

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

**THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS**

# **COURSE I**

Wednesday, August 16, 2000 — 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.

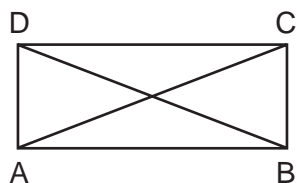
**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

## 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  $\pi$  or in radical form. [60]

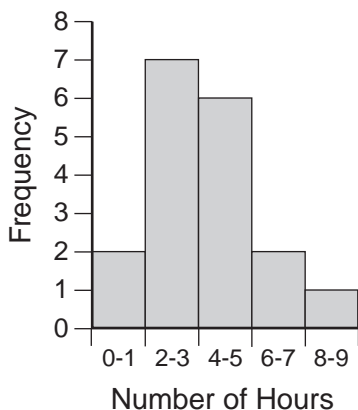
1 Solve for  $x$ :  $5x + 2x - 4 = 4x + 5$

- 2 In the accompanying diagram of rectangle  $ABCD$ , diagonal  $AC = 8x + 4$  and diagonal  $BD = 5x + 16$ . Find the value of  $x$ .



- 3 If the probability of rain is  $\frac{6}{10}$ , what is the probability that it will *not* rain?

- 4 The accompanying histogram shows the results of a survey of the number of hours a group of teenagers listened to their CD players each day. What is the total number of teenagers who were surveyed?

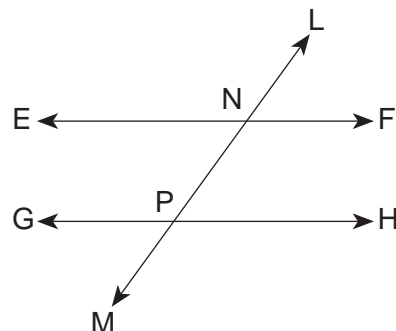


5 Solve for  $x$ :  $\frac{4}{3}x - 6 = 10$

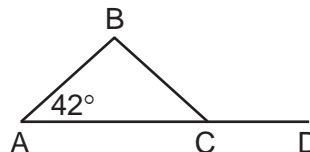
- 6 Express  $\frac{5!}{3!}$  as a whole number.

- 7 Solve for  $a$  in terms of  $b$ ,  $c$ , and  $d$ :  
 $ab + c = d$

- 8 In the accompanying diagram, parallel lines  $\overleftrightarrow{EF}$  and  $\overleftrightarrow{GH}$  are cut by transversal  $\overleftrightarrow{LM}$  at  $N$  and  $P$ , respectively. If  $m\angle LNF = 54$ , find  $m\angle NPG$ .



- 9 In the accompanying diagram of isosceles triangle  $ABC$ ,  $\overline{AB} \cong \overline{BC}$ ,  $\overline{AC}$  is extended to  $D$ , and  $m\angle A = 42$ . Find  $m\angle BCD$ .



10 Solve for the positive value of  $x$ :  $x^2 - 49 = 0$

- 11 What is the area of figure  $ABCD$  that is formed by coordinates  $A(0,0)$ ,  $B(5,0)$ ,  $C(5,3)$ , and  $D(0,3)$ ?

- 12 Write, in symbolic form, the converse of  $\sim p \rightarrow q$ .

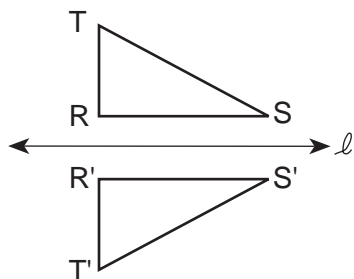
- 13 If  $x$  varies directly as  $y$  and  $x = 3$  when  $y = 8$ , what is the value of  $y$  when  $x = 9$ ?

- 14 Solve the following system of equations for  $x$ :

$$\begin{aligned} -3x + 2y &= 18 \\ 2y &= 3 \end{aligned}$$

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 Which transformation for  $\triangle RST$  is shown in the accompanying diagram?



