The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, January 25, 2000 — 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.

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 If $x = 3$ and $y = 2$, evaluate $x^2 y$.

2 Solve for y: $2.5(y + 2) - 1.5y = 6$

3 Hal has 5 pairs of shorts, 12 shirts, and 2 pairs of sandals. What is the total number of different outfits of a pair of shorts, a shirt, and a pair of sandals that he can wear?

4 The sides of a triangle are represented by $2a$, $3a - 4b$, and $a + 2b$. Express the perimeter of the triangle as a binomial in terms of a and b.

5 Factor: $x^2 - 25$

6 In the accompanying diagram, transversal t intersects parallel lines a and b, $m\angle 1 = 4x + 10$, and $m\angle 2 = 14x - 30$. Find the value of x.
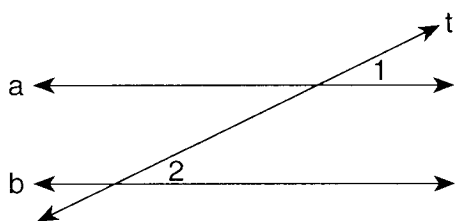
7 Solve for p in terms of x, y, and c: $cp - x = y$

8 Solve for y: $2(5 - y) = 5(y - 5)$

9 An astronaut weighs 174 pounds on Earth and 29 pounds on the Moon. If his daughter weighs 108 pounds on Earth, what is the daughter's weight on the Moon, in pounds?

10 The number of degrees in the measures of the angles of a triangle are represented by x, $3x + 7$, and $4x + 5$. Find the value of x.

11 Each letter in the word "MATH" is printed on a separate card. What is the probability of randomly selecting a card with a letter that has line symmetry?

12 In the accompanying diagram, $ABCD$ is a rectangle. If $DB = 10$ and $DC = 8$, find BC.
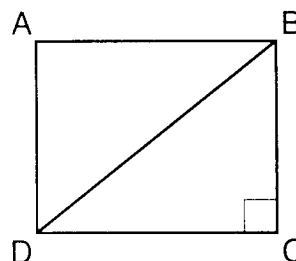

13 In a basketball game, 15 of 20 foul shots that Michelle attempted were successful. What percent of her shots were *not* successful?

Directions (14–35): 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.

14 The expression $\dfrac{15x^3 y^2}{3xy}$, $x \neq 0$, $y \neq 0$, is equivalent to

(1) $5x^2 y$ (3) $12x^2 y$

(2) $5x^4 y^3$ (4) $18x^4 y^3$

15 In the accompanying graph, the color of the pants worn by the students in a class is shown.

Color of Pants
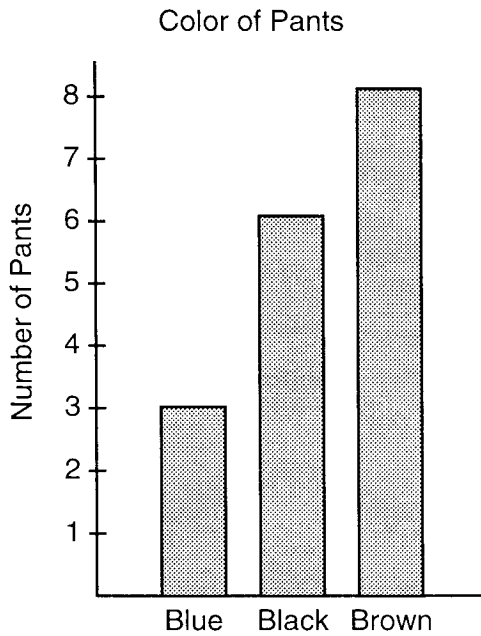
What is the probability that a student selected at random from the class is wearing black pants?

