NINTH YEAR MATHEMATICS

Thursday, January 24, 1980 — 1:15 to 4:15 p.m., only

The last page of the booklet is the answer sheet. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

On page 5 you will find the "Tables of Natural Trigonometric Functions" which you may need to answer some questions in this examination. Fold this page along the perforations, and tear it off also slowly and carefully.

When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer paper cannot be accepted if you fail to sign this declaration.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

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: $\dfrac{3}{5} = \dfrac{9}{x}$

2 Solve for x: $3(2x - 1) = 21$

3 Express as a trinomial: $(2x + 3)(x - 4)$
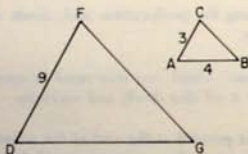
4 What is the sum of $3a + 4b - 6c$ and $2a - 4b + 2c$?

5 Solve for x: $x - 0.4 = 1.6$

6 Factor: $4x^2 - 25$

7 Factor: $x^2 - 2x - 8$

8 If the sides of a triangle are represented by $2x$, $x + 5$, and $3x - 6$, express the perimeter of the triangle in terms of x.

9 In the accompanying diagram of triangles ABC and DGF, $\angle A = \angle D$ and $\angle B = \angle G$. If $AC = 3$, $AB = 4$, and $DF = 9$, what is the length of DG?

10 If Sally's weekly allowance is t dollars, express in dollars her allowance for c weeks in terms of t and c.

11 If the replacement set for x is $\{-3, -1, 0, 1, 3\}$, write the members of the solution set for $3x < 0$.

12 Solve the following system of equations for x:

$$3x + y = 5$$
$$2x - y = 5$$

13 Solve for x in terms of a, b, and c:

$$ax + b = c$$

14 If two angles of a triangle are complementary, how many degrees are there in the third angle?

15 Find the value of $\sqrt{40}$ to the *nearest tenth*.

16 If $x = -3$ and $y = 2$, find the value of $(xy)^2$.

17 Express the average of $x + 1$ and $3x - 3$ as a binomial.

18 Express as a single fraction:

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

Directions (19-30): Write in the space provided on the separate answer sheet the *numeral* preceding the expression that best completes *each* statement or answers *each* question.

19 The product of xy^2 and x^2y^3 is
(1) x^2y^5 (3) x^3y^5
(2) x^2y^6 (4) x^3y^6

20 When $-15x^6$ is divided by $-5x^3$, the quotient is
(1) $3x^2$ (3) $3x^3$
(2) $-3x^2$ (4) $-3x^3$

21 The multiplicative inverse of $-\frac{1}{3}$ is
(1) $\frac{1}{3}$ (3) 3
(2) -3 (4) $.33\frac{1}{3}$

22 Which must be added to $2x - 4$ to produce a sum of 0?
(1) 0 (3) $2x + 4$
(2) $x + 2$ (4) $-2x + 4$

23 Which pair of numbers represents a point that does *not* lie on the graph of $2x + 3y = 6$?
(1) $(0, 2)$ (3) $(3, 0)$
(2) $(2, 3)$ (4) $(6, -2)$

24 If set $A = \{1, 3, 5, 7, 9\}$ and set $B = \{3, 4, 5\}$, then a subset of B that is also a subset of A is
(1) $\{\ \}$ (3) $\{5, 7\}$
(2) $\{1, 3, 5\}$ (4) $\{4\}$
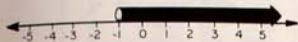
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25 A root of the equation $x^2 - 13x - 48 = 0$ is

