

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 29, 1998 — 9:15 a.m. to 12:15 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.

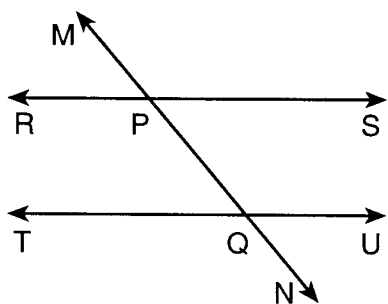
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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 Solve for t : $0.09t - 3.6 = 1.44$

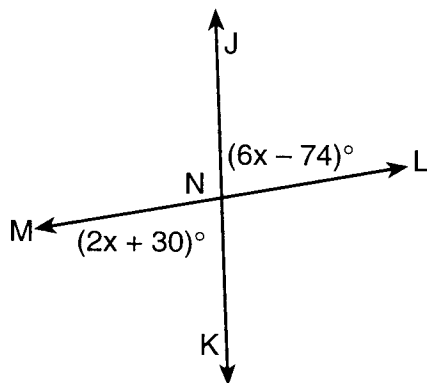
- 2 In the accompanying diagram, transversal \overleftrightarrow{MN} intersects parallel lines \overleftrightarrow{RS} and \overleftrightarrow{TU} at P and Q , respectively. If $m\angle RPM = 50$, find $m\angle PQU$.



- 3 The perimeter of a parallelogram is 32 meters and the two shorter sides each measure 4 meters. What is the length, in meters, of each of the longer sides?

4 Solve for x : $\frac{3}{4}x - 6 = 3$

- 5 In the accompanying diagram, lines \overleftrightarrow{JK} and \overleftrightarrow{LM} intersect at N , $m\angle JNL = 6x - 74$, and $m\angle MNK = 2x + 30$. What is the value of x ?



- 6 Let p represent "It was a warm summer day," and let q represent "The family went to the beach." Using p and q , write in symbolic form: "If the family went to the beach, then it was a warm summer day."

- 7 If point $(k, 5)$ is on the graph of the equation $3x - 4 = y$, what is the value of k ?

- 8 If 321,000,000,000 is written in the form 3.21×10^n , what is the value of n ?

- 9 If $a = -2$ and $b = -3$, what is the value of $3a^2b$?

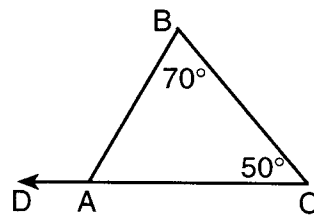
- 10 Find the sum of $3x^2 + 5x - 1$ and $x^2 - 2x - 7$.

11 Solve for m : $\frac{6}{4} = \frac{m + 5}{6}$

- 12 From a jar of red jellybeans and white jellybeans, the probability of picking a white jellybean is $\frac{2}{3}$. If the jar contains 24 jellybeans, how many red jellybeans are in the jar?

- 13 When simplified, $\sqrt{50}$ equals $x\sqrt{y}$. If x and y are both integers, what is the value of x ?

- 14 In the accompanying diagram of $\triangle ABC$, \overline{CA} is extended to D , $m\angle ABC = 70$, and $m\angle BCA = 50$. Find $m\angle DAB$.



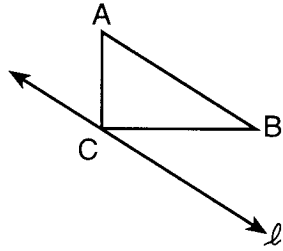
- 15 Express $(4x - 5)(6x + 5)$ as a trinomial.
- 16 Express the sum of $\frac{3x}{4}$ and $\frac{2x}{3}$ as a single fraction in lowest terms.
- 17 The volume of a rectangular solid is 80 cubic centimeters, the length is 2 centimeters, and the width is 4 centimeters. Find the number of centimeters in the height of the rectangular solid.

Directions (18–35): 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.

