

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

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

# **COURSE I**

**Tuesday, June 19, 2001 — 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  $\pi$  or in radical form. [60]

1 What is the multiplicative inverse of  $\frac{3}{7}$ ?

2 Solve for  $x$ :  $\frac{7}{2} = \frac{x}{3}$

3 Solve for  $x$ :  $2.5x + 0.5 = 6.25$

4 A letter is chosen from the eight letters in the word "SAVANNAH." What is the probability the letter is an A or an N?

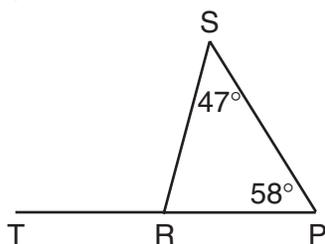
5 Solve for  $y$ :  $-4(y - 3) = 5(2y - 6)$

6 Solve the following system of equations for  $x$ :

$$\begin{aligned} 2x - 3y &= 9 \\ 3x + 3y &= 11 \end{aligned}$$

7 Solve for  $x$  in terms of  $a$ ,  $b$ , and  $c$ :  $bx - 3a = c$

8 In the accompanying diagram of  $\triangle SPR$ ,  $\overline{PR}$  is extended to  $T$ ,  $m\angle S = 47$ , and  $m\angle P = 58$ . Find  $m\angle SRT$ .



9 Express  $(x - 7)(x + 3)$  as a trinomial.

10 Write the inverse of  $\sim p \rightarrow q$ .

11 If  $a$  varies directly as  $p$  and  $a = 260$  when  $p = 13$ , what is the value of  $a$  when  $p = 17$ ?

12 What is the value of  $xy^2$  if  $x = -3$  and  $y = -7$ ?

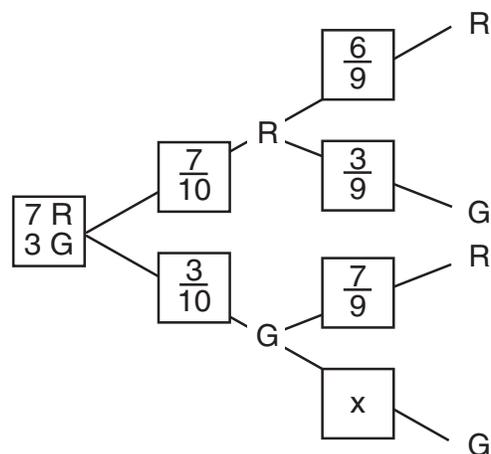
13 Point A is in Quadrant II. If point A is reflected in the  $x$ -axis, in which quadrant will its image lie?

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 Let  $p$  represent "I like cake" and let  $q$  represent "I like ice cream." Which expression represents "If I do not like cake, then I do not like ice cream"?

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

15 Shannon has 10 jellybeans: 7 red ones and 3 green ones. She will randomly choose 1 jellybean, eat it, and then choose another. The tree diagram for this situation is shown below.



What is the value of  $x$  in the diagram?

- (1)  $\frac{3}{10}$                                       (3)  $\frac{2}{10}$   
 (2)  $\frac{3}{9}$                                       (4)  $\frac{2}{9}$

16 If one side of a regular hexagon is represented by  $3x + 5$ , the perimeter of the hexagon can be represented by

- (1)  $3x + 30$                       (3)  $18x + 30$   
 (2)  $18x + 5$                       (4)  $18x - 30$

17 Written in factored form, the binomial  $4x^2 - 9$  is equivalent to

- (1)  $(2x - 3)(2x - 3)$             (3)  $(4x - 9)(x + 1)$   
 (2)  $(2x - 3)(2x + 3)$             (4)  $(4x + 1)(x - 9)$

18 The sum of  $3x^2 - 8x - 2$  and  $4x - 2$  is

- (1)  $3x^2 - 4x - 4$                 (3)  $3x^2 + 12x$   
 (2)  $3x^2 - 4x + 4$                 (4)  $7x^2 - 7x - 4$

19 The product of  $-5xy^2$  and  $2xy^3$  is

- (1)  $-3xy^5$                           (3)  $-10x^2y^5$   
 (2)  $-3x^2y^5$                         (4)  $-10x^2y^6$

20 Tony's scores on five mathematics tests were 80, 49, 70, 71, and 80. What was his median score?

- (1) 49                                  (3) 71  
 (2) 70                                  (4) 80

21 In quadrilateral  $ABCD$ ,  $m\angle A = 72$ ,  $m\angle B = 94$ , and  $m\angle C = 113$ . What is  $m\angle D$ ?

- (1) 81                                  (3) 108  
 (2) 86                                  (4) 136

22 This year Beth is twice as old as Adra. If  $x$  represents Adra's age now, which expression represents Beth's age one year ago?

