The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 17, 1993 – 8:30 to 11:30 a.m., only

Notice . . .

Calculators must be available to all students taking this examination.

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

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

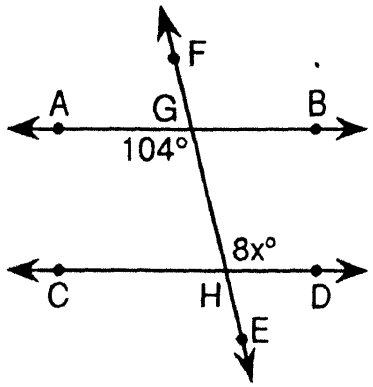
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

Part I

Answer 30 questions from 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. Where applicable, answers may be left in terms of π or in radical form. [60]

1 Solve for x: $2x - 0.3 = 1.7$

2 In the accompanying diagram, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$, and $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ at G and $\overleftrightarrow{CD}$ at H. If $m\angle AGE = 104$ and $m\angle DHG = 8x$, what is the value of x?



3 In a store, dress sizes range from 7 through 15. At inventory time, the sizes of one style of dress on the rack were: 7, 7, 9, 9, 9, 11, 11, 11, 13, 13, 13, 13, and 15. What is the mode?

4 Solve for x: $2(3x - 3) + 2 = 26$

5 Dana wants to drive to Buffalo from New York City by way of Ithaca. She has a choice of two routes from New York City to Ithaca and three routes from Ithaca to Buffalo. Using only these routes, how many different ways can Dana drive to Buffalo from New York City by way of Ithaca?

6 Using the letter n to represent a number, express "four less than twice this number" in terms of n.

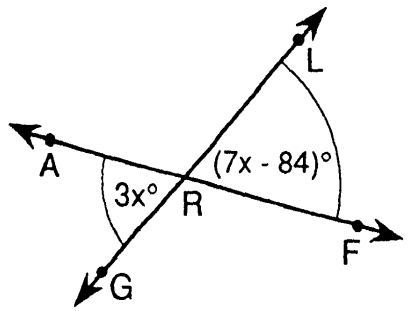
7 Solve the following system of equations for x:

$$2x + y = 6$$
$$x - y = 3$$

8 Solve for the positive value of x:

$$2x^2 = 50$$

9 In the accompanying diagram, $\overleftrightarrow{AF}$ and $\overleftrightarrow{LG}$ intersect at R, $m\angle LRF = 7x - 84$ and $m\angle ARG = 3x$. What is the value of x?



10 If x varies directly as y and $x = 4$ when $y = 7$, find the value of y when $x = 20$.

11 Given the formula $t = rv^2$, find t if $r = 3$ and $v = -2$.

12 Write, in symbolic form, the inverse of the statement $\sim p \rightarrow q$.

13 Factor: $x^2 - 16$

14 The length of a side of an equilateral triangle is represented by $2x - 1$. If the perimeter of the triangle is 21, what is the value of x?

15 The vertex angle of an isosceles triangle measures 58°. Find the measure of a base angle.

16 The point $(1,k)$ lies on the line whose equation is $x + 2y = 7$. Find the value of k.

17 The circumference of a circle is 16π. What is the radius of the circle?

18 The dimensions of a rectangle are 7 centimeters by 24 centimeters. Find, in centimeters, the length of the diagonal of this rectangle.

Directions (19–35): For *each* question chosen, write on the separate answer sheet the *numeral* preceding the word or expression that best completes the statement or answers the question.

19 The expression $\frac{-24x^6}{8x^3}$, $x \neq 0$, is equivalent to

(1) $3x^2$ (3) $-3x^2$
(2) $-3x^3$ (4) $3x^3$

20 A photograph 3 inches wide and 5 inches long is to be enlarged so that the length is 15 inches. The new width will be

(1) 9 in (3) 17 in
(2) 13 in (4) 25 in

21 Which letter has vertical but not horizontal line symmetry?

(1) **B** (3) **M**
(2) **X** (4) **S**

22 If x is an integer, what is the solution set of $3 < x \leq 6$?

(1) {3,4,5} (3) {3,4,5,6}
(2) {4,5,6} (4) {4,5}

23 Which statement has the same truth value as $\sim q \rightarrow r$?

(1) $\sim q \vee r$ (3) $\sim r \rightarrow \sim q$
(2) $\sim q \rightarrow \sim r$ (4) $\sim r \rightarrow q$

