THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, June 15, 1987 — 9:15 a.m. to 12:15 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 Solve for x: $3.5x + 5.4 = 19.4$

2 A purse contains 3 quarters, 4 dimes, 2 nickels, and 2 pennies. If one coin is pulled out of the purse at random, what is the probability the coin will be worth exactly 10 cents?

3 A basketball player made 9 out of 12 foul shots. What percent of his foul shots did he make?

4 The probability that Tim will be elected president of the freshman class is 0.7. What is the probability that Tim will *not* be elected president?

5 The length of the hypotenuse of a right triangle is 13 centimeters and the length of one of the legs is 12 centimeters. Find the number of centimeters in the length of the second leg.

6 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{EF}$. If $m\angle 2 = 72$, what is $m\angle 1$?
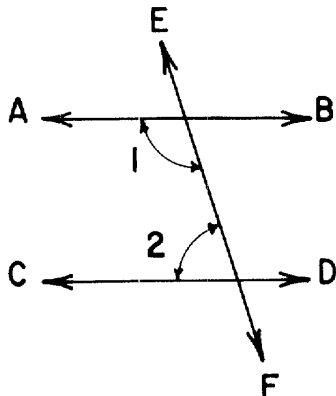
7 Solve for x: $\dfrac{x}{2.5} = \dfrac{10}{25}$

8 If one of the base angles of an isosceles triangle has a measure of 54, find the measure of the vertex angle.

9 The mean of four numbers is 5. Find the sum of the four numbers.

10 What is the value of $R^2 S$ if $R = 5$ and $S = -2$?

11 Express, in terms of π, the circumference of a circle whose diameter is 14.

12 In the accompanying figure, the measure of minor arc AB is 100. Find the measure of inscribed angle ACB.
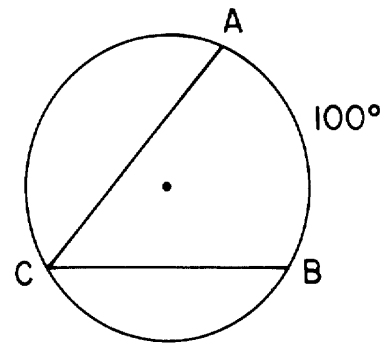
13 Solve for x in terms of b: $3x - b = 2b$

14 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. Angles AEC and DEB measure $2x - 6$ and $6x - 50$, respectively. Find the value of x.
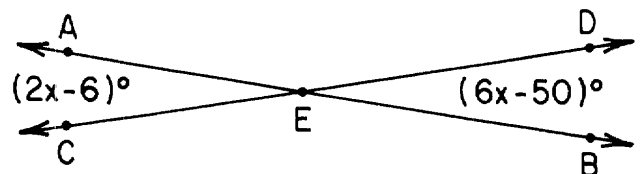
15 Two complementary angles are in the ratio of 4:5. Find the measure of the *smaller* angle.

16 Factor: $x^2 - 5x + 6$

17 Express $\dfrac{x}{2} + \dfrac{2x}{3}$ as a single fraction in lowest terms.

18 If Debbie has 3 blouses and 4 skirts, how many different outfits of a blouse and skirt can she wear?
(1) 12   (3) 3
(2) 7   (4) 4

19 The solution of the equation $3(x + 3) = 12$ is
(1) 1   (3) 3
(2) 2   (4) 4

20 If the length of each side of a triangle is doubled, then its perimeter
(1) remains the same   (3) is multiplied by 4
(2) is multiplied by 2 (4) is increased by 4

21 Let p represent "Ann can climb Mount Everest" and let q represent "The weather is clear." Which statement represents "If the weather is clear, then Ann can climb Mount Everest"?
(1) $p \wedge q$ (3) $p \rightarrow q$
(2) $p \vee q$ (4) $q \rightarrow p$

22 If a group of data consists of the numbers 2, 2, 5, 6, and 15, which statement is true?
(1) median > mean   (3) mode < median
(2) mean = mode   (4) median = mode

23 The sum of $3x^2 + x - 7$ and $x^2 + 10$ can be expressed as
(1) $4x^4 + x - 3$ (3) $3x^4 + x - 3$
(2) $3x^2 + x + 3$ (4) $4x^2 + x + 3$

24 The product of $7y^3$ and $4y^5$ is
(1) $11y^8$ (3) $28y^8$
(2) $11y^{15}$ (4) $28y^{15}$

25 Which inequality is the solution of $5x - 1 < 29$?
(1) $x > 7$ (3) $x < 6$
(2) $x < 7\frac{1}{4}$ (4) $x > 5\frac{3}{5}$

26 The point $(k,3)$ lies on the graph of the line whose equation is $2x + y = 17$. What is the value of k?
(1) 7   (3) 11
(2) 10   (4) 23

27 The lengths of the sides of a triangle are 8, 15, and 17. If the longest side of a similar triangle is 51, what is the length of the *shortest* side?
(1) 32   (3) 16
(2) 24   (4) 4

28 Which statement is always true when p is false?
(1) $p \vee q$ (3) $p \wedge q$
(2) $p \rightarrow q$ (4) $\sim p$

29 What is the solution for the following system of equations?
$$2x + y = 7$$
$$x - 2y = 6$$
(1) $(3,1)$ (3) $(-1,4)$
(2) $(1,3)$ (4) $(4,-1)$

