THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, August 13, 1987 — 8:30 to 11:30 a.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 In the accompanying figure, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{EF}$. If $m\angle AEF = 40$, find $m\angle DFE$.
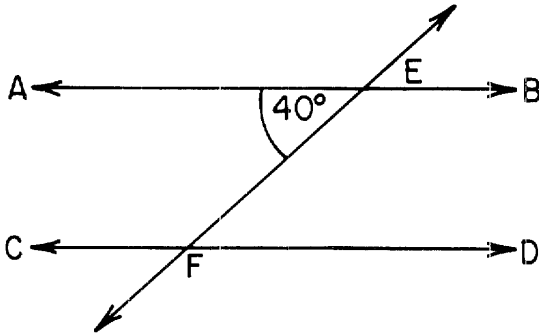
2 Solve for x: $\dfrac{4}{6} = \dfrac{x}{9}$

3 A bag contains 3 red, 4 blue, and 2 yellow marbles. If a single marble is randomly picked from the bag, what is the probability that it is a yellow marble?

4 Solve for x: $21 = 3(x + 2)$

5 A vertical pole casts a shadow 20 meters long. At the same time, a second vertical pole 8 meters high casts a shadow 32 meters long. Find, in meters, the height of the first pole.

6 Let p represent "I do my homework" and let q represent "I will pass the Regents examination." Write in symbolic form, using p and q, "If I don't do my homework, then I won't pass the Regents examination."

7 Solve for x: $0.3x + 0.5 = 1.7$

8 The area of a triangle is 24 square centimeters. If the base of this triangle is 8 centimeters, find the number of centimeters in the altitude.

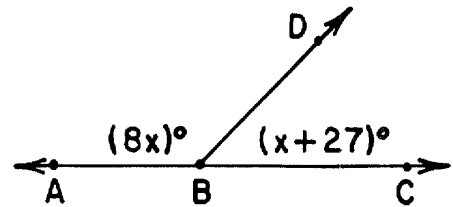9 Solve for x: $\frac{3}{2}x + 2 = 14$

10 Solve the following system of equations for x:
$$3x + 2y = 21$$
$$2y = 18$$

11 Find the value of $3a - 4b$ if $a = -2$ and $b = 1$.

12 Solve for r in terms of C and π: $C = 2\pi r$

13 In the accompanying diagram, $\overleftrightarrow{ABC}$ is a straight line, $m\angle ABD = 8x$, and $m\angle DBC = x + 27$. Find x.

14 Find the sum of $7x^2 - 3x + 5$ and $8x + 2$.

15 The measures of the three angles of a triangle are in the ratio 1:3:5. Find the measure of the *smallest* angle.

16 In the accompanying diagram of circle O, the measure of inscribed angle ACB is 40. Find the measure of central angle AOB.
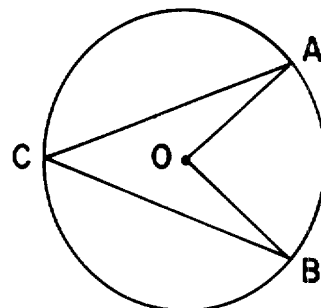
17 The area of a circle is 36π. What is the radius of the circle?

18 The length of an edge of a cube is 2 inches. How many cubic inches are there in the volume of the cube?

19 Factor: $b^2 - 4$

Directions (20–35): 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.

20 The statement "x is divisible by 3 and x is greater than 3" is true for which whole number?
(1) 5   (3) 3
(2) 6   (4) 4

21 If the length of each side of a square is represented by $4x + 1$, which expression represents the perimeter?
(1) $16x + 4$ (3) $16x^2 + 1$
(2) $8x + 2$ (4) $16x^2 + 8x + 1$

22 What is the product of $(-2x^3)(5x^4)$?
(1) $-10x^{12}$ (3) $3x^7$
(2) $-10x^7$ (4) $10x^7$

23 If $12x^4 - 3x^3 + 6x^2$ is divided by $3x^2$, the quotient is
(1) $9x^2 - 3$ (3) $4x^2 - 3x + 2$
(2) $5x^2$ (4) $4x^2 - x + 2$

24 From a standard deck of 52 cards, one card is drawn. What is the probability the card will be either an ace or a red king?
(1) $\frac{8}{52}$ (3) $\frac{6}{52}$
(2) $\frac{3}{14}$ (4) $\frac{6}{26}$

25 Which ordered pair is in the solution set of $3x - y = 10$?
(1) $(5, -5)$ (3) $(4, -2)$
(2) $(4, 2)$ (4) $(-5, 5)$

26 If the length of one of the legs of a right triangle is 10 and the length of the other leg is 24, what is the length of the hypotenuse?
(1) 13   (3) 26
(2) 17   (4) 169

27 The inequality $2x > x + 7$ is equivalent to
(1) $x > 7$ (3) $x = 7$
(2) $x < 7$ (4) $x > \frac{7}{3}$

28 If $x - 3$ is a factor of $x^2 + x - 12$, then the other factor is
(1) $4x - 3$ (3) $x - 4$
(2) $3x - 4$ (4) $x + 4$

29 A student's four test scores were 88, 91, 93, and 86. What score would be needed on a fifth test to obtain a mean of 90 for all five tests?
(1) 90   (3) 95
(2) 92   (4) 96

30 The value of 4! is
(1) 10   (3) 25
(2) 24   (4) 4

31 Which statement is true about the following set of data?
$$85, 80, 90, 85, 85$$
(1) mean > mode   (3) median > mode
(2) mean > median   (4) mean = median