(1) $\frac{1}{2}$ (3) $\frac{6}{6}$

(2) $\frac{1}{3}$ (4) $\frac{6}{17}$

16 The value of 5! is

(1) 20   (3) 80
(2) 60   (4) 120

17 If p is true and q is false, which statement must also be true?

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

18 The sum of $2\sqrt{3}$ and $\sqrt{27}$ is

(1) $11\sqrt{3}$ (3) $5\sqrt{3}$
(2) $3\sqrt{30}$ (4) $4\sqrt{3}$

19 Which expression represents a rational number?

(1) π (3) $\sqrt{7}$
(2) $\sqrt{3}$ (4) $\sqrt{16}$

20 Which transformation is represented by the illustration?

$$A \rightarrow A$$
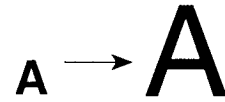
(1) reflection   (3) translation
(2) dilation   (4) rotation

21 Which value for n will make the expression $\frac{6}{2n+4}$ undefined?

(1) –2   (3) 6
(2) 2   (4) –4

22 If the converse of a given statement is $q \rightarrow \sim p$, what is the given statement?

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

23 Which ordered pair is the solution of this system of equations?

$$3x + 2y = 4$$
$$-2x + 2y = 24$$

(1) $(-4,8)$ (3) $(2,-1)$
(2) $(-4,-8)$ (4) $(2,-5)$

24 The greatest common monomial factor of $12x^2$ and $8x^3$ is

(1) $96x^5$ (3) $8x^3$
(2) $12x^2$ (4) $4x^2$

25 The expression $(3x + 4)(2x - 6)$ is equivalent to

(1) $6x^2 - 24$ (3) $3x^2 - 12x - 24$
(2) $6x^2 - 10x - 24$ (4) $2x^2 + 8x - 24$

26 What is the multiplicative inverse of $-\frac{5}{6}$?

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

27 In which set of data is the mean greater than the median?

(1) 2,5,6,8,8   (3) 2,4,5,6,6,7
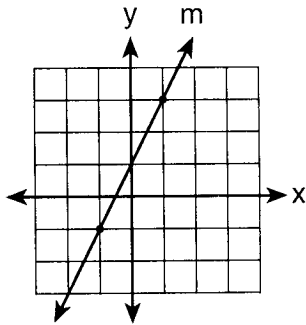(2) 2,3,5,6,7,8 (4) 2,4,4,5,6,7,8

28 The sum of $\frac{4x}{5}$ and $\frac{2x}{3}$ is

(1) $\frac{8x^2}{15}$ (3) $\frac{6x}{8}$

(2) $\frac{22x}{15}$ (4) $\frac{22x}{8}$

29 If the circumference of a circle is 8π, what is the area of the circle?

(1) 64π (3) 16π
(2) 8π (4) 4π

30 The diagram below shows the graph of line m.

Which equation represents this line?

(1) $y = 2x + 1$ (3) $y = -2x + 1$
(2) $y = \frac{1}{2}x + 2$ (4) $y = -\frac{1}{2}x + 2$

31 A rectangular prism (solid) has a length of 5 feet, a width of 4 feet, and a height of 3 feet. The number of square feet in the area of a face of the prism can *not* be

(1) 9   (3) 15
(2) 12   (4) 20

32 Which quadrilateral has only one pair of parallel sides?

(1) parallelogram   (3) rhombus
(2) rectangle   (4) trapezoid

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

(1) {3,−1}   (3) {−3,−1}
(2) {−3,1}   (4) {3,1}

34 The slope of the graph of the equation $x = 3$ is

(1) 1   (3) 3
(2) 0   (4) undefined

35 Two supplementary angles are in the ratio 5:4. The number of degrees in the *smaller* angle is

(1) 100   (3) 40
(2) 80   (4) 20

SEQUENTIAL MATH – COURSE I

Tuesday, January 25, 2000 — 1:15 to 4:15 p.m., only

Part I Score	. . . .
Part II Score	. . . .
Total Score	. . . .
Rater's Initials:	. . . .

ANSWER SHEET

Pupil . . . .   Sex: ☐ Male ☐ Female   Grade . . . .

Teacher . . . .   School . . . .

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.

