The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, June 22, 1999 — 1:15 to 4:15 p.m., only

Notice . . .

Scientific calculators must be available to all students taking this examination.

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 David has 7 blue pens, 6 black pens, and 5 red pens in his desk drawer. If he selects a pen at random, what is the probability that it will be either blue or black?

2 Solve for x: $0.05x - 2 = 8$

3 Let p represent "The Sun is shining," and let q represent "Jaclyn is swimming." Using p and q, write in symbolic form, "If Jaclyn is not swimming, then the Sun is not shining."

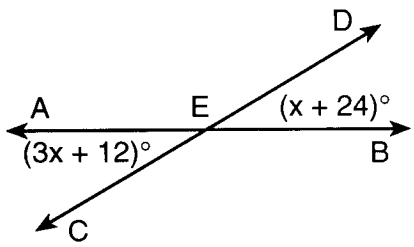
4 Solve for x: $\frac{x-2}{8} = \frac{5}{4}$

5 Solve for x: $3x + 3 = 15 + 9x$

6 Express the sum of $4x^2 - 3x + 2$ and $-2x^2 + 7x + 3$ as a trinomial.

7 The lengths of the sides of $\triangle ABC$ are 4, 5, and 6. If the length of the longest side of similar triangle DEF is 18, find the length of the *shortest* side of $\triangle DEF$.

8 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at point E. If $m\angle AEC = 3x + 12$ and $m\angle DEB = x + 24$, find the value of x.

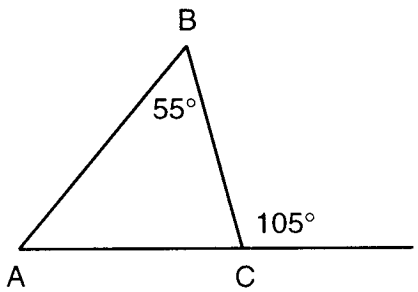


9 If x varies directly as y and $x = 10$ when $y = 3$, find x when $y = 12$.

10 Solve the following system of equations for x:

$$x - 2y = 5$$
$$3x + 2y = 23$$

11 In $\triangle ABC$ below, $m\angle B = 55$ and an exterior angle at C measures 105°. What is $m\angle A$?



12 A boy knows a telephone number begins with 777 and that the last four digits are 1, 2, 3, and 4, but he does not know their order. What is the maximum number of calls he would have to make to get the right number?

13 Two angles are complementary. The measure of one angle is twice as large as the measure of the other angle. What is the total number of degrees in the measure of the *smaller* angle?

14 In an isosceles triangle, the measure of a base angle is 65°. Find the number of degrees in the measure of the vertex angle.

Directions (15–35): 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.

15 If $a = 2$ and $b = -1$, the expression $3ab^2$ is equal to

(1) 6
(2) 12
(3) 36
(4) −12

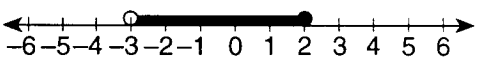
16 The distance from the Sun to the planet Neptune is about 2,790,000,000 miles. Expressed in scientific notation, this distance in miles is

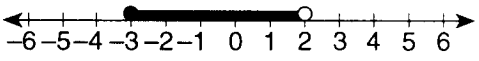
(1) 2.79×10^9
(2) 2.79×10^{-9}
(3) 27.9×10^7
(4) 27.9×10^{-7}

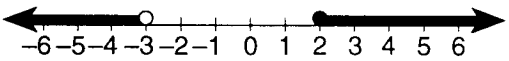
17 Marcia has 5 blouses, 4 pairs of pants, and 3 pairs of shoes. How many different outfits made up of 1 blouse, 1 pair of pants, and 1 pair of shoes are possible for her to wear?