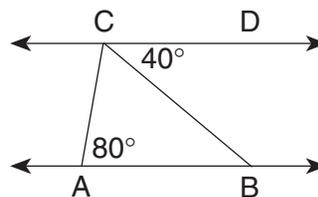
- (1)  $2x$                                 (3)  $x + 1$   
 (2)  $x - 1$                               (4)  $2x - 1$

23 Which inequality is represented by the graph below?



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

24 In the accompanying diagram,  $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ ,  $m\angle CAB = 80$ , and  $m\angle DCB = 40$ .



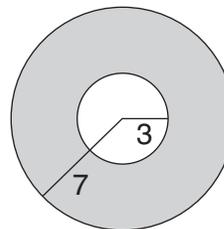
What is  $m\angle ACB$ ?

- (1) 40                                  (3) 80  
 (2) 60                                  (4) 120

25 Expressed in scientific notation, 0.00437 is

- (1)  $4.37 \times 10^{-3}$                     (3)  $43.7 \times 10^{-1}$   
 (2)  $4.37 \times 10^3$                     (4)  $43.7 \times 10^1$

26 In the diagram below, the radii of the two concentric circles are 3 and 7, respectively.



What is the area of the shaded region?

- (1)  $80\pi$                                 (3)  $8\pi$   
 (2)  $40\pi$                                 (4)  $4\pi$

27 Which transformation does *not* preserve size?

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

28 In isosceles triangle  $CAT$ , the measure of the vertex angle is one-half the measure of one of the base angles. Which statement is true about  $\triangle CAT$ ?

- (1)  $\triangle CAT$  is an equilateral triangle.  
 (2)  $\triangle CAT$  is an acute triangle.  
 (3)  $\triangle CAT$  is a right triangle.  
 (4)  $\triangle CAT$  is an obtuse triangle.

- 29 What is the slope of the line whose equation is  $y - 3x = 1$ ?
- (1) 1 (3) 3  
(2) -3 (4)  $\frac{1}{3}$
- 30 The expression  $\frac{x + 4}{x + 3}$  is undefined when  $x$  is equal to
- (1) 0 (3) 3  
(2) -3 (4) -4
- 31 If the length of each leg of an isosceles right triangle is 6, the length of the hypotenuse is
- (1) 24 (3)  $\sqrt{24}$   
(2) 72 (4)  $\sqrt{72}$
- 32 The sides of  $\triangle ABC$  are 2, 3, and 4. Which set of numbers could represent the sides of a triangle similar to  $\triangle ABC$ ?
- (1) {5,6,7} (3) {12,13,14}  
(2) {6,9,16} (4) {20,30,40}
- 33 Expressed in simplest form, the value of  $\frac{3xy}{5} \cdot \frac{10x}{9y}$  is
- (1)  $\frac{50x}{27xy^2}$  (3)  $\frac{2x^2}{3}$   
(2)  $\frac{27xy^2}{50x}$  (4)  $\frac{2x}{3y}$
- 34 The point whose coordinates are (2,-3) is on the graph of the equation
- (1)  $2x - 3y = 6$  (3)  $x + y = 5$   
(2)  $3x + y = 3$  (4)  $x - y = -1$
- 35 The sum of  $\sqrt{8}$  and  $\sqrt{18}$  is
- (1)  $5\sqrt{2}$  (3)  $13\sqrt{4}$   
(2)  $13\sqrt{2}$  (4)  $\sqrt{26}$
-

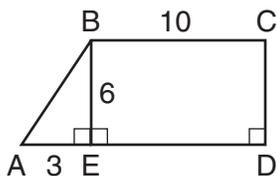
Answers to the following questions are to be written on paper provided by the school.

