The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Friday, June 17, 1988 — 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.

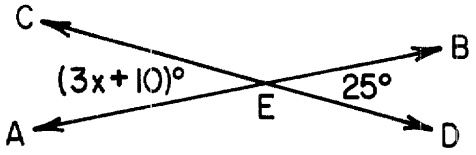
When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during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

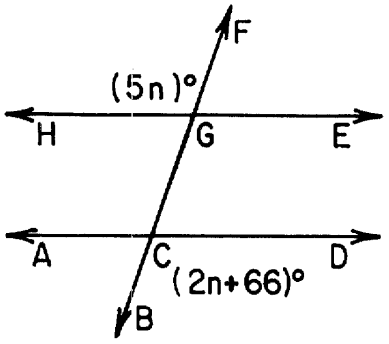
Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answers may be left in terms of π or in radical form. [60]

1 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. If $m\angle BED = 25$ and $m\angle AEC = 3x + 10$, find the value of x.



2 Solve for x: $0.02x + 4.1 = 6.3$

3 In the accompanying diagram, parallel lines $\overleftrightarrow{HE}$ and $\overleftrightarrow{AD}$ are cut by transversal $\overleftrightarrow{BF}$ at points G and C, respectively. If $m\angle HGF = 5n$ and $m\angle BCD = 2n + 66$, find n.



4 The ratio of similarity between two polygons is 2:3. If the perimeter of the smaller polygon is 14, find the perimeter of the larger polygon.

5 Solve the following system of equations for x:

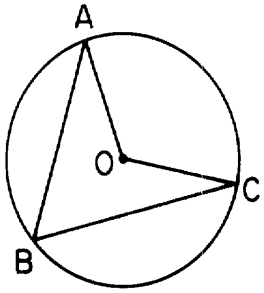
$$y = 2x - 5$$
$$x + y = 4$$

6 The perimeter of an isosceles triangle is 14. If the length of the base of the triangle is one less than the length of each leg, find the length of a leg.

7 Find the value of the expression $2x^2y$ if $x = -1$ and $y = 3$.

8 The product of two factors is $x^2 - x - 20$. If one of the factors is $x - 5$, what is the other factor?

9 In the accompanying diagram, the measure of central angle AOC is 120. Find the measure of inscribed angle ABC.



10 Solve for x: $ax + b = c$

11 Write, in symbolic form, the contrapositive of $p \rightarrow \sim q$.

12 Solve for x: $6(x + 1) = 4x$

13 The measures of the angles of a triangle are represented by $(3x - 20)$, $(7x + 30)$, and $(2x + 50)$. Find x.

14 Solve for x: $\frac{2}{5}x - 7 = -3$

15 A box contains 3 green marbles, 2 red marbles, and 1 blue marble. If one marble is selected at random, what is the probability that a red marble was *not* selected?

16 Lois is four times as old as her son Dan. The sum of their ages is 40. How old is Dan?

17 Express $\frac{a}{6} + \frac{a}{4}$ as a single fraction in simplest form.

18 In a right triangle, if the length of the hypotenuse is 15 and the length of one leg is 12, find the length of the other leg.

19 Express the product of $(2x + 3)$ and $(x - 5)$ as a trinomial.

20 From $6x^2 - 3x + 9$ subtract $2x^2 - 5x + 8$.

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 What is the median for the following set of data?

2, 7, 5, 4, 7, 2, 7

(1) 7
(2) 5
(3) $4\frac{6}{7}$
(4) 4

22 The quotient of $\frac{28x^4y^2}{14xy}$ is

(1) $2x^3y$
(2) $2x^4y^2$
(3) $14x^3y$
(4) $14x^4y^2$

23 Which sentence is an example of the distributive property?

(1) $ab = ba$
(2) $a(bc) = (ab)c$
(3) $a(b + c) = ab + ac$
(4) $a \cdot 1 = a$

24 The value of 5! is

(1) 120
(2) 25
(3) 15
(4) -5

25 Two supplementary angles are in the ratio 1:5. What is the measure of the smaller angle?

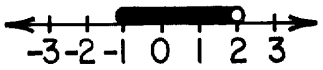
(1) 15°
(2) 30°
(3) 75°
(4) 150°

26 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	T
F	T	T
F	F	F

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

27 Which inequality is represented by the graph below?



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

28 The area of a circle is 16π. What is the circumference of the circle?

(1) 8π
(2) 2π
(3) 16π
(4) 4π

29 Which expression represents the number of cents in d dimes and n nickels?

(1) $d + n$
(2) $15(d + n)$
(3) $10d + 5n$
(4) $\frac{d}{10} + \frac{n}{5}$

30 Which ordered pair is in the solution set of $y \geq 2x + 3$?

(1) (1,4)
(2) (3,2)
(3) (0,5)
(4) (0,0)

31 For which value of x will the fraction $\frac{5}{2x - 8}$ be undefined?

(1) -4
(2) 0
(3) 8
(4) 4

32 What is the y-intercept of the line whose equation is $y - 2x = 4$?

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

33 Which is an irrational number?

(1) 5.7
(2) $\sqrt{3}$
(3) $\frac{8}{11}$
(4) $\sqrt{400}$

34 The expression $\sqrt{200}$ is equivalent to

(1) $25\sqrt{8}$
(2) $100\sqrt{2}$
(3) $2\sqrt{10}$
(4) $10\sqrt{2}$

35 What is the solution set of the equation $x^2 - 3x - 10 = 0$?

(1) $\{5,-2\}$
(2) $\{-5,-2\}$
(3) $\{5,2\}$
(4) $\{-5,2\}$

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 Solve the following system of equations graphically and check:

$$2x + y = -1$$
$$x + 2y = 4$$

[8,2]

