The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, June 19, 1979—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. Write your answers in the spaces provided on the separate answer sheet.

1 Solve for x: $3(x + 4) - x = 18$

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

3 If two angles of a triangle measure 30° and 70°, what is the number of degrees of the third angle of the triangle?

4 Solve for x in terms of a, b, and c: $ax - b = c$

5 Solve for x: $0.4x + 2 = 12$

6 The perimeter of a square is 36. What is the length of one side of the square?

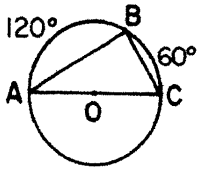
7 A person 5 feet tall casts a shadow of 12 feet at the same time that a tree casts a shadow of 60 feet. Find the number of feet in the height of the tree.

8 Solve for y: $\frac{y}{3} + 2 = 5$

9 Solve for h: $\frac{24}{h} = \frac{16}{4}$

10 Factor: $x^2 - 7x$

11 In the accompanying figure, $\triangle ABC$ is inscribed in circle O. Arc AB measures 120°, and arc BC measures 60°. Find the number of degrees in angle B.



12 Solve for x: $x + y = 7$
$2x - y = 2$

13 If 30 students took an examination and 24 passed, what percent of the students passed the examination?

14 What is the slope of the graph of $y = 2x + 3$? 22

15 The mail consists of 3 bills, 2 advertisements, and 1 letter. If the mail is opened randomly, what is the probability that an advertisement is opened first? 23

16 What is the total number of possible 5-letter arrangements of the letters D, I, S, C, and O, if each letter is used only once in each arrangement? 24

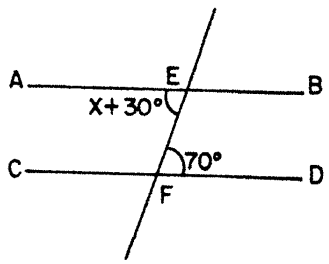
17 Two fair dice are tossed. Each die has six faces numbered 1 to 6. What is the probability that each die shows a 5? 25

18 If the probability of an event happening is $\frac{2}{5}$, what is the probability of the event *not* happening? 26

19 A school cafeteria offers 6 kinds of sandwiches and 3 kinds of beverages. If a lunch consists of a sandwich and a beverage, how many different lunches can a student choose? 27

20 P represents "It is cold" and Q represents "I will go skiing." Using P and Q, write in symbolic form: "If it is cold, then I will *not* go skiing." 28

21 As shown in the accompanying figure, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$, and $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{EF}$ at E and F, respectively. If the measure of $\angle AEF$ equals $x + 30°$, and the measure of $\angle DFE$ equals 70°, find x. 29



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Directions (22–35): 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.

22 The product of $6x^3$ and $5x^4$ is
(1) $11x^{12}$ (3) $30x^{12}$
(2) $11x^7$ (4) $30x^7$

23 Which point lies on the graph of $2x + y = 10$?
(1) (0,8) (3) (3,4)
(2) (10,0) (4) (4,3)

24 The solution set of $x^2 - x - 6 = 0$ is
(1) $\{1,-6\}$ (3) $\{3,-2\}$
(2) $\{-3,2\}$ (4) $\{5,1\}$

25 What is the area of a circle whose radius is 5?
(1) 100π (3) 10π
(2) 25π (4) 5π

26 The length of the hypotenuse of a right triangle is 8 and the length of one leg is 5. The length of the other leg is
(1) $\sqrt{39}$ (3) 3
(2) $\sqrt{89}$ (4) 13

27 What are the numbers in the solution set of $4 \leq x < 7$ if x is an integer?
(1) 5,6 (3) 4,5,6
(2) 5,6,7 (4) 4,5,6,7

28 The length of a rectangle is 5 more than its width. If the width is represented by w, which expression represents the area of the rectangle?
(1) $w^2 + 5w$ (3) $5w^2$
(2) $w^2 + 5$ (4) $4w + 10$

29 What is the inverse of the statement, "If n is an odd integer, then $n + 2$ is an odd integer"?
(1) If n is an odd integer, then $n + 2$ is not an odd integer.
(2) If n is not an odd integer, then $n + 2$ is not an odd integer.
(3) If $n + 2$ is an odd integer, then n is an odd integer.
(4) If $n + 2$ is not an odd integer, then n is not an odd integer.

30 The expression $\sqrt{300}$ is equivalent to
(1) $50\sqrt{6}$ (3) $3\sqrt{10}$
(2) $12\sqrt{5}$ (4) $10\sqrt{3}$

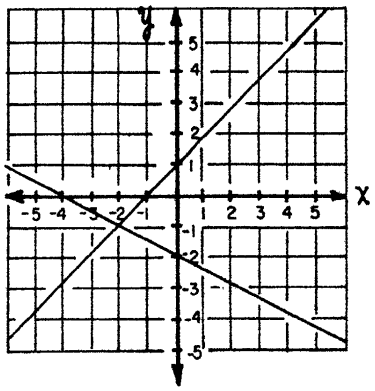
31 Five girls in a club reported on the number of boxes of cookies that they sold: 20, 20, 40, 50, and 70. Which is true?
(1) The median is 20.
(2) The mean is 20.
(3) The median is equal to the mean.
(4) The median is equal to the mode.

