The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, June 16, 1994 — 9:15 a.m. to 12:15 p.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, slowly 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 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

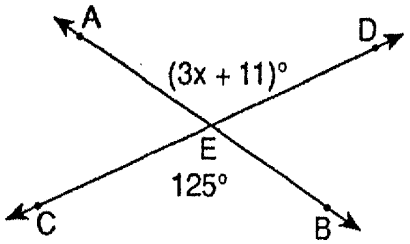
Part I

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 the positive value of x:

$$x^2 - 64 = 0$$

2 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. If $m\angle AED = 3x + 11$ and $m\angle CEB = 125$, find x.



3 For which value of x is the expression $\frac{1}{x - 9}$ undefined?

4 Solve for x: $6(x - 2) - 4x = 16$

5 Solve for x: $\frac{x - 1}{6} = \frac{1}{3}$

6 The mean of five numbers is 6. Find the sum of the five numbers.

7 Find the number of degrees in the measure of the base angle of an isosceles triangle whose vertex angle measures 70°.

8 Find the sum of $4x^2 - 3x + 6$ and $-7x^2 + 3x + 6$.

9 A child who is 4 feet tall casts a 6-foot shadow at the same time that a nearby tree casts a 30-foot shadow. What is the height, in feet, of the tree?

10 If x varies directly as y and $x = 6$ when $y = 15$, find the value of x when $y = 25$.

11 If the point $(-4,k)$ is on the graph of the equation $3x + y = -8$, find the value of k.

12 The lengths of the sides of a triangle are represented by $3x - 4$, $x + 2$, and $4x$. Express the perimeter of the triangle as a binomial in terms of x.

13 Solve for x: $0.3x = 0.01x + 2.9$

14 Write in symbolic form the inverse of $\sim p \rightarrow q$.

15 Express the difference $\frac{3}{4x} - \frac{1}{8x}$, $x \neq 0$, as a single fraction in simplest form.

16 Express the product $(2x - 1)(3x + 4)$ as a trinomial.

17 The coordinates of $\triangle ABC$ are $A(0,4)$, $B(6,0)$, and $C(0,0)$. Find the area of $\triangle ABC$.

18 Express, in terms of π, the area of a circle whose radius is 6.

19 Solve the following system of equations for x:

$$2x + y = 4$$
$$x - 2y = 7$$

20 If a fair coin is tossed three times, what is the probability of getting three tails?

Directions (21–35): 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.

21 If $2x$ represents an even integer, then the next consecutive even integer would be represented by

(1) $2x + 1$
(2) $2x + 2$
(3) $3x$
(4) $x + 2$

22 Let p represent: "It is raining."
Let q represent: "The Sun is shining."
Let r represent: "There is a rainbow in the sky."

Which statement could be used to represent "If it is raining and the Sun is shining, then there is a rainbow in the sky"?

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

23 A cafeteria offers a choice of five sandwiches, three salads, and three beverages. How many different meals can be chosen if each meal consists of one sandwich, one salad, and one beverage?

(1) 1
(2) 5
(3) 11
(4) 45

24 In scientific notation, 54,000,000 is expressed as

(1) 5.4×10^{-7}
(2) 54×10^{7}
(3) 54×10^{6}
(4) 5.4×10^{7}

25 Which statement would be a correct heading for the last column in the table below?

p	q	?
T	T	T
T	F	F
F	T	F
F	F	F

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

26 The area of a rectangle is represented by $32x^3$. If the length of this rectangle is $4x$, then the width is

(1) $16x^2$
(2) $16x^3$
(3) $8x^2$
(4) $8x^3$

27 If the measures of the angles of a triangle are in the ratio 1:3:5, the number of degrees in the measure of the *smallest* angle is

(1) 10
(2) 20
(3) 60
(4) 180

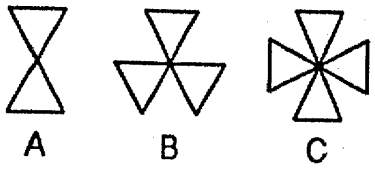
28 Which inequality is equivalent to $\frac{3x}{2} - 6 < 9$?

(1) $x < 7$
(2) $x < 2$
(3) $x < 8$
(4) $x < 10$

29 Which sentence illustrates the distributive property?

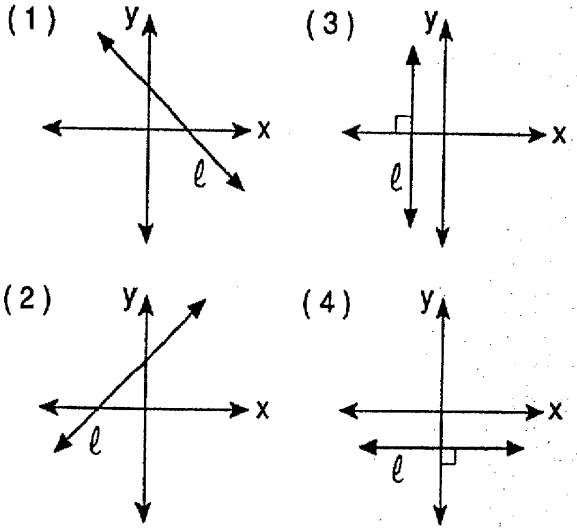
(1) $xy = yx$
(2) $x(yz) = (xy)z$
(3) $x(y + z) = xy + xz$
(4) $1(xy) = xy$

30 Which figures have both point symmetry and line symmetry?



(1) A and C, only
(2) B and C, only
(3) none of the figures
(4) all of the figures

31 In which graph does line ℓ have a negative slope?



32 There are 12 players on a basketball team. Before a game, both ankles of each player are taped. Each roll of tape will tape three ankles. Which product can be used to determine the number of rolls of tape needed to tape the players' ankles?