24 For which value of x is the expression $\frac{3}{5 - x}$ undefined?

(1) 0 (3) 3
(2) 5 (4) -5

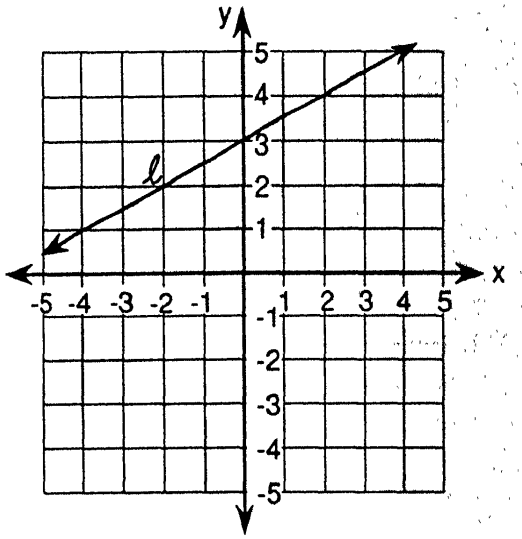
25 The sum of $\frac{x}{3}$ and $\frac{3x}{4}$ is

(1) $\frac{4x}{12}$ (3) $\frac{13x}{12}$
(2) $\frac{3x^2}{12}$ (4) $\frac{4x}{7}$

26 Which expression is false when p is false and q is false?

(1) $p \wedge q$ (3) $p \rightarrow q$
(2) $\sim(p \vee q)$ (4) $q \rightarrow \sim p$

27 Which equation represents line ℓ, shown in the accompanying diagram?



(1) $y = 2x + 3$ (3) $y = 3x + \frac{1}{2}$
(2) $y = \frac{1}{2}x + 3$ (4) $y = 3x + 2$

28 If two coins are tossed, the probability of getting two tails is

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

29 The expression $3\sqrt{27} - \sqrt{12}$ is equivalent to

(1) $7\sqrt{3}$ (3) $15\sqrt{3}$
(2) $23\sqrt{3}$ (4) $4\sqrt{3}$

30 If 20% of a number is equal to $3x$, then the number is

(1) $0.15x$ (3) $6x$
(2) $0.6x$ (4) $15x$

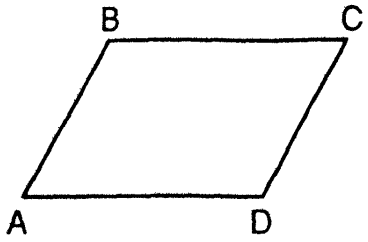
31 If the number 36,000,000 is written in scientific notation, the numerical value of the exponent is

(1) 6 (3) 7
(2) -6 (4) -7

32 If four boxes of raisins cost x quarters, what is the cost, in cents, of one box?

(1) $\frac{25x}{4}$ (3) $\frac{x}{4}$
(2) $\frac{4}{25x}$ (4) $4x$

33 In the accompanying figure, *ABCD* is a parallelogram.



Which statement must be true?

(1) The sum of the measures of the four angles is 180°.
(2) Angles *A* and *B* are complementary.
(3) Angles *A* and *B* are congruent.
(4) Angles *A* and *B* are supplementary.

34 If $x = 13$, then the value of $\sqrt{x - 5}$ is

(1) a rational number
(2) an irrational number
(3) undefined
(4) an integer

35 A side of a square is represented by $x - 3$. Which expression represents the area of the square?

(1) $4x - 12$
(2) $x^2 + 9$
(3) $x^2 - 6x + 9$
(4) $x^2 - 9$

Answers to the following questions are to be written on paper provided by the school.