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

33 If $p \rightarrow q$ is false, then
(1) p is true and q is false
(2) p is false and q is true
(3) p and q are both true
(4) p and q are both false

34 Let p represent "The polygon has exactly 3 sides," and let q represent "All angles of the polygon are right angles." Which is true if the polygon is a rectangle?
(1) $p \wedge q$ (3) p
(2) $p \vee q$ (4) $\sim q$

35 What is the solution of the system of equations whose graphs are shown below?



(1) $(-1,-2)$ (3) $(-2,-1)$
(2) $(-2,1)$ (4) $(0,-2)$

☞ GO RIGHT ON TO THE NEXT PAGE.

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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.

36 Answer *either* *a* or *b* but *not* both:

a Solve graphically and check:

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

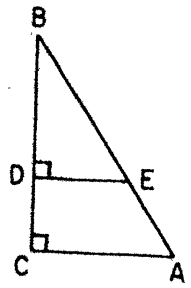
OR

b On the same set of coordinate axes, graph the following system of inequalities and label the solution set *A*:

$$2y \geq x - 4$$
$$y < 3x \quad [8,2]$$

37 In triangle ABC, angle A is 30° more than angle B. Angle C equals the sum of angle A and angle B. Find the measures of *each* of the three angles. [*Only an algebraic solution will be accepted.*] [5,5]

38 In the diagram below, $\angle BDE$ and $\angle BCA$ are right angles, $\triangle ABC$ is similar to $\triangle EBD$, $BC = 12$, $AC = 9$, and $BD = 8$.



a Find DE. [2]

b Find BE. [2]

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

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

e Find the area of trapezoid $CAED$. [2]

39 Find three consecutive positive odd integers such that the square of the smallest exceeds twice the largest by 7. [*Only an algebraic solution will be accepted.*] [5,5]

40 *a* Copy and complete the truth table for the statement $(p \rightarrow q) \leftrightarrow (q \vee \sim p)$. [7]

p	q	$p \rightarrow q$	$\sim p$	$q \vee \sim p$	$(p \rightarrow q) \leftrightarrow (q \vee \sim p)$

b Why is $(p \rightarrow q) \leftrightarrow (q \vee \sim p)$ a tautology? [1]

c In $(p \rightarrow q \leftrightarrow q \vee \sim p)$, let p represent "We pollute the water." and let q represent, "The fish will die."

Which statement is logically equivalent to "If we pollute the water, then the fish will die?"

(1) The fish will die or we do not pollute the water.

(2) We pollute the water and the fish will die.

(3) If we do not pollute the water, then the fish will not die.

(4) If the fish die, then we pollute the water. [2]

41 The first step of an experiment is to pick one number from the set {1,2,3}. The second step of the experiment is to pick one number from the set {1,4,9}.

a Draw a tree diagram or list the sample space of all possible pairs of outcomes. [4]

b Determine the probability that:

(1) both numbers are the same [2]

(2) the second number is the square of the first [2]

(3) both numbers are odd [2]

42 The following data are heights (in centimeters) of a group of 15 students: 165, 160, 173, 150, 188, 150, 173, 155, 163, 152, 175, 183, 151, 163, 178.

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

Interval	Number (frequency)
180–189	
170–179	
160–169	
150–159	

b On graph paper, construct a frequency histogram based on the grouped data. [6]

c In what interval is the median for the grouped data? [2]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Tuesday, June 19, 1979 — 9:15 a.m. to 12:15 p.m., only

Part I 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

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FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, June 19, 1979 — 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.] For questions 22–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 3

(2) 7

(3) 80

(4) $\frac{c + b}{a}$

(5) 25

(6) 9

(7) 25

(8) 9

(9) 6

(10) $x(x - 7)$

(11) 90

(12) 3

(13) 80

(14) 2

(15) $\frac{2}{6}$

(16) 120

(17) $\frac{1}{36}$

(18) $\frac{3}{5}$

(19) 18

(20) $P \rightarrow \sim Q$

(21) 40

(22) 4

(23) 3

(24) 3

(25) 2

(26) 1

(27) 3

(28) 1

(29) 2

(30) 4

(31) 3

(32) 4

(33) 1

(34) 2

(35) 3

[OVER]

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Part II

Please refer to the Department's pamphlet *Suggestions on the Rating of Regents Examination Papers 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) Analysis [5]
$\angle A = 60°$
$\angle B = 30°$ [5]
$\angle C = 90°$

(38) *a* 6 [2]
b 10 [2]
c 54 [2]
d 24 [2]
e 30 [2]

(39) Analysis [5]
5,7,9 [5]

(40) *c* 1 [2]

(41) *b* (1) $\frac{1}{9}$ [2]
(2) $\frac{3}{9}$ [2]
(3) $\frac{4}{9}$ [2]

(42) *a*

Interval	Number
180–189	2
170–179	4
160–169	4
150–159	5

[2]

c 160–169 [2]