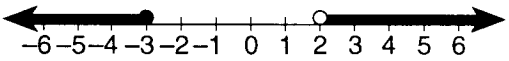
(1) 12
(2) 19
(3) 23
(4) 60

18 Which graph represents the inequality $-3 < x \leq 2$?

(1) 

(2) 

(3) 

(4) 

19 In the diagram below, figure B is the image of figure A under which transformation?

(1) line reflection
(2) rotation
(3) translation
(4) dilation

20 What is the slope of the graph of the equation $y = \frac{1}{2}x - 7$?

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

21 If a parallelogram has a base of $6x$ and a height of $2x$, what is the area of the parallelogram in terms of x?

(1) $12x$
(2) $16x$
(3) $12x^2$
(4) $16x^4$

22 The chart below shows how the cost of a specific notebook varied over a 5-week period.

Week	Cost
1	$5.00
2	$5.25
3	$3.00
4	$3.50
5	$4.75

Based on the chart, which statement is true about the cost of this notebook over this period?

(1) The mode was $3.00.
(2) The mean was $4.30.
(3) The median was $4.50.
(4) The median was $3.00.

23 If the radius of a circle is doubled, what change takes place in the circumference of the circle?

(1) It remains the same.
(2) It is multiplied by 2.
(3) It is multiplied by 4.
(4) It is multiplied by 8.

24 If $(x - 13)$ is one factor of $x^2 - 9x - 52$, the other factor is

(1) $(x + 4)$
(2) $(x - 4)$
(3) $(x + 5)$
(4) $(x - 39)$

25 Which type of symmetry does the letter **H** have?

(1) line symmetry, only
(2) point symmetry, only
(3) both point and line symmetry
(4) neither point nor line symmetry

26 Given two statements: $x \rightarrow y$ and $\sim x \rightarrow \sim y$. In which way is the second statement related to the first?

(1) converse
(2) contrapositive
(3) inverse
(4) biconditional

27 Which property is illustrated by the equation $-8 + 0 = -8$?

(1) additive inverse
(2) additive identity
(3) commutative property
(4) distributive property

28 The expression $\sqrt{8} - \sqrt{50}$ is equivalent to

(1) $-7\sqrt{2}$
(2) $-\sqrt{42}$
(3) $-3\sqrt{2}$
(4) $5\sqrt{2}$

29 Dawn is 3 years older than her sister Sara. If Dawn's age is represented by x, which expression represents Sara's age?

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

30 If the lengths of the legs of a right triangle are 3 and 8, what is the length of the hypotenuse?

(1) $\sqrt{5}$
(2) $\sqrt{11}$
(3) $\sqrt{55}$
(4) $\sqrt{73}$

31 When $8x^4 - 8x$ is divided by $8x$, the quotient is

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

32 Which point is *not* on the line $2x - y = 3$?

(1) (1,–1)
(2) (–1,–5)
(3) (3,–3)
(4) (7,11)

33 If the diagonals of a parallelogram are perpendicular but *not* congruent, then the parallelogram is

(1) a rectangle
(2) a rhombus
(3) a square
(4) an isosceles trapezoid

34 In the table below, which interval contains the upper quartile?

Interval	Frequency
91–100	3
81–90	5
71–80	4
61–70	5
51–60	3

(1) 51–60
(2) 71–80
(3) 81–90
(4) 91–100

35 What is the solution set of $y^2 - y - 12 = 0$?

(1) {3,4}
(2) {3,–4}
(3) {–12,1}
(4) {–3,4}

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

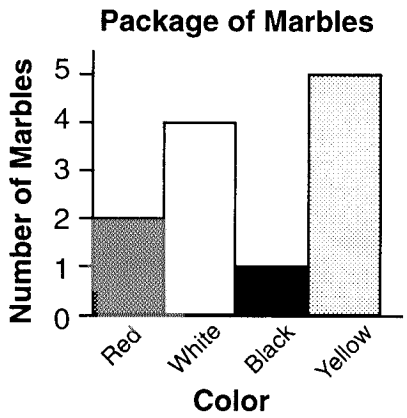
Part II

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 Solve the following system of equations algebraically and check.

$$\frac{2}{3}x + y = 13$$
$$-x + 2y = 5$$ [8,2]

37 Adam bought a package of marbles and sorted all of them by color as shown in the accompanying graph.



a What was the total number of marbles in the package? [1]

b If one marble was selected at random, find the probability that it was red, black, or yellow. [1]

c If two marbles were selected at random, with replacement, find the probability that

