The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, January 25, 1989 — 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.

   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 On a restaurant menu, there are six sandwich choices and three beverage choices. How many different lunches may a person order consisting of one sandwich and one beverage?

2 A base angle of an isosceles triangle measures 50. Find the number of degrees in the measure of the vertex angle.

3 A 50-milliliter salt solution contains 4 milliliters of salt. How many milliliters of salt will a 75-milliliter solution of the same strength contain?

4 If 15 is 25% of a number, find the number.

5 In the accompanying figure, arc AB of circle O measures 70. If the measure of $\angle AOB$ is represented by x, find the value of x.
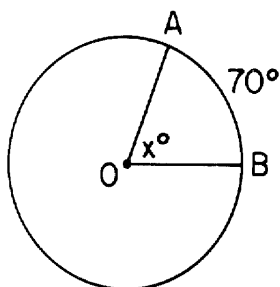
6 Two numbers are in the ratio 3:2. If the smaller number is 24, find the larger number.

7 Solve for x: $0.3x + 1 = 2.2$

8 Solve for x: $\dfrac{x - 1}{4} = \dfrac{1}{2}$

9 Twice the sum of a number and 4 is equal to 22. What is the number?

10 Solve for y in terms of x: $3y + 2 = x$

11 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are intersected by transversal $\overleftrightarrow{GH}$ at points E and F, respectively. If $m\angle AEG$ is $(3x + 7)$ and $m\angle CFE$ is $(4x - 2)$, find x.
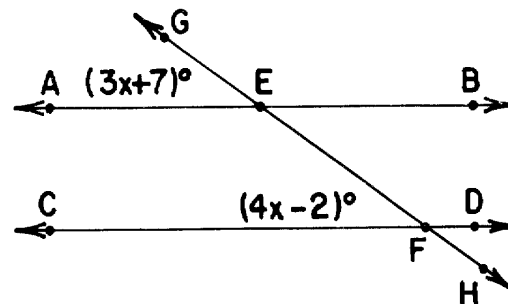
12 The table below shows the distribution of scores on a math test. Using the data in the table, determine the total number of students who took the test.

Interval	Tally	Cumulative Frequency
61–70	IIII	4
71–80	JHH I	10
81–90	II	12
91–100	IIII	16

13 In the accompanying diagram, the adjacent angles formed by intersecting lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ have measures of $3x + 50$ and $x + 10$. Find x.
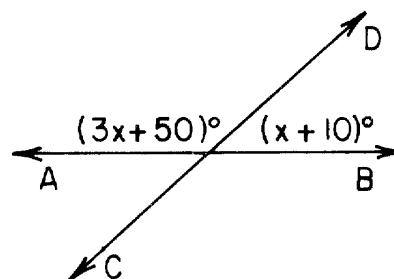
14 Express the sum of $x^2 - 3x + 5$ and $3x^2 - 2x - 2$ as a trinomial.

15 If $a = \dfrac{b^2 - c}{2}$, find the value of a when $b = 2$ and $c = -4$.

16 Solve the following system of equations for x:
$$3x + y = 9$$
$$-2x + y = -1$$

17 If $a + b = 5$ and $a - b = 3$, find the value of $a^2 - b^2$.

18 Express $\dfrac{3a}{4} - \dfrac{a}{3}$ as a single fraction in simplest form.

19 Express $(x + 1)(2x - 3)$ as a trinomial.

Directions (20–34): 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.

20 The product of $3x^2y^3$ and $4xy^2$ is equivalent to
(1) $7x^2y^6$
(2) $7x^3y^5$
(3) $12x^2y^6$
(4) $12x^3y^5$

21 If x represents the smallest of three consecutive even integers, then the largest would be represented by
(1) $x + 2$
(2) $x + 3$
(3) $x + 4$
(4) $x + 6$

22 The value of $4!$ is
(1) 24
(2) 16
(3) 12
(4) 4

23 For the group of data 3, 3, 6, 7, 16, which is true?
(1) mean > median
(2) mode = mean
(3) median < mode
(4) median = mean

24 The expression $5\sqrt{3} - \sqrt{27}$ is equivalent to
(1) $8\sqrt{3}$
(2) $-8\sqrt{3}$
(3) $-2\sqrt{3}$
(4) $2\sqrt{3}$