_____

Signature

Tear Here

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

Part II

Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 Let p represent: "$ABCD$ is a square."
Let q represent: "$ABCD$ is a parallelogram."

a Using p and q, write this statement in symbolic form: "If $ABCD$ is a square, then $ABCD$ is a parallelogram." [1]

b Write the inverse of the statement in part a in symbolic form. [2]

c Construct a truth table for each statement written in parts a and b. [7]

37 The chart below shows the result of a survey taken of one section of an arena at a concert. People were asked their ages as they were seated.

a Construct a frequency histogram for the frequency table below. [4]

| Age	Frequency
0–5	18
6–10	23
11–15	12
16–20	8
21–25	12
26–30	15
31–35	7
36–40	5

b What is the total number of people who were less than 16 years old? [2]

c What is the probability that a person chosen at random is older than 25? [2]

d Which interval contains the median? [2]

38 a On the same set of coordinate axes, graph the following lines.

(1) $y = 2$ [1]
(2) $y = 6$ [1]
(3) $y = 2x + 12$ [3]
(4) $y = 2x - 12$ [3]

b Find the area of the parallelogram formed by these lines. [2]

39 In the accompanying diagram, isosceles right triangle ACB is inscribed in a semicircle with a diameter of length 32. Find the area of the shaded region in terms of π. [10]
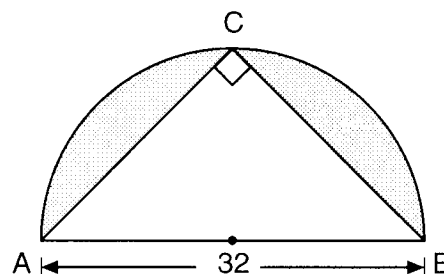
40 There are only three flavors of gumdrops in a jar containing 40 gumdrops. There are 3 times as many cherry gumdrops as lemon gumdrops. There are 4 more than twice as many orange gumdrops as lemon gumdrops.

a How many gumdrops of each flavor are in the jar? [*Only an algebraic solution will be accepted.*] [6]

b Two gumdrops are drawn at random without replacement. Find the probability that both are the same flavor. [4]

41 At the Happyland Day Care Center, the length of the rectangular sandbox is 4 feet longer than the width.

a Find the number of feet in the length and the width of the sandbox if the area is 140 square feet. [*Only an algebraic solution will be accepted.*] [8]

b Find the number of feet in the perimeter of the sandbox. [2]

42 The senior class at Northwest High School needed to raise money for the yearbook. A local sporting goods store donated hats and T-shirts. The number of T-shirts was three times the number of hats. The seniors charged $5 for each hat and $8 for each T-shirt. If the seniors sold everything and raised $435, what was the total number of hats and the total number of T-shirts that were sold? [*Show or explain the procedure used to obtain your answer.*] [10]

FOR TEACHERS ONLY

SCORING KEY

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 14–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 18	(11) 1	(21) 1	(31) 1
(2) 1	(12) 6	(22) 3	(32) 4
(3) 120	(13) 25	(23) 1	(33) 1
(4) $6a - 2b$	(14) 1	(24) 4	(34) 4
(5) $(x + 5)(x - 5)$	(15) 4	(25) 2	(35) 2
(6) 4	(16) 4	(26) 3	
(7) $\frac{y + x}{c}$	(17) 2	(27) 4	
(8) 5	(18) 3	(28) 2	
(9) 18	(19) 4	(29) 3	
(10) 21	(20) 2	(30) 1	

[OVER]

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics,* 1996 Edition. 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.

(36) a $p \rightarrow q$ [1]

     b $\sim p \rightarrow \sim q$ [2]

(37) b 53   [2]

     c $\frac{27}{100}$ [2]

     d 11–15   [2]

(38) b 48   [2]

(39) $128\pi - 256$ [10]

(40) a 6 lemon

        16 orange   [6]

        18 cherry

     b $\frac{576}{1560}$ [4]

(41) a width = 10

        length = 14   [8]

     b 48   [2]

(42)   15 hats

      45 T-shirts   [10]

As a reminder . . .

Regents examinations based on the Sequential Mathematics, Course I, syllabus will not be offered after January 2002.