(1) $12 \text{ players} \cdot \frac{1 \text{ player}}{2 \text{ ankles}} \cdot \frac{3 \text{ ankles}}{1 \text{ roll}}$

(2) $12 \text{ players} \cdot 2 \text{ ankles} \cdot \frac{3 \text{ rolls}}{1 \text{ ankle}}$

(3) $12 \text{ players} \cdot \frac{2 \text{ ankles}}{1 \text{ player}} \cdot \frac{1 \text{ roll}}{3 \text{ ankles}}$

(4) $12 \text{ players} \cdot \frac{1 \text{ roll}}{3 \text{ ankles}}$

33 Which expression is *not* equal to 1?

(1) $\frac{6^5}{6^3 \cdot 6^2}$

(2) $\frac{3!}{6}$

(3) 6^0

(4) $\frac{6^6}{6^2 \cdot 6^3}$

34 A rectangular lot that is 60 feet by 80 feet has a straight diagonal pathway. What is the length, in feet, of the diagonal pathway?

(1) $\sqrt{20}$

(2) 140

(3) 20

(4) 100

35 A side of a cube measures 4 centimeters and a side of a smaller cube measures 2 centimeters. The volume of the larger cube is how many times the volume of the smaller cube?

(1) 6

(2) 2

(3) 8

(4) 4

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

Part II

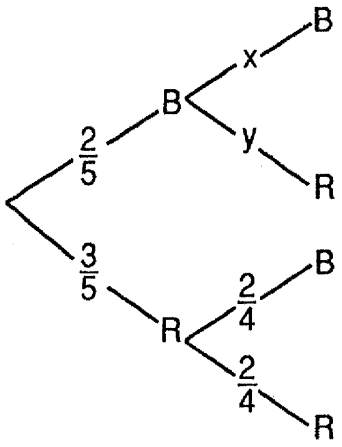
Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 On the same set of coordinate axes, graph the following system of inequalities. Label the solution set S.

$$y \geq -2x + 4$$
$$x - y < 1$$ [8,2]

37 Three numbers are in the ratio 3:5:7. If the largest number is multiplied by 3, the result is 26 more than the sum of the first and second numbers. Find the numbers. [*Only an algebraic solution will be accepted.*] [5,5]

38 Two blue marbles and three red marbles are in a bag. Without looking, Joan picks a marble from the bag and notes its color. Without replacing the marble, she chooses a second marble at random and notes its color. The tree diagram below represents all possible outcomes with the probability value on each branch.



a Find the values of x and y. [2]

b Find the probability that

(1) two red marbles were selected [2]

(2) *at least* one of the marbles selected was blue [3]

(3) one blue marble and one red marble were selected [3]

39 The frequency table below shows the distribution of weight, in pounds, of 32 students.

Interval	Frequency
160–179	9
140–159	8
120–139	6
100–119	2
80–99	7

a Which interval contains the median? [2]

b Which interval contains the lower quartile? [2]

c *On your answer paper*, copy and complete the cumulative frequency table below, using the data given in the frequency table. [2]

Interval	Cumulative Frequency
80–179	
80–159	
80–139	
80–119	
80–99	

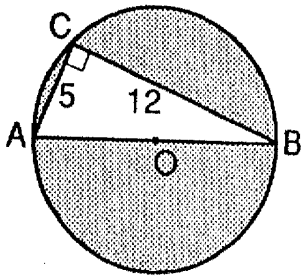
d Construct a cumulative frequency histogram using the table completed in part *c*. [4]

☞ GO RIGHT ON TO THE NEXT PAGE.

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

p	q	$\sim p$	$\sim q$	$p \wedge \sim q$	$\sim(p \wedge \sim q)$	$q \vee \sim p$	$[\sim(p \wedge \sim q)] \leftrightarrow (q \vee \sim p)$
T	T						
T	F						
F	T						
F	F						

41 In the accompanying diagram, right triangle ABC is inscribed in circle O, $\angle ACB$ is a right angle, $\overline{AB}$ is a diameter, $AC = 5$, and $BC = 12$. Using $\pi = 3.14$, find the area of the shaded portion to the *nearest tenth.* [10]



42 Ramos buys some pens and pencils. He bu seven more pens than pencils. Pens cost \$0.4 each and pencils cost \$0.40 each. If he has \$10 t spend, what is the greatest number of each h can buy? [*Show or explain the procedure used t obtain your answer.*] [10]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Thursday, June 16, 1994 — 9:15 a.m. to 12:15 p.m., only

Part I Score	.....
Part I 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

Thursday, June 16, 1994 — 9:15 a.m. to 12:15 p.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 21–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 8

(2) 38

(3) 9

(4) 14

(5) 3

(6) 30

(7) 55

(8) $-3x^2 + 12$

(9) 20

(10) 10

(11) 4

(12) $8x - 2$

(13) 10

(14) $p \rightarrow \sim q$

(15) $\frac{5}{8x}$

(16) $6x^2 + 5x - 4$

(17) 12

(18) 36π

(19) 3

(20) $\frac{1}{8}$

(21) 2

(22) 3

(23) 4

(24) 4

(25) 2

(26) 3

(27) 2

(28) 4

(29) 3

(30) 1

(31) 1

(32) 3

(33) 4

(34) 4

(35) 3

[OVER]

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.

(37) 6, 10, 14 [5,5]

(38) *a* $x = \frac{1}{4}$
$y = \frac{3}{4}$ [2]

b (1) $\frac{6}{20}$ [2]

(2) $\frac{14}{20}$ [3]

(3) $\frac{12}{20}$ [3]

(39) *a* 140–159 [2]

b 100–119 [2]

(41) 102.7 [10]

(42) 8 pencils
15 pens [10]