The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, January 24, 1983 — 1:15 to 4:15 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 The probability of rain tomorrow is 40%. What is the probability that it will *not* rain tomorrow?

2 Solve for y: $3(y - 1) = 9$

3 Solve for m: $\frac{m}{15} = \frac{2}{3}$

4 If $x = 6$ and $y = 3$, what is the sum of $\frac{4}{x} + \frac{1}{y}$?

5 A tree 10 meters in height casts a shadow 25 meters long. At the same time, a person casts a shadow 5 meters long. What is the number of meters in the height of the person?

6 Solve for y in terms of a, b, and x:
$ay - bx = 2$

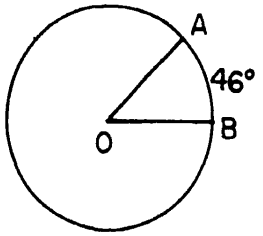
7 Solve for x: $0.03x = 36$

8 There are 3 ways of going from town A to town B and 6 ways of going from town B to town C. Find the total number of ways a person can go from town A to town B to town C.

9 Express the *sum* of $(4x - 2)$ and $(3 - x)$ as a binomial.

10 A bag contains 2 green marbles, 4 blue marbles, and 5 red marbles. If one marble is drawn at random from the bag, what is the probability that it will be green?

11 In the accompanying diagram, the measure of arc AB in circle O is 46°. Find the measure in degrees of angle AOB.



12 Solve the following system of equations for x:

$$3x + y = 5$$
$$2x - y = 0$$

13 Factor: $x^2 - 7x + 10$

14 The measures of the angles of a triangle are represented by x, $2x$, and $(x + 20)$. Find the number of degrees in the measure of the *smallest* angle of the triangle.

15 Express as a binomial: $3x^2(2x - 5)$

16 Two angles are supplementary and congruent. How many degrees are in the measure of each angle?

17 What percent of 200 is 14?

18 The length of the edge of a cube is represented by e. Express the volume of the cube in terms of e.

19 Factor: $9x^2 - 1$

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20 Find the length of the radius of a circle whose circumference is 18π.

21 A fair coin and a fair die are tossed simultaneously. What is the total number of possible outcomes in the sample space?

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 value of π is
(1) rational and equal to 3.14
(2) irrational and equal to 3.14
(3) rational and between 3.14 and 3.15
(4) irrational and between 3.14 and 3.15

23 The largest possible value of x in the solution set of $2x + 1 \leq 7$ is
(1) 6 (3) 3
(2) 2 (4) 4

24 Let p represent "I am 18," and let q represent "I am going to college." Which statement is represented by $p \rightarrow q$?
(1) I am 18 and I am not going to college.
(2) If I am 18, then I am going to college.
(3) I am not 18 and I am not going to college.
(4) If I am going to college, then I am 18.

25 If p represents the statement "It is cold" and q represents the statement "It is winter," which represents "It is cold and it is not winter"?
(1) $p \rightarrow q$ (3) $p \wedge q$
(2) $p \vee \sim q$ (4) $p \wedge \sim q$

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

27 The graph of which equation has a slope of 2?
(1) $y = 2x - 3$ (3) $y = 3x - 2$
(2) $y = -2x + 3$ (4) $y = -3x + 2$

28 Which point does *not* lie on the graph of $x - 2y = 10$?
(1) $(0,-5)$ (3) $(5,0)$
(2) $(2,-4)$ (4) $(6,-2)$

29 If two rectangles have equal perimeters, which statement *must* be true?
(1) The rectangles have equal areas.
(2) The rectangles are squares.
(3) The lengths of the rectangles are equal.
(4) The sum of the length and width of one rectangle is equal to the sum of the length and width of the other.

30 The equation $5x + 10 = 55$ has the same solution set as the equation
(1) $x = 45$ (3) $5x = 65$
(2) $x + 10 = 11$ (4) $5x + 15 = 60$

31 The scores on a test were 75, 75, 85, 90, and 100. Which statement about these scores is true?
(1) The mean and the median are the same.
(2) The mode is greater than the median.
(3) The mode is greater than the mean.
(4) The mean is less than the median.

