The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 14, 1996 — 8:30 to 11:30 a.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 If 3 times a number is decreased by 5, the result is 7. Find the number.

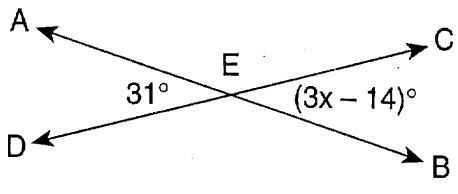
2 Let p represent "Mr. Sanchez teaches mathematics" and let q represent "Mr. Sanchez coaches the soccer team." Using p and q, write in symbolic form: "If Mr. Sanchez teaches mathematics, then he does not coach the soccer team."

3 Express 7.8×10^3 as an integer.

4 What is the probability that a digit chosen at random from the set {1,2,3,4,5,6,7,8} will be a number divisible by 3?

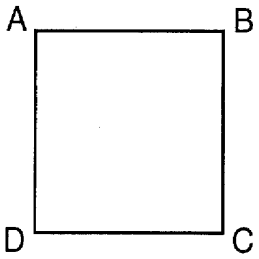
5 Let p represent "I am well prepared" and let q represent "I will succeed." Using p and q, write in symbolic form: "I am well prepared and I will succeed."

6 In the accompanying diagram, lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at point E. If $m\angle CEB = 3x - 14$ and $m\angle AED = 31$, find the value of x.



7 The volume of a rectangular solid is 24 cubic centimeters. If the width is 2 centimeters and the length is 3 centimeters, what is the height, in centimeters, of the solid?

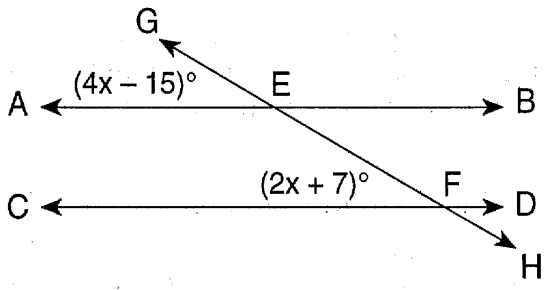
8 In the accompanying figure, $ABCD$ is a square, $AB = 5x - 10$, and $BC = 2x + 20$. Find the value of x.



9 A school building has 8 entry doors on the first floor and 3 stairways to the second floor. In how many different ways can a person enter the building and go to the second floor?

10 A tree casts a shadow 30 feet long at the same time that a boy 5 feet tall casts a shadow 3 feet long. Find the height, in feet, of the tree.

11 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect transversal $\overleftrightarrow{GH}$ at points E and F, respectively. If $m\angle AEG = 4x - 15$ and $m\angle CFE = 2x + 7$, find the value of x.



12 If $-18x^4y$ is divided by $-2xy$, what is the quotient?

13 Three numbers are represented by $2x$, $3x$, and $4x$. Find the value of x if the mean of the three numbers is 15.

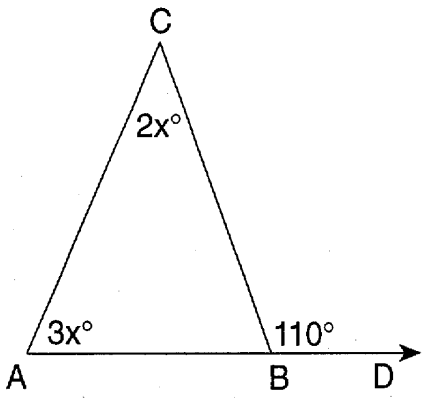
14 Solve for x: $4(x + 3) = 2x - 8$

15 Solve the following system of equations for x:

$$2x + y = 10$$
$$3x - y = 15$$

16 Write in symbolic form the inverse of $s \rightarrow \sim t$.

17 In the accompanying diagram, the measure of exterior angle CBD is 110°. If the measures of the two nonadjacent interior angles are represented by $3x°$ and $2x°$, find the value of x.



18 Find the sum of $4a^2 - 7a - 5$ and $-8a^2 - 2a + 7$.

19 Solve the equation $2x^2 - 98 = 0$ for the positive value of x.

Directions (20–35): 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.

