The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 19, 1986—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.

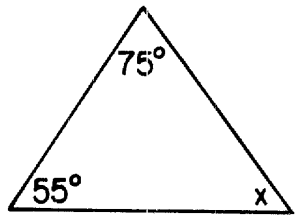
When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during 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 diagram, what is the measure of angle x?



2 Solve for x: $1.2x + 0.3 = 7.5$

3 What is the multiplicative inverse of $\frac{1}{5}$?

4 The mean of four numbers is 10. If three of the numbers are 7, 8, and 11, what is the fourth number?

5 Two congruent angles A and B are supplementary. Find the measure of angle A.

6 The area of a square is 81. Find the perimeter.

7 Find the value of $5x^2$ if $x = -3$.

8 What percent of 25 is 10?

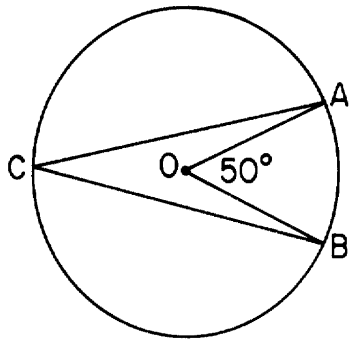
9 Perform the indicated operation:

$$-5(4a - 6b)$$

10 The ratio of the perimeters of two isosceles right triangles is 1:3. If the length of the hypotenuse of the larger triangle is 18, find the length of the hypotenuse of the smaller triangle.

11 Solve for x: $2x - 5 = 4x + 7$

12 In the accompanying figure, the measure of angle AOB is 50. Find the measure of inscribed angle ACB.



13 Solve for x: $\frac{2}{3}x - 1 = 5$

14 Solve the following system of equations for x:

$$3x + 3y = 21$$
$$6x - 3y = 6$$

15 Factor: $25x^2 - 9$

16 Solve for p in terms of r, s, and t:

$$rp + s = t$$

17 Let p represent the statement "$x + 3$ is even" and let q represent the statement "x is prime." If the replacement set for x is $\{1,2,3,4\}$, find the value of x for which the statement $p \wedge q$ is true.

18 Find the positive root of the equation $x^2 - x - 6 = 0$.

19 Assume that there is an equal probability of a child being either a boy or a girl. In a family with only two children, what is the probability that both children are boys?

20 Express the sum of $3x^3 - 7x^2 + 2$ and $-x^3 + 9x^2 - 5$ as a trinomial.

Directions (21–34): 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.

21 The product of $4x^4$ and $5x^5$ is
(1) $9x^9$ (3) $20x^9$
(2) $9x^{20}$ (4) $20x^{20}$

22 If x is a positive integer, then the solution set of $4x + 2 < 14$ is
(1) {1} (3) {1,2,3}
(2) {1,2} (4) {1,2,3,4}

23 A set of data consists of 3, 3, 6, 4, and 9. The median for these data is
(1) 6 (3) 3
(2) 5 (4) 4

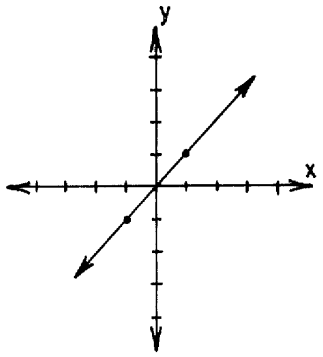
24 If $(a,0)$ is a point on the graph of the equation $2x + y = 6$, what is the value of a?
(1) 6 (3) 3
(2) 2 (4) 4

25 A newspaper poll was taken to determine the probable winner in an election for mayor. The probability that Andrews will win is 0.4, while the probability that Egan will win is 0.3. What is the probability that either Andrews or Egan will win?
(1) 0.7 (3) 0.3
(2) 0.12 (4) 0.4

26 What is the inverse of $\sim q \rightarrow p$?
(1) $p \rightarrow q$ (3) $q \rightarrow \sim p$
(2) $\sim p \rightarrow q$ (4) $\sim p \rightarrow \sim q$

27 Which number is rational?
(1) $4\sqrt{2}$ (3) $\frac{1}{2}\sqrt{3}$
(2) $\sqrt{15}$ (4) $\sqrt{16}$

28 What is an equation of the line whose graph is shown below?



(1) $y = -x$ (3) $y = x$
(2) $y = 2x$ (4) $y = 2$

29 What is the circumference of a circle whose radius is 6?
(1) 6π (3) 36π
(2) 12π (4) 3π

30 The expression $\frac{5}{(x - 2)(x + 3)}$ is meaningless when x is equal to
(1) 2 or –3 (3) –2 or 3
(2) –2 (4) 0

31 The value of 4! is
(1) 24 (3) –4
(2) 16 (4) 4

32 If two legs of a right triangle are 9 and 11, the hypotenuse is
(1) 20 (3) 40
(2) 2 (4) $\sqrt{202}$

33 Which statement is always true?
(1) $p \wedge \sim p$ (3) $p \rightarrow \sim p$
(2) $\sim(\sim p) \leftrightarrow p$ (4) $p \wedge q$

34 Which inequality is represented by the accompanying graph?

(1) $-2 < x \leq 3$ (3) $-2 \leq x < 3$
(2) $-2 \leq x \leq 3$ (4) $-2 < x < 3$

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

35 *On the answer sheet,* using point D as the vertex, construct an angle congruent to angle CAB of triangle ABC.