32 The sum of $\sqrt{50}$ and $\sqrt{18}$ is
(1) $2\sqrt{17}$ (3) $15\sqrt{2}$
(2) $8\sqrt{2}$ (4) 34

33 What is the y-intercept of the graph of the line whose equation is $y = 3x - \frac{2}{3}$?
(1) $-\frac{2}{3}$ (3) 3
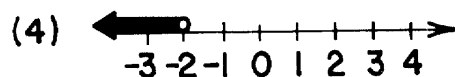(2) -2 (4) $\frac{2}{3}$

34 Given the truth table below, which would be the best heading for the last column?

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

(1) $p \wedge q$
(2) $p \rightarrow q$

(3) $p \vee q$
(4) $p \leftrightarrow q$

35 Which graph represents the solution set of the inequality $4x > -8$?

(1)

(2)

(3)

(4)
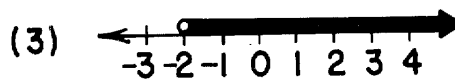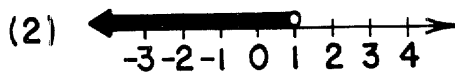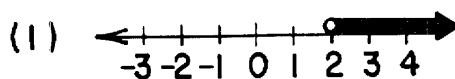
Answers to the following questions are to be written on paper provided by the school.

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:

$$y \leq 2x - 4$$
$$y + 3x > 6$$ [8]

b Based on your answer to part *a*, write the coordinates of a point which is *not* in the solution set.   [2]

37 The following data are test scores for a class of 20 students: 98, 96, 83, 91, 88, 77, 58, 75, 62, 80, 100, 87, 93, 91, 64, 91, 85, 90, 76, 92.

a *On your answer paper*, copy and complete the table.   [2]

Interval	Number (frequency)
91–100	
81–90	
71–80	
61–70	
51–60	

b Construct a frequency histogram, using the table completed in part *a*.   [4]
*c* In which interval does the mode lie?   [2]
d In which interval does the median lie?   [2]

38 Find three consecutive even integers such that the sum of the smallest integer and twice the second is 12 more than the third. [*Only an algebraic solution will be accepted.*]   [5,5]

39 The product of two positive numbers is 48. The larger number is 13 more than the smaller. Find both numbers. [*Only an algebraic solution will be accepted.*]   [4,6]

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

41 In the accompanying diagram, *ABDE* is a rectangle, *ACDE* is a trapezoid, *AB:BC* = 3:1, *AC* = 24, and the area of rectangle *ABDE* is 108.
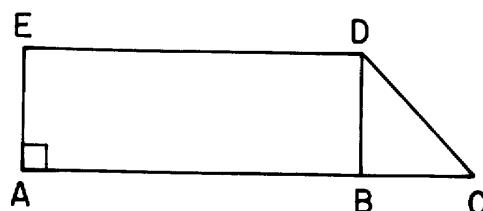
a Find *BC*.   [2]
b Find *DB*.   [2]
c Find the area of △*BCD*.   [2]
d Find the area of trapezoid *ACDE*.   [2]
e Find *CD*. [Answer may be left in radical form.]   [2]

42 An experiment requires spinning an arrow attached to a disk and then tossing a fair six-sided die. The arrow is free to spin but cannot land on a line. The disk is divided into four equal areas, three of which are blue and the fourth is red.
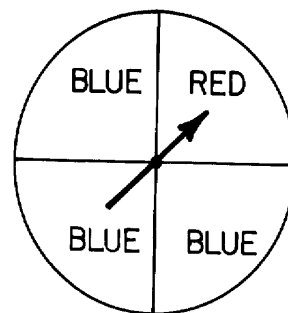
a Draw a tree diagram or list the sample space of all possible pairs of outcomes for spinning the arrow and then tossing the die.   [4]
b What is the probability the arrow will land in a blue area on the first spin?   [2]
c What is the probability the arrow will land in the red area and a 3 will be tossed on the die?   [2]
d What is the probability the arrow will land in a blue area and an 8 will be tossed on the die?   [2]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Thursday, August 13, 1987 — 8:30 to 11:30 a.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 . . . .
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

Math.–Course I–Aug. '87

[7]

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, August 13, 1987—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 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 20–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 40	(11) –10	(21) 1	(31) 4
(2) 6	(12) $\frac{C}{2\pi}$	(22) 2	(32) 2
(3) $\frac{2}{9}$	(13) 17	(23) 4	(33) 1
(4) 5	(14) $7x^2 + 5x + 7$	(24) 3	(34) 4
(5) 5	(15) 20	(25) 2	(35) 3
(6) $\sim p \rightarrow \sim q$	(16) 80	(26) 3	
(7) 4	(17) 6	(27) 1	
(8) 6	(18) 8	(28) 4	
(9) 8	(19) $(b - 2)(b + 2)$	(29) 2	
(10) 1	(20) 2	(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) *c* 91–100   [2]
     d 81–90   [2]

(38) Analysis   [5]
     6, 8, 10   [5]

(39) Analysis   [4]
     3, 16   [6]

(41) *a* 6   [2]
     b 6   [2]
     c 18   [2]
     d 126   [2]
     e $6\sqrt{2}$ *or* $\sqrt{72}$ [2]

(42) *b* $\frac{3}{4}$ [2]

     c $\frac{1}{24}$ [2]

     d 0   [2]