\dfrac{16x + y}{6}$	(22) 3	(30) a 36
(7) $7b^2$		(23) 1	
(8) 6	(15) $x = 4, y = 4$ *or* $(4, 4)$	(24) 3	
	(16) 6.9		

[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]
    25 [3]
    Check [1]

(33) Analysis [5]
    $\dfrac{12}{19}$ [3]
    Check [2]

(34) $x = 4, y = 0$ [8]
    Check [2]

(35) *a* 173 [5]
    b 20 [5]

(36) *a* $t =$ no. of hours the express train traveled.
    $40(t + 1) + 60t = 740$ [5]
   b $w =$ no. of miles in width
    $w(w + 5) = 24$ [5]

*(37)
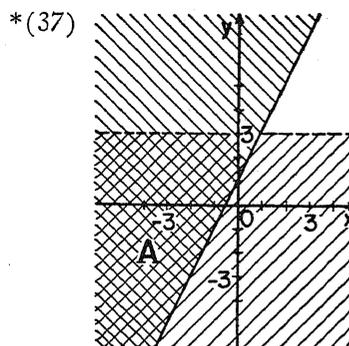
The region labeled *A*, the dashed boundary line excluded.

*(38) Allow a total of 10 credits, 2 credits for each of the following:
  a 3
  b 1
  c 5
  d 7
  e 6