  (1) 8   (3) 12

  (2) 2   (4) 16

26 The expression $\sqrt{90}$ is equivalent to

  (1) $6\sqrt{15}$ (3) $3\sqrt{10}$

  (2) $9\sqrt{10}$ (4) $10\sqrt{3}$

27 Which solution set is represented by the graph below?

  (1) $\{x | x > -1\}$ (3) $\{x | x \leq -1\}$

  (2) $\{x | x < -1\}$ (4) $\{x | x \geq -1\}$

28 The value of $|-8| + |-3|$ is

  (1) 5   (3) 11

  (2) -5 (4) -11

29 What is 16.47 rounded to the nearest integer?

  (1) 16   (3) 16.5

  (2) 16.4   (4) 17

30 The number of inches in $(3x - 2)$ feet is

  (1) $12x$ (3) $36x - 2$

  (2) $\dfrac{3x - 2}{12}$ (4) $36x - 24$

Part II

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

31 On the same set of coordinate axes, graph the following system of inequalities and label the solution set A. [8,2]

$$2x - y \le 3$$
$$3x + y < 7$$

32 Answer *both a* and *b*.

a Two positive numbers are in the ratio of 5 to 13. If the difference between the two numbers is 48, find the larger number. [5]

b Express as a single fraction in *lowest terms*:

$$\frac{2x + 1}{8} - \frac{x + 2}{6} \qquad [5]$$

33 Solve the following system of equations algebraically and check.

$$\frac{y}{2} = x + 1$$
$$4x - y = 6 \qquad [8,2]$$

34 The cost of a high school ring was $45 for the large size and $35 for the regular size. The total receipts from the sale of 120 rings were $5,000. How many rings of each size were sold? [*Only an algebraic solution will be accepted.*] [5,5]

35 The sides of a rectangle are x and $x + 6$. The area of the rectangle is 55. Find the lengths of the sides. [*Only an algebraic solution will be accepted.*] [5,5]

36 Answer *both a* and *b*.

a As indicated in the accompanying diagram, a vertical flagpole 50 meters tall casts a shadow 75 meters long on level ground. What is the angle of elevation of the Sun to the *nearest degree*? [5]
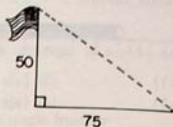
b As shown in the accompanying diagram, a kite is flying at the end of a 200-meter straight string. If the string makes an angle of 68° with the ground, how high is the kite to the *nearest meter*? [5]
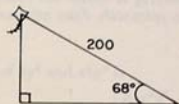
37 Each of the questions in *a* through *e* can be correctly answered by ONE and ONLY ONE of the following numbers: $-2, -1, 0, 1, 2$. On your answer paper, write the letters *a* through *e* and after each letter, write the number which answers the question. [10]

a What is the smallest natural number?
b What is the additive identity element?
c What number satisfies the inequality $2x > 3$?
d What is the largest negative integer?
e For what value of y is the fraction $\dfrac{6}{y + 2}$ meaningless?

FOR TEACHERS ONLY

Use only *red* ink or *red* 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 numeral 1, 2, 3, or 4.

(1) 15	(11) $-3, -1$	(21) 2
(2) 4	(12) 2	(22) 4
(3) $2x^2 - 5x - 12$	(13) $\dfrac{c - b}{a}$	(23) 2
(4) $5a - 4c$	(14) 90	(24) 1
(5) 2	(15) 6.3	(25) 4
(6) $(2x + 5)(2x - 5)$	(16) 36	(26) 3
(7) $(x - 4)(x + 2)$	(17) $2x - 1$	(27) 1
(8) $6x - 1$	(18) $\dfrac{17x}{6}$	(28) 3
(9) 12	(19) 3	(29) 1
(10) ct	(20) 3	(30) 4

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* 78   [5]

     b $\dfrac{2x-5}{24}$ [5]

(33) $x = 4$ [5]
     $y = 10$
     Check   [2]

(34) Analysis   [5]
     40 regular   [5]
     80 large

(35) Analysis   [5]
     5, 11   [5]

(36) *a* 34°   [5]
     b 185   [5]

(37) *a* 1   [2]
     b 0   [2]
     c 2   [2]
     d −1   [2]
     e −2   [2]