The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, June 20, 1983 — 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.

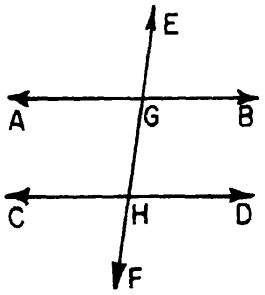
1 Solve for x: $2(x - 3) = 8$

2 If a certain number is decreased by 9, the result is 24. What is the number?

3 If one card is drawn from a standard deck of 52 playing cards, what is the probability the card is a red seven?

4 The selling price of a radio is $50, not including a sales tax at the rate of 7%. What is the sales tax on the purchase of the radio?

5 In the accompanying diagram, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, and $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ at G and $\overleftrightarrow{CD}$ at H. If the degree measure of $\angle AGH$ is $(3x - 10)$ and the degree measure of $\angle GHD$ is 80, find the value of x.



6 Express as a trinomial: $(3x - 1)(x + 2)$

7 Let p represent "I will go roller skating" and let q represent "The sun is shining." Using p and q, write in symbolic form: "I will go roller skating if and only if the sun is shining."

8 The side of a square is represented by $(x + 3)$. Express the perimeter of the square in terms of x.

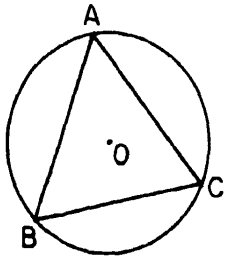
9 Factor: $64 - x^2$

10 Solve for x: $0.25x + 2 = 6$

11 What is the y-intercept of the graph of the equation $y = 3x - 5$?

12 The lengths of the sides of $\triangle ABC$ are 14, 11, and 4 centimeters. The longest side of similar triangle RST is 28 centimeters. Find the length in centimeters of the shortest side of $\triangle RST$.

13 As shown in the accompanying figure, equilateral triangle ABC is inscribed in circle O. Find the measure in degrees of minor arc AB.



14 The degree measures of the angles of a triangle are represented by $2x$, $3x$, and $4x$. Find the number of degrees in the *smallest* angle.

15 The following data are numbers of minutes a student spent on homework: 25, 35, 30, 50, and 38. What is the median of the data?

16 Solve for E in terms of I and R:

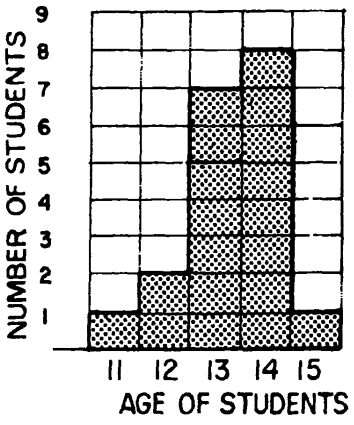
$$\frac{E}{I} = R$$

17 The lengths of the legs of a right triangle are 3 and 6. Find, in radical form, the length of the hypotenuse of the right triangle.

18 Solve for a: $\frac{a+2}{12} = \frac{5}{3}$

19 The circumference of a circle is 8π. What is the radius of the circle?

20 The accompanying histogram shows the distribution of student ages in a ninth grade class. Which age is the mode?



21 Express as a trinomial:

$(5x^2 + 2x - 3) - (2x^2 - 3x + 7)$

Directions (22–34): 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.

22 On a test the probability of getting the correct answer to a certain question is represented by $\frac{x}{7}$. Which can *not* be a value of x?

(1) 1 (3) 0

(2) −1 (4) 7

23 The expression $(-2)^2(\frac{1}{2})^3$ is equivalent to

(1) −2 (3) $\frac{1}{2}$

(2) 2 (4) $\frac{1}{32}$

24 The length of a rectangle is represented by x. If the width of the rectangle is 3 less than its length, which expression represents the area of the rectangle?