(1) the first marble was red and the second was yellow [2]

(2) one of the two marbles was blue [1]

d If two marbles were selected at random, *without* replacement, find the probability that

(1) two red marbles were selected [2]

(2) neither marble selected was red or black [3]

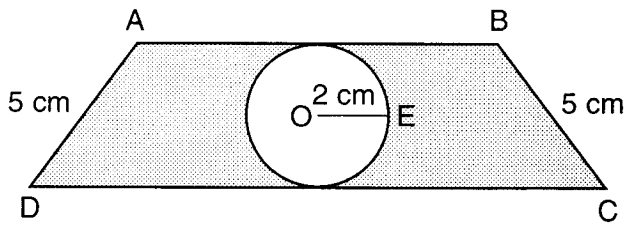
38 *a* On the same set of coordinate axes, graph this system of inequalities:

$$3y \geq 2x - 6$$
$$x + y > 7$$ [8]

b Based on the graph drawn in part *a*, write the coordinates of a point in the solution set of this system of inequalities. [2]

39 Linda's Video Store sold three times as many *Titanic* tapes as *Godzilla* tapes. The price of a *Titanic* tape is \$20 and the price of a *Godzilla* tape is \$15. If her total sales for these tapes was \$2250, what is the total number of each video that she sold? [*Show or explain the procedure used to obtain your answer.*] [10]

40 In the accompanying diagram, the length of each leg of isosceles trapezoid $ABCD$ is 5 centimeters. The length of $\overline{DC}$ is 6 centimeters longer than the length of $\overline{AB}$, and the perimeter of trapezoid $ABCD$ is 36 centimeters. Circle O is inscribed in the trapezoid. Radius OE equals 2 centimeters. Find the area of the shaded region to the *nearest tenth of a square centimeter.* [10]



41 Find two consecutive integers such that the sum of three times the larger and twice the square of the smaller is 12. [*Only an algebraic solution will be accepted.*] [4,6]

GO RIGHT ON TO THE NEXT PAGE.

42 *a* *On your answer paper,* copy and complete the truth table for the tautology below. [8]

p	q	$\sim p$	$q \rightarrow p$	$\sim(q \rightarrow p)$	$\sim p \wedge q$	$\sim(q \rightarrow p) \leftrightarrow (\sim p \wedge q)$
						T
						T
						T
						T

Let p represent "I will bake a cake" and let q represent "Company comes."

b Based on the tautology in part *a*, which sentence is equivalent to "It is not true that if company comes, then I will bake a cake"? [2]

(1) If I do not bake a cake, then company comes.
(2) I do not bake a cake or company comes.
(3) I do not bake a cake and company comes.
(4) If company comes, then I will bake a cake.

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Tuesday, June 22, 1999 — 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.

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

Tear Here

Tear Here

Tear Here

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, June 22, 1999 — 1:15 to 4:15 p.m., 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 15–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{13}{18}$

(2) 200

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

(4) 12

(5) –2

(6) $2x^2 + 4x + 5$

(7) 12

(8) 6

(9) 40

(10) 7

(11) 50

(12) 24

(13) 30

(14) 50

(15) 1

(16) 1

(17) 4

(18) 1

(19) 2

(20) 1

(21) 3

(22) 2

(23) 2

(24) 1

(25) 3

(26) 3

(27) 2

(28) 3

(29) 4

(30) 4

(31) 4

(32) 3

(33) 2

(34) 3

(35) 4

[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) (9,7) [8]
Check [2]

(37) *a* 12 [1]
b $\frac{8}{12}$ [1]
c (1) $\frac{10}{144}$ [2]
(2) 0 [1]
d (1) $\frac{2}{132}$ [2]
(2) $\frac{72}{132}$ [3]

(39) 30 *Godzilla* tapes
90 *Titanic* tapes [10]

(40) 39.4 [10]

(41) Analysis [4]
–3,–2 [6]

(42) *b* 3 [2]

As a reminder . . .

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