

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

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, June 17, 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.

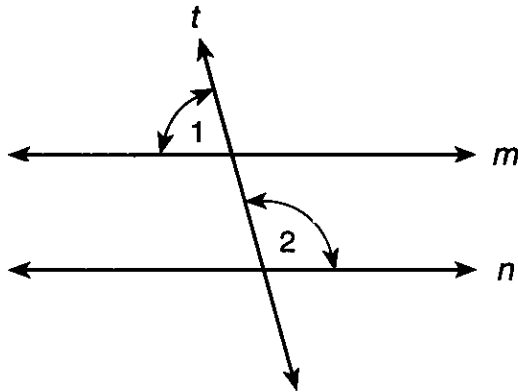
When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during 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]

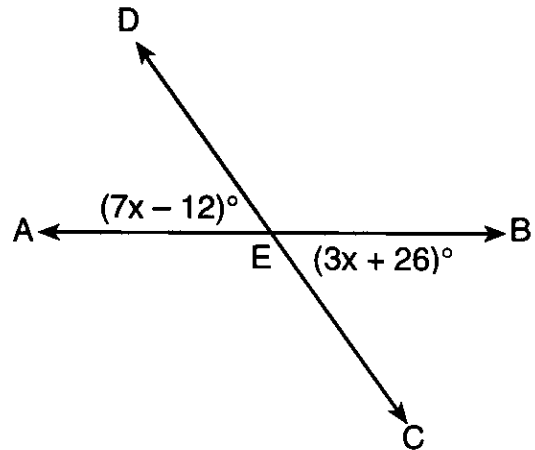
- 1 Parallel lines m and n are cut by transversal t . If $m\angle 1 = 75$, find $m\angle 2$.



- 2 Solve for m : $0.02m = 18$
- 3 If $n + 1$ represents an odd integer, express the next larger odd integer in terms of n .
- 4 Factor: $x^2 + 3x - 28$
- 5 A student has 3 different shirts, 2 different pairs of pants, and 3 different pairs of shoes. How many different outfits consisting of one pair of pants, one shirt, and one pair of shoes can be made from this selection?
- 6 Solve for x : $3x + 6 = 5x + 12$
- 7 If 60% of a number is 144, what is the number?
- 8 One base angle of an isosceles triangle measures 50° . What is the number of degrees in the vertex angle?

- 9 Solve for x in terms of a , b , and c : $ax - b = -c$

- 10 In the accompanying diagram, \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect at E , $m\angle AED = 7x - 12$, and $m\angle CEB = 3x + 26$. Find the value of x .



- 11 What is the total number of possible five-letter arrangements of the letters C, H, I, P, S if each letter is used only once in each arrangement?
- 12 Find the area of a rectangle whose vertices are $(0,0)$, $(5,0)$, $(5,4)$, and $(0,4)$.
- 13 What is the multiplicative inverse of $-\frac{a}{b}$?

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 product of $5x^3y^2$ and $4xy^4$ is
- | | |
|----------------|----------------|
| (1) $20x^4y^6$ | (3) $20x^4y^8$ |
| (2) $9x^4y^6$ | (4) $9x^3y^8$ |

15 A bag contains five green, six red, and seven black jelly beans. If one jelly bean is drawn at random, what is the probability that the jelly bean is green or red?

- (1) $\frac{5}{18}$ (3) $\frac{7}{18}$
 (2) $\frac{6}{18}$ (4) $\frac{11}{18}$

16 Let p represent "I am sitting in the sun" and let q represent "I am warm." Which expression represents "If I am not sitting in the sun, then I am not warm"?

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

17 When rice is prepared, the amount of rice varies directly as the amount of water required. If 2 cups of rice requires 4.5 cups of water, what is the total number of cups of water needed to prepare 5 cups of rice?

- (1) 9 (3) 11.25
 (2) 10 (4) 22.5

18 Which expression is undefined when $y = 4$?

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

19 If $a = -3$ and $b = 4$, then the value of $-5a^2b$ is

- (1) 180 (3) -120
 (2) 120 (4) -180

20 Which ordered pair is the solution to this system of equations?

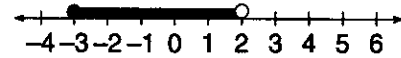
$$\begin{aligned} 2x - y &= 10 \\ x + y &= 2 \end{aligned}$$

- (1) (4, -2) (3) (2, -4)
 (2) (4, 2) (4) (-4, 2)

21 Which letter contains both line and point symmetry?

- (1) A (3) H
 (2) N (4) T

22 Which expression is represented in the graph below?



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

23 If the length of the side of a rhombus is represented by $x + 3$, which expression represents the perimeter of the rhombus?