Part II

Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 *a* On the same set of coordinate axes, graph the following system of equations.

$$\begin{aligned} x + y &= 10 \\ y &= 5 \end{aligned}$$ [4,2]

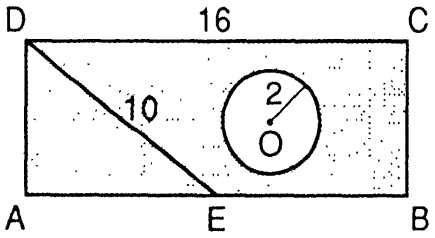
b Find the area of the trapezoid bounded by the x-axis, the y-axis, and the graphs drawn in part *a*. [4]

37 Find three positive consecutive odd integers such that the square of the middle integer increased by four times the largest integer is 173. [*Only an algebraic solution will be accepted.*] [4,6]

38 Solve the following system of equations algebraically and check:

$$\begin{aligned} 2x - y &= -1 \\ x &= -3y + 17 \end{aligned}$$ [8,2]

39 In the accompanying diagram, $ABCD$ is a rectangle, E is the midpoint of $\overline{AB}$, $DC = 16$, $ED = 10$, and the radius of circle O is 2.

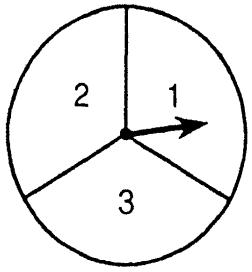


a Find, to the *nearest tenth*, the area of the shaded region. [Use $\pi = 3.14$.] [8]

b To the *nearest whole percent*, what percent of the area of the rectangle is the area of the circle? [2]

40 *On your answer paper*, construct and complete the truth table for the statement $[(p \rightarrow q) \vee \sim p] \wedge \sim q$. [10]

41 In the accompanying diagram, the circle is divided into three equal parts. A two-digit number is formed by spinning the spinner twice. The first spin is the tens digit and the second spin is the units digit.



a Draw a tree diagram or list the sample space showing all possible outcomes. [4]

b Find the mean of all numbers that could be formed. [2]

c Find the probability that a number that could be formed is

(1) larger than the mean [1]
(2) a prime number [1]
(3) a number divisible by 5 [1]
(4) a number less than 35 [1]

42 The larger of two numbers is 24 less than the square of the smaller. If the larger number is divided by the smaller one, the quotient is −5. Find the larger of the two numbers. [*Show or explain the procedure used to obtain your answer.*] [10]

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SEQUENTIAL MATH — COURSE I

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Part I Score	.....
Part II Score	.....
Total Score	.....
Rater's Initials:	.....

ANSWER SHEET

Pupil ..... Sex: ☐ Male ☐ Female Grade .....

Teacher ..... School .....

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer 30 questions from this part.

1	11	21	31 .....
2	12	22	32 .....
3	13	23	33 .....
4	14	24	34 .....
5	15	25	35 .....
6	16	26	
7	17	27	
8	18	28	
9	19	29	
10	20	30	

Your answers for Part II should be placed on paper provided by the school.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination, and that I have neither given nor received assistance in answering any of the questions during the examination.

Signature

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 17, 1993 – 8:30 to 11:30 a.m., only

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 a total of 60 credits, 2 credits for each of 30 of the following. [If more than 30 are answered, only the first 30 answered should be considered.] Allow no partial credit. For questions 19–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 1

(2) 13

(3) 13

(4) 5

(5) 6

(6) $2n - 4$

(7) 3

(8) 5

(9) 21

(10) 35

(11) 12

(12) $p \rightarrow \sim q$

(13) $(x + 4)(x - 4)$

(14) 4

(15) 61°

(16) 3

(17) 8

(18) 25

(19) 2

(20) 1

(21) 3

(22) 2

(23) 4

(24) 2

(25) 3

(26) 1

(27) 2

(28) 3

(29) 1

(30) 4

(31) 3

(32) 1

(33) 4

(34) 2

(35) 3

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics* and its supplement. 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.

(36) *b* 37.5 [4]

(37) 9, 11, 13 [4,6]

(38) (2,5) [8]

(39) *a* 83.4 [8]

b 13 [2]

(41) *b* 22 [2]

c (1) $\frac{4}{9}$ [1]

(2) $\frac{4}{9}$ [1]

(3) 0 [1]

(4) 1 [1]

(42) 40 [10]