25 In the accompanying truth table, which statement should be the heading for column 3?
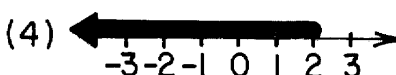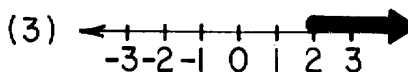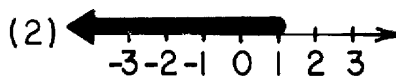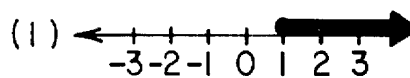
Column 1	Column 2	Column 3
p	q	?
T	T	T
T	F	F
F	T	F
F	F	F

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

26 What is the inverse of the statement "If it is sunny, I will go swimming"?
(1) If I go swimming, then it is sunny.
(2) If it is not sunny, I will not go swimming.
(3) If I do not go swimming, then it is not sunny.
(4) I will go swimming if, and only if, it is sunny.

27 Which graph represents the solution set of $2x + 1 \geq 3$?

(1)
(2)
(3)
(4)

28 The sentence $3 + (5 + 2) = (5 + 2) + 3$ illustrates
(1) the commutative property of addition
(2) the associative property of addition
(3) the distributive property of multiplication over addition
(4) the additive identity element

29 What is the solution set of the equation $x^2 - 2x - 3 = 0$?
(1) $\{2,1\}$
(2) $\{2,-1\}$
(3) $\{-3,0\}$
(4) $\{3,-1\}$

30 Let p represent the statement "All sides are congruent," and let q represent the statement "All angles are congruent." The statement $p \land \sim q$ is true for a

(1) rectangle   (3) square
(2) rhombus   (4) trapezoid

31 The expression $\dfrac{1}{(x - 1)(x + 2)}$ is undefined if x is equal to

(1) –1 or 2   (3) 0
(2) 1 or –2   (4) –1

32 A single card is drawn from a standard deck of 52 cards. What is the probability the card is a five or a diamond?

(1) $\dfrac{17}{52}$ (3) $\dfrac{16}{52}$

(2) $\dfrac{15}{52}$ (4) $\dfrac{18}{52}$

33 What is the slope of the line whose equation is $y - 2x = 4$?

(1) –2   (3) –4
(2) 2   (4) 4

34 What is the area of a circle whose diameter is 10?

(1) 10π (3) 25π
(2) 20π (4) 100π

Directions (35): Leave all construction lines on the answer sheet.

35 *On the answer sheet*, construct and label a segment $\overline{DE}$ on line ℓ congruent to segment $\overline{AB}$.

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. [40]

36 *a* On the same set of coordinate axes, graph the following system of inequalities:

$$x < 5$$
$$2x + y \geq 6 \qquad [8]$$

  b Write the coordinates of a point in the solution set of the inequalities graphed in part *a*. [2]

37 In the accompanying figure, $\triangle ABC$ is inscribed in circle O, $\overline{AB}$ is a diameter of circle O, $AB = 20$, $BC = 16$, and the measure of minor arc $AC = 74$.
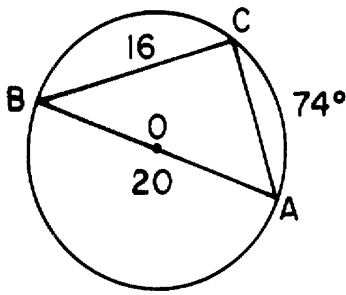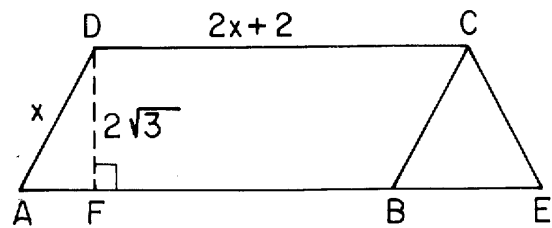

  a Find the measure of $\angle ACB$. [2]

  b Find the measure of $\angle BAC$. [2]

  c Find the length of $\overline{AC}$. [2]

  d Find the area of $\triangle ABC$. [2]

  e Find the area of circle O. [Answer may be left in terms of π.] [2]

38 Mr. Walden has two square flower gardens. A side of the larger garden is 3 feet more than a side of the smaller garden. The sum of the areas of the two gardens is 269 square feet. Find the length of a side, in feet, of each garden. [*Only an algebraic solution will be accepted.*] [3,7]