32 When $3x^2$ is multiplied by $-5x^3$, the product is
(1) $-15x^6$ (3) $-8x^5$
(2) $-15x^5$ (4) $15x^5$

33 Which inequality is represented by the graph below?

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

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34 The solution set of $x^2 - 2x - 8 = 0$ is

(1) $\{-6,2\}$
(2) $\{4,2\}$
(3) $\{-4,2\}$
(4) $\{4,-2\}$

35 The sum of $\sqrt{2}$ and $3\sqrt{2}$ is

(1) $3\sqrt{2}$
(2) $4\sqrt{2}$
(3) $3\sqrt{4}$
(4) $4\sqrt{4}$

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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 On the same set of coordinate axes, graph the following system of inequalities and label the solution set S.

$$y > x + 1$$
$$x \leq -1$$ [8,2]

37 Solve algebraically and check:

$$2c - d = -1$$
$$c + 3d = 17$$ [8,2]

38 Jim bought 3 packets of vegetable seeds: beans, carrots, and radishes; and two packets of flower seeds: marigolds and petunias. Finding that his garden was too small, he decided to give away one packet of vegetable seeds and one packet of flower seeds, each selected randomly.

a Draw a tree diagram or list all possible pairs of packets in the sample space that he might select to give away. [4]

b Find the probability that he did *not* give away the packet of bean seeds. [2]

c Find the probability that he gave away two packets of vegetable seeds. [2]

d Find the probability that he gave away the packet of petunia seeds. [2]

39 The length of a rectangle is 3 more than three times the width. The perimeter of the rectangle is 62.

a Find the length and width of the rectangle. [*Only an algebraic solution will be accepted.*] [4,4]

b Find the area of the rectangle. [2]

40 The sum of the squares of two consecutive positive even integers is 52. Find the integers. [*Only an algebraic solution will be accepted.*] [4,6]

41 Answer *both a and b.*

a Given the inequality: $8x \geq 3(x - 5)$

(1) Solve for x. [4]

(2) Choose one value of x from your solution in part (1), and show that it makes the inequality $8x \geq 3(x - 5)$ true. [2]

b On your answer paper, copy and complete the truth table for the statement $(p \rightarrow q) \leftrightarrow (p \vee q)$. [4]

p	q	$p \rightarrow q$	$p \vee q$	$(p \rightarrow q) \leftrightarrow (p \vee q)$
T	T			
T	F			
F	T			
F	F			

42 The points scored by Rosa in twenty basketball games are 35, 33, 27, 35, 29, 37, 32, 35, 35, 32, 23, 37, 32, 29, 26, 30, 28, 31, 29, 35.

a Find the mode. [2]

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

Interval	Tally	Frequency
35–37		
32–34		
29–31		
26–28		
23–25		

c Construct a frequency histogram based on the table completed in part *b*. [4]

d In what interval does the median lie? [2]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Monday, January 24, 1983 — 1:15 to 4:15 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

Monday, January 24, 1983 — 1:15 to 4:15 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 22–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 60%	(11) 46	(21) 12	(31) 1
(2) 4	(12) 1	(22) 4	(32) 2
(3) 10	(13) $(x - 5)(x - 2)$	(23) 3	(33) 2
(4) 1	(14) 40	(24) 2	(34) 4
(5) 2	(15) $6x^3 - 15x^2$	(25) 4	(35) 2
(6) $\frac{bx + 2}{a}$	(16) 90	(26) 1	
(7) 1,200	(17) 7	(27) 1	
(8) 18	(18) e^3	(28) 3	
(9) $3x + 1$	(19) $(3x + 1)(3x - 1)$	(29) 4	
(10) $\frac{2}{11}$	(20) 9	(30) 4	

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) $d = 5$ [5]
$c = 2$
Check [2]

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

c 0 [2]

d $\frac{3}{6}$ [2]

(39) *a* Analysis [4]
$w = 7$ [4]
$l = 24$
b 168 [2]

(40) Analysis [4]
4,6 [6]

(41) *a* (1) $x \geq -3$ [4]

(42) *a* 35 [2]
d 32–34 [2]