(1) $x(x - 3)$ (3) $2x - 6$

(2) $x^2 - 3$ (4) $2x + 6$

25 The value of 4! is

(1) 1 (3) 24

(2) 12 (4) 4

26 The expression $18x^6 \div 3x^3$ is equivalent to

(1) $15x^2$ (3) $6x^2$

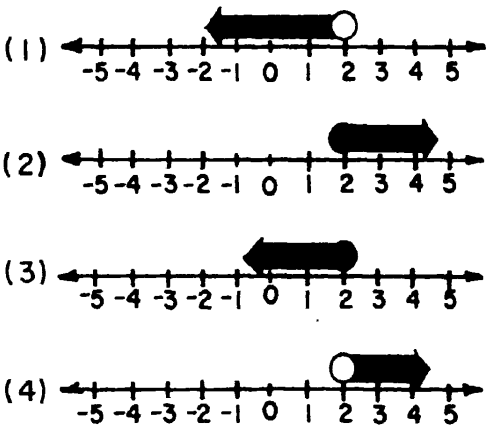
(2) $15x^3$ (4) $6x^3$

27 Which is the converse of the statement $p \rightarrow \sim q$?

(1) $p \rightarrow \sim q$ (3) $q \rightarrow \sim p$

(2) $\sim p \rightarrow \sim q$ (4) $\sim q \rightarrow p$

28 Which graph represents the solution set of $x \geq 2$?



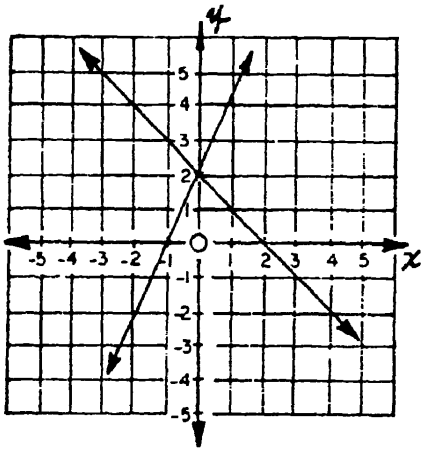
29 An equation of the line which is parallel to the x-axis and 3 units below the x-axis is

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

30 The area of a rectangle is represented by $x^2 + 2x - 3$. If the width of the rectangle is represented by $(x - 1)$, the length may be represented by

(1) $(x - 3)$ (3) $(x - 3)$
(2) $(x - 2)$ (4) $(x + 4)$

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



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

32 Which ordered pair is *not* in the solution set of $x - 2y \leq 6$?

(1) $(2,-2)$ (3) $(0,0)$
(2) $(5,1)$ (4) $(1,-6)$

33 For which value of x is the expression $\frac{x - 4}{x + 3}$ undefined?

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

34 Which statement is false when p is false and q is false?

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

Directions (35): Use compasses and straightedge. Leave all construction lines on the answer sheet.

35 *On the answer sheet*, construct an angle congruent to angle ABC, using $\overrightarrow{RS}$ as one ray of the angle.

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

$$y > -2x + 7$$
$$y \leq 3x - 3$$

[8]

b Write the coordinates of a point in the solution set of this system. [2]

37 The measure of the base of a parallelogram is 5 meters more than the measure of the altitude to that base. If the area of the parallelogram is 36 square meters, find the number of meters in the measures of the base and altitude. [*Only an algebraic solution will be accepted.*] [5,5]

38 For a class picnic, the school cafeteria prepared a box lunch for each student, consisting of a sandwich and a cookie. The sandwiches were tuna, ham, or peanut butter and the cookies were oatmeal or chocolate chip.

a Draw a tree diagram or list a sample space showing all possible combinations of one sandwich and one cookie that could be in the boxes. [4]

b If each combination was equally likely to be in any one of the boxes, what is the probability that a box chosen at random contains:

(1) a peanut butter sandwich and an oatmeal cookie [2]

(2) a ham sandwich [2]

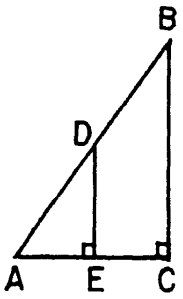
(3) a sandwich that is *not* tuna [2]

39 Solve the following system of equations algebraically and check:

$$3x + y = 4$$
$$x - 2y = 6$$

[8,2]