39 Solve the following system of equations algebraically and check:

$$3x - 2y = 22$$
$$2x + 5y = 2 \qquad [8,2]$$

40 In the accompanying diagram, $ABCD$ is a parallelogram with $\overline{AB}$ extended through B to E. Segment EC is drawn forming equilateral triangle BEC. The length of $\overline{DC}$ is two units more than twice the length of $\overline{AD}$. Altitude $DF = 2\sqrt{3}$ and the perimeter of parallelogram $ABCD$ is 28.

  a If the length of $\overline{AD}$ is represented by x, find the measure of

  (1) $\overline{AD}$ [4]

  (2) $\overline{DC}$ [1]

  (3) $\overline{AE}$ [1]

  b Find the area of $\triangle BEC$. [Answer may be left in radical form.] [2]

  c Find the area of trapezoid $AECD$. [Answer may be left in radical form.] [2]

41 Four chips, numbered 1, 2, 3, and 4, are in a hat. One chip is drawn and then, without replacement, a second chip is drawn.

  a Draw a tree diagram or list the sample space showing all possible outcomes. [3]

  b What is the probability that one of the two numbers drawn is odd and the other is even? [2]

  c What is the probability of drawing two prime numbers? [2]

  d What is the probability that the sum of the two numbers drawn is *not* less than 5? [2]

  e What is the probability that the sum of the two numbers is greater than 7? [1]

☞ **GO RIGHT ON TO THE NEXT PAGE.**

42 *a On your answer paper*, copy and complete the truth table for the statement
$(p \rightarrow q) \leftrightarrow \sim(p \wedge \sim q)$.   [8]

p	q	$p \rightarrow q$	$\sim q$	$p \wedge \sim q$	$\sim(p \wedge \sim q)$	$(p \rightarrow q) \leftrightarrow \sim(p \wedge \sim q)$
T	T					
T	F					
F	T					
F	F					

b Let *p* represent "Sue lives in Buffalo" and let *q* represent "Sue lives in New York State." Using the table completed in part *a*, which statement is equivalent to "If Sue lives in Buffalo, then Sue lives in New York State"?   [2]

(1) Sue lives in Buffalo and Sue does not live in New York State.
(2) It is false that Sue lives in Buffalo and Sue does not live in New York State.
(3) Sue lives in Buffalo or Sue does not live in New York State.
(4) Sue does not live in Buffalo and Sue does not live in New York State.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Wednesday, January 25, 1989 — 1:15 to 4:15 p.m., only

Part I Score . . . .

Part II Score . . . .

Total Score . . . .

Rater's Initials: . . . .

ANSWER SHEET

Pupil . . . . Teacher . . . .

School . . . . Grade . . . .

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 Answer question 35
on the other side
of this sheet.

6 . . . .   16 . . . .   26 . . . .

7 . . . .   17 . . . .   27 . . . .

8 . . . .   18 . . . .   28 . . . .

9 . . . .   19 . . . .   29 . . . .

10 . . . .   20 . . . .   30 . . . .

35

A————B   ←————ℓ————→
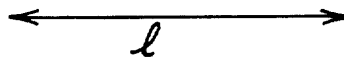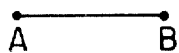
Your answers for Part II should be placed on paper provided by the school.

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

Wednesday, January 25, 1989 — 1:15 to 4:15 p.m., 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 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 20–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 18	(11) 9	(21) 3	(31) 2
(2) 80	(12) 16	(22) 1	(32) 3
(3) 6	(13) 30	(23) 1	(33) 2
(4) 60	(14) $4x^2 - 5x + 3$	(24) 4	(34) 3
(5) 70	(15) 4	(25) 3	(35) construction
(6) 36	(16) 2	(26) 2	
(7) 4	(17) 15	(27) 1	
(8) 3	(18) $\frac{5a}{12}$	(28) 1	
(9) 7	(19) $2x^2 - x - 3$	(29) 4	
(10) $\frac{x - 2}{3}$	(20) 4	(30) 2	

Part II

Please refer to the Department publication *Guide for Rating Regents Examinations 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.

(37) *a* 90 [2]
b 53 [2]
c 12 [2]
d 96 [2]
e 100π [2]

(38) 10, 13 [3,7]

(39) (6,−2) *or* $\begin{array}{l}x = 6\\y = -2\end{array}$ [8]
Check [2]

(40) *a* (1) 4 [4]
(2) 10 [1]
(3) 14 [1]
b $4\sqrt{3}$ [2]
c $24\sqrt{3}$ [2]

(41) *b* $\frac{8}{12}$ [2]
c $\frac{2}{12}$ [2]
d $\frac{8}{12}$ [2]
e 0 [1]

(42) *b* 2 [2]