- (1) $4x + 3$ (3) $x^2 + 9$
 (2) $4x + 12$ (4) $x^2 + 6x + 9$

24 Which inequality is equivalent to $\frac{2}{3}x - 5 < 11$?

- (1) $x < 6$ (3) $x < 16$
 (2) $x < 9$ (4) $x < 24$

25 If the edge of a cube is 6 centimeters and the edge of a second cube is 5 centimeters, the difference in the volumes of these cubes is

- (1) 1 cm^3 (3) 30 cm^3
 (2) 11 cm^3 (4) 91 cm^3

26 Expressed in scientific notation, 0.003146 is equivalent to

- (1) 31.46×10^4 (3) 3.146×10^{-3}
 (2) 3.146×10^3 (4) 3.146×10^{-2}

27 Which inequality is true for the set of data 9, 12, 6, 7, 8, 9, 3?

- (1) mean < median < mode
 (2) median < mean < mode
 (3) mode < mean < median
 (4) mean < mode < median

28 When $5x^4 - 5x$ is divided by $5x$, the quotient is

- (1) x^3 (3) $x^3 - 1$
 (2) $x^5 - 1$ (4) $5x$

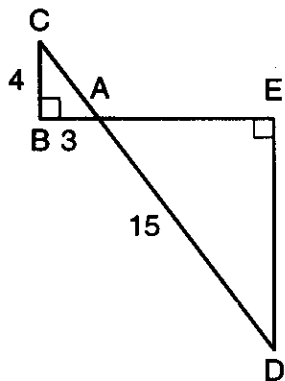
29 The solution set of $x^2 - 36 = 0$ is

- (1) $\{-6\}$ (3) $\{9, -4\}$
 (2) $\{-6, 6\}$ (4) $\{6\}$

30 Which equation represents a line with a slope of -2 ?

- (1) $y = 2x - 1$ (3) $y = x - 2$
 (2) $y = -2x + 1$ (4) $y = -x + 2$

31 In the accompanying diagram, \overline{BAE} , \overline{CAD} , $\angle B$ and $\angle E$ are right angles, $AB = 3$, $BC = 4$, and $AD = 15$.



What is the length of \overline{DE} ?

- (1) 5 (3) 9
 (2) 8 (4) 12

32 What is the sum of $\frac{x+2}{3}$ and $\frac{x}{5}$?

- (1) $\frac{8x+10}{15}$ (3) $\frac{2x+2}{15}$
 (2) $\frac{x^2+2x}{15}$ (4) $\frac{2x+2}{8}$

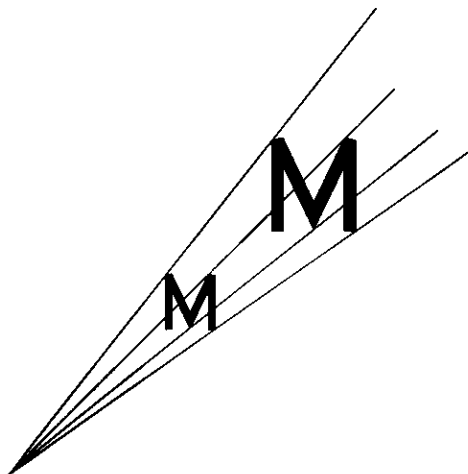
33 If the measures of two complementary angles are in the ratio 1:5, the measure of the larger angle is

- (1) 72° (3) 144°
 (2) 75° (4) 150°

34 The sum of $6\sqrt{2}$ and $\sqrt{50}$ is

- (1) $\sqrt{2}$ (3) $31\sqrt{2}$
 (2) $11\sqrt{2}$ (4) 60

35 Which transformation for letter M is shown in the accompanying diagram?



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

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 following equations:

- (1) $x + y = 7$ [2]
- (2) $3y - 2x = 6$ [3]
- (3) $y = -2$ [2]

b Find the area of the triangle formed by the lines drawn in part *a*. [3]

37 Let *p* represent: "The water temperature is 100°C ."

Let *q* represent: "The water boils."