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

Part II

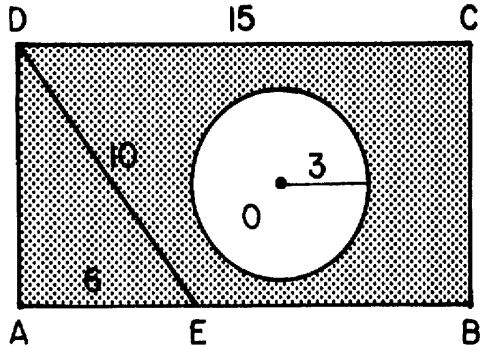
Answer four questions from this part. Show all work unless otherwise directed. [40]

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

$$y < 2x + 3$$
$$y \geq 4$$ [8]

b Write the coordinates of a point which is *not* in the solution set of the inequalities graphed in part *a*. [2]

37 In the accompanying diagram, *ABCD* is a rectangle, *E* is a point on $\overline{AB}$, $DE = 10$, $AE = 6$, and $DC = 15$. Circle *O* has a radius of 3.



a Find *AD*. [2]
b Find the area of $\triangle ADE$. [2]
c Find the area of circle *O*. [2]
d Find the area of trapezoid *EBCD*. [2]
e Find the area of the shaded portion. [2]

38 Find three consecutive even integers such that the square of the first is 80 less than the square of the third. [*Only an algebraic solution will be accepted.*] [5,5]

39 In rectangle *ABCD*, *AB* is 7 inches longer than *BC*. The area of rectangle *ABCD* is 60 square inches. Find the number of inches in *AB*. [*Only an algebraic solution will be accepted.*] [4,6]

40 The following table shows the distribution of test grades of students on a math test.

Interval	Cumulative Frequency
40–49	1
50–59	4
60–69	6
70–79	11
80–89	17
90–99	20

a On graph paper, construct a cumulative frequency histogram based on the data. [4]
b Which interval contains the median? [2]
c Which interval contains the greatest number of scores? [2]
d Which interval contains the lower quartile? [2]

41 The assembly committee of the River High School student council consists of four students whose ages are 14, 15, 16, and 17. One student will be chosen at random to be chairperson and then, from the remaining three, one will be chosen at random to be recording secretary.
a Draw a tree diagram or list the sample space showing all possible outcomes. [4]
b Find the probability that:
(1) the chairperson is older than the recording secretary [2]
(2) both students chosen are under the age of 16 [2]
(3) both students chosen are the same age [2]

42 *On your answer paper*, construct a truth table for the statement $(\sim p \rightarrow q) \leftrightarrow (p \wedge \sim q)$. [10]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Tuesday, August 19, 1986—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 .....

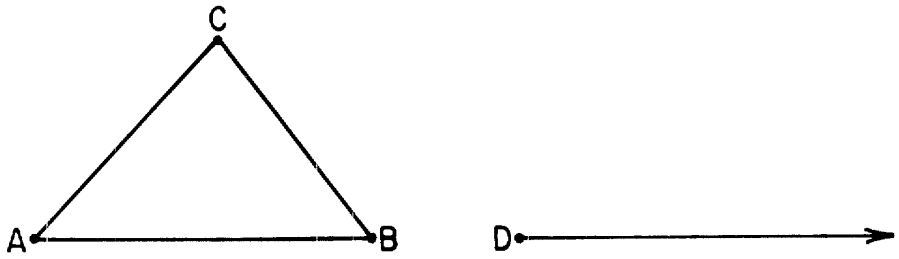
Your answers to Part I should be recorded on this answer sheet.

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 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



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 19, 1986—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 21–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 50

(2) 6

(3) 5

(4) 14

(5) 90

(6) 36

(7) 45

(8) 40

(9) $-20a + 30b$

(10) 6

(11) -6

(12) 25

(13) 9

(14) 3

(15) $(5x - 3)(5x + 3)$

(16) $\frac{t - s}{r}$

(17) 3

(18) 3

(19) $\frac{1}{4}$

(20) $2x^3 + 2x^2 - 3$

(21) 3

(22) 2

(23) 4

(24) 3

(25) 1

(26) 3

(27) 4

(28) 3

(29) 2

(30) 1

(31) 1

(32) 4

(33) 2

(34) 1

(35) construction

[OVER]

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) *a* 8 [2]
b 24 [2]
c 9π [2]
d 96 [2]
e $120 - 9\pi$ [2]

(38) Analysis [5]
8, 10, 12 [5]

(39) Analysis [4]
12 [6]

(40) *b* 70–79 [2]
c 80–89 [2]
d 60–69 [2]

(41) *b* (1) $\frac{6}{12}$ [2]
(2) $\frac{2}{12}$ [2]
(3) 0 [2]