37 In a math class, there are four students in the first row: three boys, Arthur, David, and Carlos, and one girl, Kim. The teacher will call one of these students to the board to solve a problem. When the problem is solved, the teacher will then call upon one of the remaining students in the first row to do a second problem at the board.

a Draw a tree diagram or list the sample space for calling two students to the board. [3]

b Find the probability that

(1) Kim will be one of the two students called to the board [2]

(2) at least one boy will be called to the board [2]

(3) Kim and Arthur will be the two students called to the board [2]

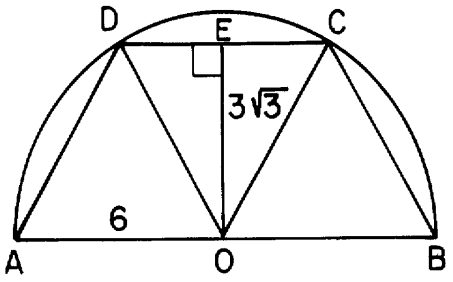
(4) two girls will be called to the board [1]

38 The length of the hypotenuse of a right triangle is 25 units. One of the legs is 5 units longer than the other leg.

a Find the length of each leg. [*Only an algebraic solution will be accepted.*] [8]

b Find in square units the area of the triangle. [2]

39 In the accompanying diagram, trapezoid $ABCD$ is inscribed in semicircle O. Triangles AOD, DOC, and COB are equilateral, $\overline{OE} \perp \overline{CD}$, $\overline{CD} \parallel \overline{AB}$, $OA = 6$, and $OE = 3\sqrt{3}$.



a Find AD. [1]

b Find the perimeter of trapezoid $ABCD$. [2]

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

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

e Find the area of the semicircle. [Answer may be left in terms of π.] [3]

40 Write an equation or a system of equations that can be used to solve *each* of the following problems. In *each* case, state what the variable or variables represent. [*Solution of the equations is not required.*]

a One number is 4 more than three times a smaller number. If twice the larger number is decreased by three times the smaller number, the result is 32. Find the numbers. [5]

b Find three consecutive positive odd integers such that twice the sum of the second and the third is 2 less than six times the first. [5]

☞ **GO RIGHT ON TO THE NEXT PAGE.**

41 The table below shows the distribution of the total runs scored by a high school baseball team in each of 28 games.

Runs Scored	Frequency	Cumulative Frequency
0–1	4	4
2–3	11	
4–5	6	
6–7	5	
8–9	2	

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

b Using the data in the cumulative frequency column, draw a cumulative frequency histogram. [4]

c Which interval contains the median number of runs scored in a game? [2]

d If one of these games is chosen at random, what is the probability that more than 5 runs were scored in the game chosen? [2]

42 Each part below consists of three sentences. *On your answer paper*, write the letters *a* through *e* and next to each letter, write the truth value for the third sentence in each part based on the truth values given for the first two sentences.

a	John will buy a car. John will get a raise. John will buy a car if and only if John will get a raise.	TRUE FALSE ?	[2]
b	Physics is a science. Jan plays piano. Physics is a science and Jan does *not* play piano.	TRUE FALSE ?	[2]
c	If a polygon is a square, then the polygon is a rectangle. Polygon *ABCD* is a square. Polygon *ABCD* is a rectangle.	TRUE TRUE ?	[2]
d	I like apples or it is Tuesday. I like apples. It is Tuesday.	FALSE FALSE ?	[2]
e	If it is snowing, the roads are slippery. The roads are not slippery. It is not snowing.	TRUE TRUE ?	[2]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Friday, June 17, 1988 — 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 .....
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

Friday, June 17, 1988 — 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 21–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 5

(2) 110

(3) 22

(4) 21

(5) 3

(6) 5

(7) 6

(8) $x + 4$

(9) 60

(10) $\frac{c - b}{a}$

(11) $q \rightarrow \sim p$

(12) -3

(13) 10

(14) 10

(15) $\frac{4}{6}$

(16) 8

(17) $\frac{5a}{12}$

(18) 9

(19) $2x^2 - 7x - 15$

(20) $4x^2 + 2x + 1$

(21) 2

(22) 1

(23) 3

(24) 1

(25) 2

(26) 4

(27) 2

(28) 1

(29) 3

(30) 3

(31) 4

(32) 4

(33) 2

(34) 4

(35) 1

[OVER]

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

(2) 1 [2]

(3) $\frac{2}{12}$ [2]

(4) 0 [1]

(38) *a* 15, 20 [8]

b 150 [2]

(39) *a* 6 [1]

b 30 [2]

c $9\sqrt{3}$ [2]

d $27\sqrt{3}$ [2]

e 18π [3]

(40) *a* Let n = smaller number

$2(3n + 4) - 3n = 32$ [5]

b Let x = smallest positive odd integer

$2(2x + 6) = 6x - 2$ [5]

(41) *c* 2 – 3 [2]

d $\frac{7}{28}$ [2]

(42) *a* False [2]

b True [2]

c True [2]

d False [2]

e True [2]

Notice . . .

The January 1989 Regents examination in Course I, Three-Year Sequence for High School Mathematics, will be the last examination based on the original 1976 Syllabus. The June 1989 examination will be based on the revised syllabus (1988). If you have not received a copy of the revised syllabus, contact Fredric Paul, Chief, Bureau of Mathematics Education, State Education Department, Albany, NY 12234.