40 In the diagram below, triangle ABC is a right triangle with the right angle at C. Segment DE is perpendicular to $\overline{AC}$ at E. $BC = 5$, $AC = 6$, and $DE:BC = 1:2$.



a Find DE. [1]

b Find AB. [2]

c Find AE. [2]

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

e Find the area of trapezoid $ECBD$. [3]

41 The table below shows the distribution of scores of 30 students on a test.

Scores	Frequency	Cumulative Frequency
91–100	3	
81–90	11	
71–80	8	
61–70	6	
51–60	1	
41–50	1	

a Using the data in the Frequency column of the table, draw a frequency histogram. [4]

b *On your answer paper*, copy the table and complete the column for Cumulative Frequency. [2]

c Using the data in the Cumulative Frequency column of the table, draw a cumulative frequency histogram. [4]

☞ **GO RIGHT ON TO THE NEXT PAGE.**

42 *a On your answer paper*, copy and complete the truth table for the statement $\sim(p \vee q) \leftrightarrow (\sim p \wedge \sim q)$. [5]

p	q	$p \vee q$	$\sim(p \vee q)$	$\sim p$	$\sim q$	$(\sim p \wedge \sim q)$	$\sim(p \vee q) \leftrightarrow (\sim p \wedge \sim q)$
T	T						
T	F						
F	T						
F	F						

b Is $\sim(p \vee q) \leftrightarrow (\sim p \wedge \sim q)$ a tautology? [1]

c Justify the answer you gave in part *b*. [1]

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SEQUENTIAL MATH — COURSE I

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Part I Score: .....

Rater's Initials:

.....

ANSWER SHEET

Pupil .....Teacher.....

School .....Grade.....

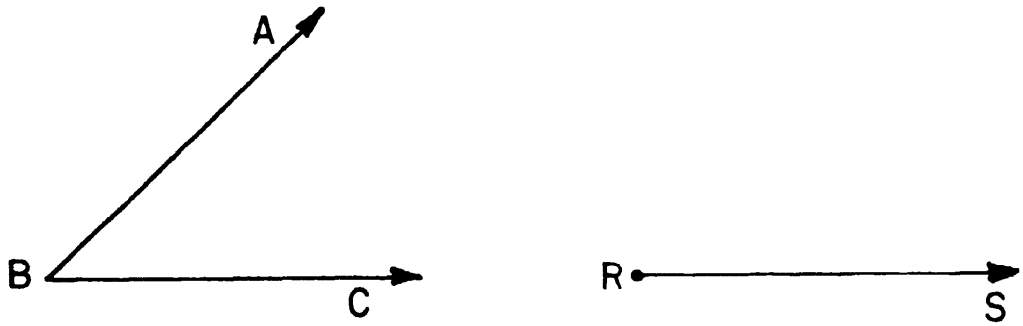
Your answers to Part I should be recorded on this answer sheet.

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 **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

D

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, June 20, 1983 — 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 22–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 7

(2) 33

(3) $\frac{2}{52}$

(4) \$3.50 *or* 3.50

(5) 30

(6) $3x^2 + 5x - 2$

(7) $p \leftrightarrow q$

(8) $4x + 12$

(9) $(8 + x)(8 - x)$

(10) 16

(11) -5

(12) 8

(13) 120

(14) 40

(15) 35

(16) IR

(17) $\sqrt{45}$

(18) 18

(19) 4

(20) 14

(21) $3x^2 + 5x - 10$

(22) 2

(23) 3

(24) 1

(25) 3

(26) 4

(27) 4

(28) 2

(29) 1

(30) 3

(31) 2

(32) 4

(33) 2

(34) 1

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]
$b = 9$ [5]
$h = 4$

(38) b (1) $\frac{1}{6}$ [2]
(2) $\frac{2}{6}$ [2]
(3) $\frac{4}{6}$ [2]

(39) $x = 2$ [8]
$y = -2$
Check [2]

(40) a 4 [1]
b 10 [2]
c 3 [2]
d 24 [2]
e 18 [3]

(41) c A column for "cumulative relative frequency" is *not* required.

(42) b yes [1]