- (1) line reflection                      (3) translation  
(2) rotation                              (4) dilation
- 16 If  $w + 5$  represents an even integer, the next *smaller* even integer is represented by
- (1)  $2w - 5$                               (3)  $w + 7$   
(2)  $2w + 5$                               (4)  $w + 3$
- 17 What is the sum of  $5x - 6y + z$  and  $5x - 6y - z$ ?
- (1)  $10x - 12y + 2z$                       (3)  $10x + 12y - z$   
(2)  $10x - 12y$                               (4)  $10x + 12y$
- 18 Rick's recorded times in four 1-mile runs are 4.8 minutes, 5.3 minutes, 4.7 minutes, and 5.4 minutes. For Rick's next run, which time will give him a mean of 5.0 minutes?
- (1) 4.8 min                                  (3) 5.7 min  
(2) 5.3 min                                  (4) 6.0 min
- 19 The product of  $(2x - 3)(3x + 5)$  is equivalent to
- (1)  $5x^2 - x - 15$                               (3)  $5x + 2$   
(2)  $6x^2 + x + 15$                               (4)  $6x^2 + x - 15$
- 20 Which property is demonstrated by the following equation?

$$a(b + c) = ab + ac$$

- (1) associative property of addition  
(2) distributive property  
(3) commutative property of addition  
(4) identity property of addition

- 21 What is the total number of different six-letter arrangements that can be formed from the letters in the word "FOREST" if each letter is used only once in each arrangement?

- (1) 1    (3) 720  
(2) 6    (4) 46,656

- 22 What is the  $y$ -intercept of the line whose equation is  $y = 6x - 7$ ?

- (1)  $-6$     (3) 7  
(2) 6    (4)  $-7$

- 23 Which inequality is equivalent to  $2x - 1 > 5$ ?

- (1)  $x > 6$     (3)  $x < 3$   
(2)  $x > 2$     (4)  $x > 3$

- 24 One factor of  $x^2 + 5x - 24$  is

- (1)  $x - 8$     (3)  $x - 3$   
(2)  $x - 6$     (4)  $x + 4$

- 25 What is the sum of  $\frac{6x}{7}$  and  $\frac{2x}{5}$ , expressed as a single fraction in lowest terms?

- (1)  $\frac{8x}{35}$     (3)  $\frac{44x}{35}$   
(2)  $\frac{12x}{35}$     (4)  $\frac{44x}{12}$

- 26 In two supplementary angles, the measure of one angle is 6 more than twice the measure of the other. The measures of these two angles are

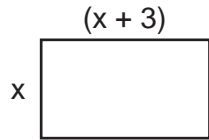
- (1)  $28^\circ$  and  $62^\circ$                                   (3)  $58^\circ$  and  $122^\circ$   
(2)  $32^\circ$  and  $58^\circ$                                   (4)  $62^\circ$  and  $118^\circ$

- 27 In the truth table below, which statement is the correct heading for column 4?

Column 1	Column 2	Column 3	Column 4
$p$	$q$	$\sim p$	?
T	T	F	F
T	F	F	F
F	T	T	T
F	F	T	F

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

28 In terms of  $x$ , what is the area of the rectangle shown below?



- (1)  $x^2 + 3x$                       (3)  $4x + 6$   
 (2)  $2x + 3$                       (4)  $5x$

29 What is the volume of a cube whose edge has a length of 4?

- (1) 12                                  (3) 64  
 (2) 24                                  (4) 96

30 If the circumference of a circle is  $36\pi$ , what is the length of a radius of the circle?

- (1) 6                                    (3) 36  
 (2) 18                                  (4) 72

31 For which value of  $x$  is the expression  $\frac{4x}{x+6}$  undefined?

- (1) 0                                    (3) 6  
 (2) 2                                    (4)  $-6$

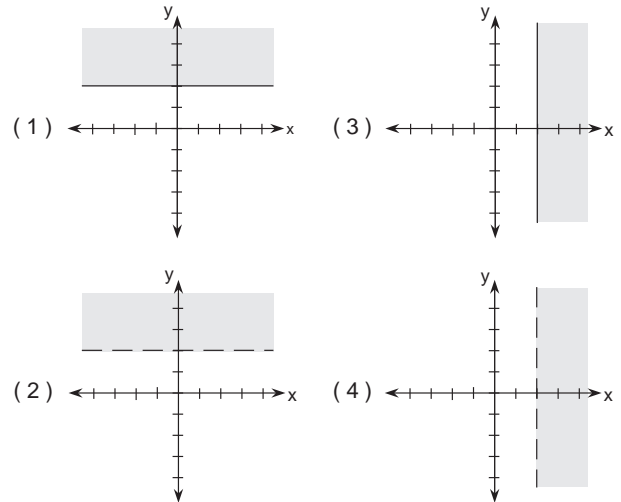
32 Which monomial is equivalent to  $(7x^4)^2$ ?