- 18 If the length of a rectangle is represented by $20a$ and the width is represented by $0.4a$, the area of the rectangle is represented by
- (1) $50a$ (3) $20.4a^2$
 (2) $80a^2$ (4) $8a^2$
- 19 Which equation represents the line whose slope is $\frac{1}{2}$ and whose y -intercept is 5?
- (1) $y = \frac{1}{2}x + 5$ (3) $y = \frac{1}{2}x - 5$
 (2) $y = 5x + \frac{1}{2}$ (4) $y = 5x - \frac{1}{2}$
- 20 If p represents "All sides are congruent" and q represents "All angles are congruent," then for which figure will the statement $p \wedge q$ be true?
- (1) rectangle (3) square
 (2) rhombus (4) trapezoid
- 21 Which statement is true for the following group of data?
- 11, 13, 18, 19, 19
- (1) mean > median (3) mode = median
 (2) mean > mode (4) median < mode
- 22 What is the converse of $r \rightarrow \sim s$?
- (1) $\sim s \rightarrow r$ (3) $\sim s \rightarrow \sim r$
 (2) $r \rightarrow s$ (4) $s \rightarrow \sim r$

- 23 When x is an integer, what is the solution set of $5 \leq x < 8$?
- (1) $\{5, 6, 7, 8\}$ (3) $\{6, 7, 8\}$
 (2) $\{5, 6, 7\}$ (4) $\{6, 7\}$
- 24 What is the greatest common factor of $24a^2b$ and $18abc$?
- (1) 6 (3) $6a^2b$
 (2) $6ab$ (4) $6abc$
- 25 Which measure is always the same as the 25th percentile?
- (1) mean (3) upper quartile
 (2) median (4) lower quartile
- 26 If $21x^3 - 42x^2 + 3x$ is divided by $3x$, the quotient is
- (1) $7x^2 - 14x + 1$ (3) $7x^2 - 14x$
 (2) $7x^3 - 42x^2 + 3x$ (4) $7x^2 + 14x - 1$
- 27 The expression $\frac{2}{(x - 2)(x + 3)}$ is undefined when x is equal to
- (1) 0 (3) -2 or 3
 (2) 2 or -3 (4) -1
- 28 If $9x + 2a = -3a + 4x$, then x equals
- (1) 1 (3) $-a$
 (2) 0 (4) $-5a$
- 29 At which point will the graphs of the equations $2x + y = 8$ and $x - y = 4$ intersect?
- (1) (0,4) (3) $(-4, 0)$
 (2) (4,0) (4) $(5, -2)$
- 30 What is the value of ${}_5P_3$?
- (1) 6 (3) 60
 (2) 15 (4) 125
- 31 What is the total number of lines of symmetry in a rectangle that is not a square?
- (1) 1 (3) 0
 (2) 2 (4) 4

- 32 In the accompanying diagram of right triangle ABC with the right angle at C , line ℓ is drawn through C and is parallel to \overline{AB} .



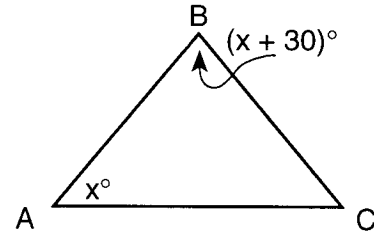
If $\triangle ABC$ is reflected in line ℓ , forming the image $\triangle A'B'C'$, which statement is *not* true?

- (1) C and C' are the same point.
 - (2) $m\angle ABC = m\angle A'B'C'$
 - (3) The area of $\triangle A'B'C'$ is twice the area of $\triangle ABC$.
 - (4) Line ℓ is equidistant from A and A' .
- 33 What is the solution set of the equation $x^2 + 2x - 15 = 0$?
- (1) $\{3, -5\}$
 - (2) $\{-3, 5\}$
 - (3) $\{-3, -5\}$
 - (4) $\{3, 5\}$

- 34 Which expression represents the number of eggs in x dozen?

- (1) $\frac{x}{12}$
- (2) $\frac{12}{x}$
- (3) $12 + x$
- (4) $12x$

- 35 In the accompanying diagram of isosceles triangle ABC , $\overline{AB} \cong \overline{BC}$, $m\angle BAC = x$, and $m\angle ABC = x + 30$.