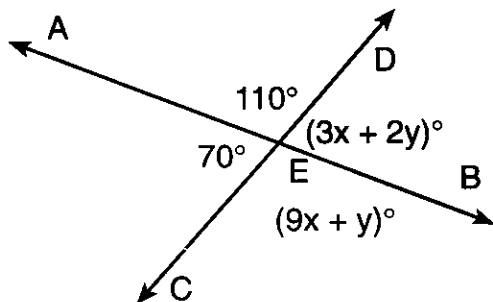
a Using *p* and *q*, write this statement in symbolic form: "If the water temperature is 100°C , then the water boils." [1]

b Write the converse of the statement in part *a* in symbolic form. [1]

c Write the inverse of the statement in part *a* in symbolic form. [1]

d Construct a truth table for the statements in part *b* and part *c* to determine whether or not these statements are logically equivalent. Justify your answer. [7]

38 Lines \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect at *E*, $m\angle AED = 110$, $m\angle DEB = 3x + 2y$, $m\angle BEC = 9x + y$, and $m\angle CEA = 70$. Find the values of *x* and *y*. Check your answer. [Only an algebraic solution will be accepted.] [8,2]



39 The frequency table below shows the ages of the first 40 persons to enter a theater.

Age	Frequency
0–9	8
10–19	7
20–29	4
30–39	11
40–49	5
50–59	3
60–69	2

a On your answer paper, copy and complete the cumulative frequency table below. [2]

Age	Cumulative Frequency
0–9	8
0–19	
0–29	
0–39	
0–49	
0–59	
0–69	

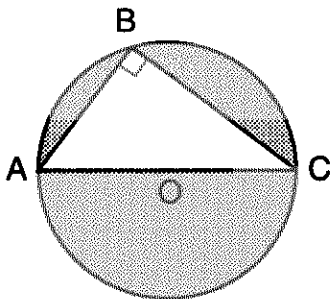
b Using the information from part *a*, construct a cumulative frequency histogram. [4]

c What is the probability that a person chosen at random will be less than 20 years old? [2]

d Does the interval 40–49 contain the age at the 80th percentile? Explain your answer. [1,1]

40 Three bags of potatoes and four cases of corn cost \$40. Five bags of potatoes and two cases of corn cost \$34. Find the cost of one bag of potatoes and the cost of one case of corn. [Show or explain the procedure used to obtain your answer.] [10]

- 41 In the accompanying diagram, right triangle ABC with the right angle at B is inscribed in circle O , AC is a diameter, $BC=12$ centimeters, and $AB = 9$ centimeters. Find the area of the shaded region to the nearest square centimeter. [10]



- 42 The area of the rectangular playground enclosure at Happy Times Nursery School is 600 square meters. The length of the playground is 25 meters longer than the width. Find the dimensions of the playground. [Only an algebraic solution will be accepted.] [4,6]

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SEQUENTIAL MATH – COURSE I

Wednesday, June 17, 1998 — 9:15 a.m. to 12:15 p.m., only

Part I Score
Part II Score	<u>.....</u>
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

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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 14–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 105	(11) 120	(21) 3	(31) 4
(2) 900	(12) 20	(22) 2	(32) 1
(3) $n + 3$	(13) $-\frac{b}{a}$	(23) 2	(33) 2
(4) $(x - 4)(x + 7)$	(14) 1	(24) 4	(34) 2
(5) 18	(15) 4	(25) 4	(35) 4
(6) -3	(16) 1	(26) 3	
(7) 240	(17) 3	(27) 1	
(8) 80	(18) 3	(28) 3	
(9) $\frac{b-c}{a}$	(19) 4	(29) 2	
(10) 9.5	(20) 1	(30) 2	

[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) $b = 45$ [3]

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

$b \ q \rightarrow p$ [1]

$c \ \sim p \rightarrow \sim q$ [1]

d Truth table(s) [6]

Yes [1]

(38) $x = 10$ [8]

$y = 20$

Check [2]

(39) $c = \frac{15}{40}$ [2]

d Yes, the 80th percentile would be the 32nd person and that person is in interval 40–49. [1,1]

(40) \$4 per bag of potatoes [10]
\$7 per case of corn

(41) 123 [10]

(42) Analysis [4]

15, 40 [6]