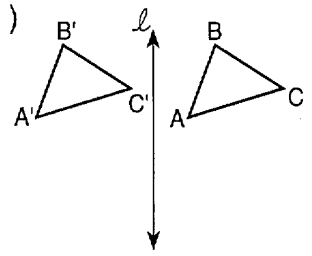
20 Which inequality is the solution of $x + 78 \geq 14$?

(1) $x \geq 92$
(2) $x \geq 64$
(3) $x \geq -64$
(4) $x \leq -92$

21 If $cx - d = f$, then x is equal to

(1) $f + d - c$
(2) $\frac{f - d}{c}$
(3) $d + f$
(4) $\frac{f + d}{c}$

22 Which diagram represents a reflection in line ℓ?

(1)


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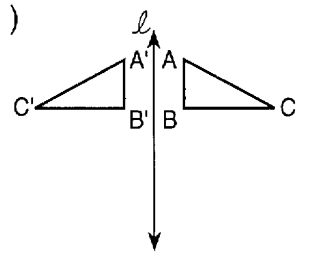

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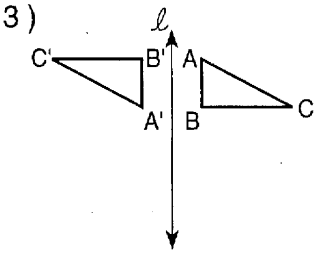

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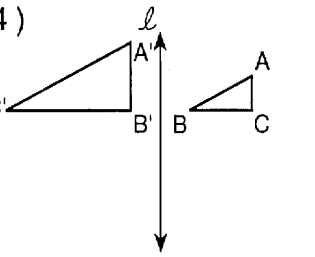


23 Which equation represents a line whose slope is $\frac{1}{2}$ and whose y-intercept is 3?

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

24 The value of $\frac{6!}{2!}$ is

(1) 360
(2) 180
(3) 24
(4) 6

25 If y is an integer, what is the solution set of $-3 \leq y < 2$?

(1) {–3,–2,–1,0,1}
(2) {–2,–1,0,1,2}
(3) {–3,–2,–1}
(4) {0,1}

26 Tickets for a music concert were purchased at the rate of 500 tickets in 20 minutes. At this rate, how many tickets were purchased in m minutes?

(1) $\frac{1}{25}m$
(2) $25m$
(3) $50m$
(4) $500m$

27 A 3-inch × 5-inch photograph is enlarged so that each side is doubled. What is the number of square inches in the area of the enlarged photograph?

(1) 15
(2) 16
(3) 30
(4) 60

28 When $x = 2$ and $y = 0.5$, which expression has the largest value?

(1) $x - y$
(2) $x + y$
(3) $x \div y$
(4) $x \bullet y$

29 Which shape has the greatest number of lines of symmetry?

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

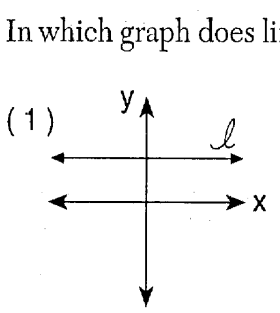
30 What is the multiplicative inverse of $\frac{x}{2}$?

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

31 Expressed as a single fraction, $\frac{5a}{2} - \frac{a}{3}$ is equivalent to

(1) $\frac{5}{6}$
(2) $\frac{4a}{6}$
(3) $\frac{13a}{6}$
(4) $2a$

32 In which graph does line ℓ have a negative slope?

(1)


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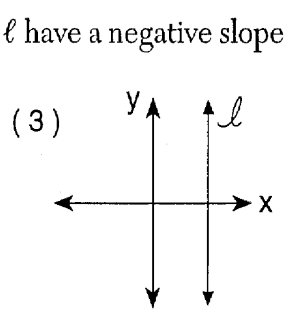

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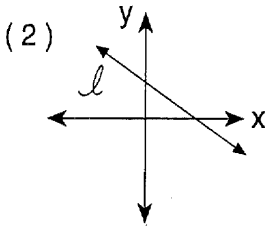

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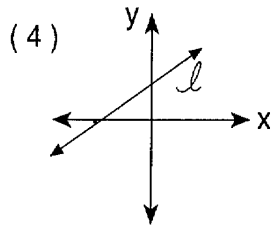