30 The sum of $\sqrt{12}$ and $5\sqrt{3}$ is
(1) $10\sqrt{3}$ (3) $7\sqrt{3}$
(2) $7\sqrt{6}$ (4) 360

31 What is the contrapositive of the statement $q \rightarrow \sim p$?
(1) $p \rightarrow q$ (3) $p \rightarrow \sim q$
(2) $\sim p \rightarrow q$ (4) $\sim q \rightarrow p$

32 What is the slope of the line whose equation is $y = 2x - 10$?
(1) $\frac{1}{2}$ (3) 5
(2) 2   (4) -10

33 Which expression is undefined if $x = 2$?
(1) $\frac{2}{x - 2}$ (3) $\frac{2}{x}$
(2) $\frac{x - 2}{2}$ (4) $(x - 2)(x + 2)$

34 Which open sentence is represented by the graph below?
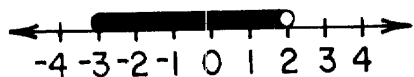
(1) $-3 < x < 2$ (3) $-3 \leq x \leq 2$

(2) $-3 \leq x < 2$ (4) $-3 < x \leq 2$

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

35 *On the answer sheet*, using compass and straight-edge, construct a triangle congruent to triangle ABC. Use $\overline{A'B'}$ as one side of the congruent triangle.

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]

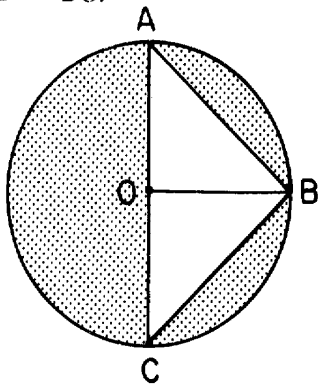36 *a* On the same set of coordinate axes, graph the following system of inequalities:

$$y < -2x + 3$$
$$y - 3x \geq -2 \quad [8]$$

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

37 Solve algebraically and check:

$$4x + 3y = 12$$
$$-2x + y = -16 \quad [8,2]$$

38 In the accompanying figure, $\triangle ABC$ is inscribed in circle O, $\overline{AC}$ is a diameter of circle O, $AC = 8$, and $\overset{\frown}{AB} \cong \overset{\frown}{BC}$.

a Find the measure of minor arc *AB*.   [2]
b Find the measure of $\angle BOC$.   [2]
c Find the measure of $\angle ABC$.   [2]
d Find the area of $\triangle ABC$.   [2]
e Find the area of the shaded region. [Answer may be left in terms of π.]   [2]

39 The sum of the measures of three angles is 200. These measures are in the ratio 3:5:12. Find the measures of the three angles. [*Only an algebraic solution will be accepted.*]   [5,5]

40 One positive number is one more than another positive number. The sum of the squares of the two numbers is 85. Find both positive numbers. [*Only an algebraic solution will be accepted.*]   [5,5]

41 Eight of Mrs. Smith's students weigh 79, 60, 80, 50, 55, 100, 80, and 72 pounds. If one of the students is picked at random, find the probability that the student's weight will be:
a greater than the mean   [4]
b exactly equal to the median   [4]
c less than the mode   [2]

☞ GO RIGHT ON TO THE NEXT PAGE.

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

p	q	$\sim p$	$\sim q$	$p \lor q$	$\sim(p \lor q)$	$\sim p \land \sim q$	$\sim(p \lor q) \leftrightarrow (\sim p \land \sim q)$
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T							
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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Monday, June 15, 1987 — 9:15 a.m. to 12:15 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
6 . . . .   16 . . . .   26 . . . .   of this sheet.

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

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

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

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

35
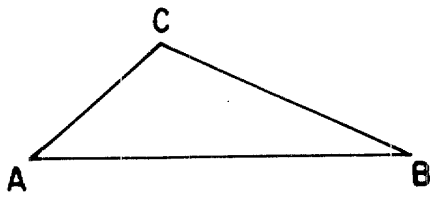
Your answers for Part II should be placed on paper provided by the school.

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

Monday, June 15, 1987 — 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 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 18–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 4	(11) 14π	(21) 4	(31) 3
(2) $\frac{4}{11}$	(12) 50	(22) 3	(32) 2
(3) 75	(13) b	(23) 4	(33) 1
(4) 0.3	(14) 11	(24) 3	(34) 2
(5) 5	(15) 40	(25) 3	(35) construction
(6) 108	(16) $(x-3)(x-2)$	(26) 1	
(7) 1	(17) $\frac{7x}{6}$	(27) 2	
(8) 72	(18) 1	(28) 4	
(9) 20	(19) 1	(29) 4	
(10) –50	(20) 2	(30) 3	

Part II

Please refer to the Department's pamphlet *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) $(6, -4)$ *or* $\begin{array}{l} x = 6 \\ y = -4 \end{array}$ [8]

        Check   [2]

(38) *a* 90   [2]
     b 90   [2]
     c 90   [2]
     d 16   [2]
     e $16\pi - 16$ [2]

(39) Analysis   [5]
     30, 50, 120   [5]

(40) Analysis   [5]
     6, 7   [5]

(41) *a* $\frac{4}{8}$ [4]
     b 0   [4]
     c $\frac{5}{8}$ [2]