What is the value of x ?

- (1) 80
- (2) 75
- (3) 50
- (4) 30

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

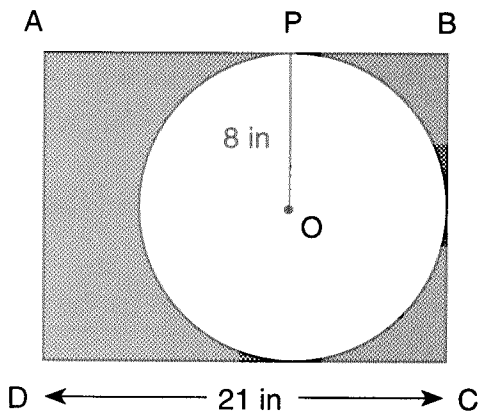
Part II

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 *a* On the same set of axes, graph the inequalities $y > 3x - 4$ and $x + 2y \leq 6$. [8]

b State the coordinates of a point that is *not* in the solution set of either inequality graphed in part *a*. [2]

37 In the accompanying diagram, circle O is inscribed in rectangle $ABCD$. Radius OP is drawn to \overline{AB} , the length of \overline{CD} is 21 inches, and the length of \overline{OP} is 8 inches.



Find to the nearest integer:

- a* the area of the shaded region [8]
- b* the circumference of circle O [2]

38 The length of a rectangle is 7 units more than its width. If the width is doubled and the length is increased by 2, the area is increased by 42 square units. Find the dimensions of the original rectangle. [Only an algebraic solution will be accepted.] [5.5]

39 Solve the following system of equations algebraically and check:

$$\begin{aligned} 2x + 3y &= 17 \\ 3x - 2y &= -0.5 \end{aligned} \quad [8,2]$$

40 In a container of 60 coins, there are twice as many quarters as nickels and three times as many dimes as nickels.

a Determine the number of each kind of coin in the container. [Only an algebraic solution will be accepted.] [4]

b If a coin is shaken from the container, what is the probability that the coin is

- (1) a quarter [2]
- (2) *not* a nickel [2]

c If three coins are shaken from the container, what is the probability that their total value is more than \$0.75? [2]

41 On your answer paper, construct and complete a truth table for the statement $[p \wedge (q \rightarrow \sim p)] \leftrightarrow (p \rightarrow q)$. [10]

42 The sophomore class at South High School raised \$800 from the sale of tickets to a dance. Tickets sold for \$1.50 in advance and \$2.00 at the door. If a total of 475 tickets were sold, what was the number of tickets sold at the door? [Show or explain the procedure used to obtain your answer.] [10]

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SEQUENTIAL MATH – COURSE I

Thursday, January 29, 1998 — 9:15 a.m. to 12:15 p.m., only

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

Tear Here

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

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

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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 18–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 56	(11) 4	(21) 4	(31) 2
(2) 130	(12) 8	(22) 1	(32) 3
(3) 12	(13) 5	(23) 2	(33) 1
(4) 12	(14) 120	(24) 2	(34) 4
(5) 26	(15) $24x^2 - 10x - 25$	(25) 4	(35) 3
(6) $q \rightarrow p$	(16) $\frac{17x}{12}$	(26) 1	
(7) 3	(17) 10	(27) 2	
(8) 11	(18) 4	(28) 3	
(9) -36	(19) 1	(29) 2	
(10) $4x^2 + 3x - 8$	(20) 3	(30) 3	

[OVER]

SEQUENTIAL MATH – COURSE I – *concluded*

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.

(37) a 135 [8]
 b 50 [2]

(38) Analysis [5]
3,10 [5]

(39) $x = 2.5, y = 4$ [8]
Check [2]

(40) a 10 nickels, 30 dimes,
20 quarters [4]

b (1) $\frac{20}{60}$ [2]

(2) $\frac{50}{60}$ [2]

c 0 [2]

(42) 175 [10]