33 What is $5\sqrt{2} - \sqrt{18}$ expressed in simplest radical form?

(1) $2\sqrt{2}$
(2) $-2\sqrt{2}$
(3) $8\sqrt{2}$
(4) $-8\sqrt{2}$

34 If the lengths of the legs of a right triangle are 12 and 16, the length of the hypotenuse is

(1) 20
(2) 28
(3) 400
(4) $\sqrt{28}$

35 If two supplementary angles are in the ratio 4:5, the measure of the larger angle is

(1) 20°
(2) 80°
(3) 100°
(4) 120°

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 If the length of one side of a square is tripled and the length of an adjacent side is increased by 10, the resulting rectangle has an area that is 6 times the area of the original square. Find the length of a side of the original square. [10]

37 Construct and complete the truth table for the statement $(p \rightarrow q) \leftrightarrow \sim(p \wedge \sim q)$. [10]

38 *a* For all values of x for which these expressions are defined, perform the indicated operation and express in simplest form.

(1) $\frac{x+2}{3} + \frac{x}{6}$ [3]

(2) $\frac{x+2}{3} \cdot \frac{9}{x}$ [3]

b The distance an object falls is given by the formula $d = \frac{1}{2}gt^2$. Find d, to the *nearest tenth*, when $g = 9.8$ and $t = 4\frac{1}{2}$. [4]

39 On a Course I test, the scores of ten students were 90, 83, 82, 95, 96, 67, 88, 91, 82, and 86.

a Find the

(1) mean [1]
(2) median [2]
(3) mode [1]

b Find the probability that the score of a student chosen at random will be

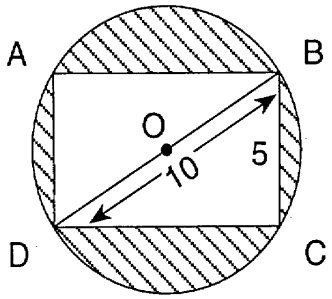
(1) less than the mean [2]
(2) greater than the median [2]
(3) greater than or equal to the mode [2]

40 *a* Solve the following system of equations graphically:

$$y = 2x$$
$$x + y = 6$$ [6]

b Solve the system of equations given in part *a* algebraically. [4]

41 Rectangle $ABCD$ is inscribed in circle O with the center on diagonal $\overline{BD}$ of the rectangle. The length of $\overline{BD}$ is 10 and the length of $\overline{BC}$ is 5.



a Find, in simplest radical form, the

(1) length of $\overline{DC}$ [4]
(2) area of the rectangle [2]

b Find, to the *nearest integer*, the area of the shaded region. [4]

42 The larger of two negative numbers is five more than the smaller. If the square of the larger number is increased by 27, the result is the smaller number multiplied by –7. Find the numbers. [*Only an algebraic solution will be accepted.*] [5,5]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Wednesday, August 14, 1996 — 8:30 to 11:30 a.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

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 14, 1996 — 8:30 to 11:30 a.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 20–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 4

(2) $p \rightarrow \sim q$

(3) 7,800

(4) $\frac{2}{8}$

(5) $p \wedge q$

(6) 15

(7) 4

(8) 10

(9) 24

(10) 50

(11) 11

(12) $9x^3$

(13) 5

(14) –10

(15) 5

(16) $\sim s \rightarrow t$

(17) 22

(18) $-4a^2 - 9a + 2$

(19) 7

(20) 3

(21) 4

(22) 2

(23) 4

(24) 1

(25) 1

(26) 2

(27) 4

(28) 3

(29) 4

(30) 2

(31) 3

(32) 2

(33) 1

(34) 1

(35) 3

[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) 10 [10]

(38) *a* (1) $\frac{3x + 4}{6}$ [3]

(2) $\frac{3x + 6}{x}$ [3]

b 99.2 [4]

(39) *a* (1) 86 [1]

(2) 87 [2]

(3) 82 [1]

b (1) $\frac{4}{10}$ [2]

(2) $\frac{5}{10}$ [2]

(3) $\frac{9}{10}$ [2]

(40) *b* (2,4) [4]

(41) *a* (1) $5\sqrt{3}$ [4]

(2) $25\sqrt{3}$ [2]

b 35 [4]

(42) Analysis [5]

–13 and –8 [5]