- (1)  $49x^6$                               (3)  $14x^6$   
 (2)  $49x^8$                               (4)  $14x^8$

33 The length of the hypotenuse of a right triangle is 7, and the length of one leg is 4. What is the length of the other leg?

- (1)  $\sqrt{33}$                               (3)  $\sqrt{65}$   
 (2) 33                                    (4) 65

34 Which graph represents the inequality  $x \geq 2$ ?



35 Which figure does *not* always possess line symmetry?

- (1) square                              (3) circle  
 (2) rectangle                          (4) parallelogram

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

Part II

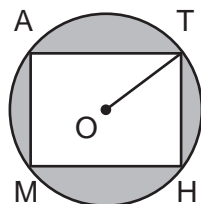
Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 a On the same set of coordinate axes, graph the following system of equations.

$$\begin{aligned} y &= -4 & [2] \\ 2x + y &= 6 & [4] \end{aligned}$$

b Find the area of the trapezoid bounded by the  $x$ -axis, the  $y$ -axis, and the graphs drawn in part a. [4]

37 In the accompanying diagram, rectangle  $MATH$  is inscribed in circle  $O$ . The length of radius  $OT$  is 5 centimeters and the length of  $\overline{TH}$  is 6 centimeters.



a Find the length of  $\overline{MH}$  in centimeters. [3]

b Find the area of the shaded region to the nearest square centimeter. [7]

38 There are four coins in a jar: a penny, a nickel, a dime, and a quarter. One coin is removed at random. Without replacing the first coin, a second coin is removed.

a Draw a tree diagram or list the sample space showing all the possible outcomes. [4]

b Find the probability that the total value of the two coins selected is

- (1) 11 cents [2]
- (2) greater than 35 cents [2]
- (3) at most 30 cents [2]

39 The sum of two integers is 10, and the sum of their squares is 250. Find the two integers. [Only an algebraic solution will be accepted.] [4,6]

40 Solve the following system of equations algebraically and check.

$$\begin{aligned} 0.7x + 0.4y &= 16 \\ x + y &= 10 \end{aligned} \quad [8,2]$$

41 A museum sold 50 more adult tickets at \$6.50 each than children's admission tickets at \$5.50 each. What is the minimum number of each type of ticket that the cashier had to sell for the total receipts to be at least \$1000? [Show or explain the procedure used to obtain your answer.] [10]

42 a Each set below consists of three sentences. Assume that the first two sentences are true. On your answer paper, write the truth value "true" or "false" for the third sentence in each set. If the truth value cannot be determined from the given information, write "cannot be determined." [2,2]

- (1) If Chris gets her homework done, then she will go to the volleyball game.  
Chris goes to the volleyball game.  
Chris gets her homework done.
- (2) I do not study and I do not pass my test.  
I do not study.  
I pass my test.

b On your answer paper, copy and complete the truth table for the statement  $\sim(p \wedge q) \rightarrow \sim q$ . [6]

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



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SEQUENTIAL MATH – COURSE I

Wednesday, August 16, 2000 — 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.

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Signature

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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

Wednesday, August 16, 2000 — 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 15–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 3	(11) 15	(21) 3	(31) 4
(2) 4	(12) $q \not\equiv \sim p$	(22) 4	(32) 2
(3) $\frac{4}{10}$	(13) 24	(23) 4	(33) 1
(4) 18	(14) -5	(24) 3	(34) 3
(5) 12	(15) 1	(25) 3	(35) 4
(6) 20	(16) 4	(26) 3	
(7) $\frac{d-c}{b}$	(17) 2	(27) 2	
(8) 126	(18) 1	(28) 1	
(9) 138	(19) 4	(29) 3	
(10) 7	(20) 2	(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* 16 [4]

(40) (40,–30) [8]  
Check [2]

(37) *a* 8 [3]  
*b* 31 [7]

(41) 57 children's tickets [10]  
107 adults' tickets

(38) *b* (1)  $\frac{2}{12}$  [2]  
(2) 0 [2]  
(3)  $\frac{10}{12}$  [2]

(42) *a* (1) cannot be determined [2]  
(2) false [2]

(39) Analysis [4]  
–5,15 [6]

**As a reminder . . .**

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