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 craft shop sold 150 pillows. Small pillows were \$6.50 each and large pillows were \$9.00 each. If the total amount collected from the sale of these items was \$1180.00, what is the total number of each size pillow that was sold? [Show or explain the procedure used to obtain your answer.] [10]

37 In the accompanying diagram,  $ABCD$  is a trapezoid with altitude  $\overline{BE}$ ,  $AE = 3$ ,  $BE = 6$ , and  $BC = 10$ .



- a Find  $AB$  to the nearest tenth. [3]
- b The area of  $\triangle ABE$  is what percent of the area of trapezoid  $ABCD$ ? Express your answer to the nearest whole percent. [7]

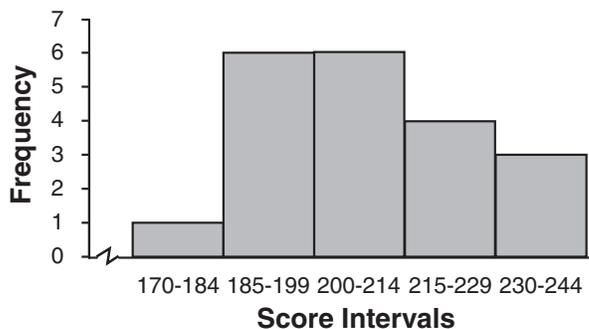
38 Elton bought a pack of 16 baseball cards. He sorted them by position and noted that he had pictures of 4 pitchers, 5 outfielders, and 7 infielders.

- a A single card is chosen from the pack at random. Find the probability that
  - (1) the card shows an outfielder [1]
  - (2) the card does *not* show a pitcher [2]
- b Two cards are randomly chosen from the pack of 16 cards without replacement. Find the probability that
  - (1) both cards show outfielders [3]
  - (2) neither card shows a pitcher [4]

39 The scores of the teams in a local bowling league are listed in the chart below.

TEAMS				
Aces	Bees	Cubs	Darts	Experts
186	177	199	197	193
224	207	212	196	214
216	235	188	226	231
207	223	239	205	200

- a What is the mode of the 20 bowling scores listed? [2]
- b Using the information provided by the histogram, copy and complete the cumulative frequency table below it. [2]



Interval	Cumulative Frequency
170-244	
170-229	
170-214	
170-199	
170-184	1

- c On graph paper, construct a cumulative frequency histogram for the data obtained in part b. [4]
- d Is a score of 214 below the 75th percentile? Justify your answer. [1,1]

- 40 Let  $p$  represent “I am happy.”  
Let  $q$  represent “I am wearing green.”
- a* Write each of the sentences below in symbolic form.
- (1) If I am happy, then I am not wearing green. [1]
- (2) If I am wearing green, then I am happy. [1]
- b* Construct a truth table to determine whether or not sentences (1) and (2) in part *a* are logically equivalent. Justify your answer. [7,1]

- 41 Solve the following system of equations graphically and check.

$$\begin{aligned}y &= \frac{2}{3}x + 5 \\x + 3y &= -3\end{aligned} \quad [8,2]$$

- 42 Find two negative consecutive odd integers such that their product is 63. [*Only an algebraic solution will be accepted.*] [4,6]

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SEQUENTIAL MATH – COURSE I

Tuesday, June 19, 2001 — 1:15 to 4:15 p.m., only

<b>Part I Score</b> .....
<b>Part II Score</b> .....
<b>Total Score</b> .....
<b>Rater's Initials:</b> .....

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

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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 19, 2001 — 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 14–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{7}{3}$	(11) 340	(21) 1	(31) 4
(2) 10.5	(12) -147	(22) 4	(32) 4
(3) 2.3	(13) III	(23) 4	(33) 3
(4) $\frac{5}{8}$	(14) 3	(24) 2	(34) 2
(5) 3	(15) 4	(25) 1	(35) 1
(6) 4	(16) 3	(26) 2	
(7) $\frac{c+3a}{b}$	(17) 2	(27) 1	
(8) 105	(18) 1	(28) 2	
(9) $x^2 - 4x - 21$	(19) 3	(29) 3	
(10) $p \rightarrow \sim q$	(20) 3	(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) 68 small pillows [10]  
82 large pillows

(40) a (1)  $p \rightarrow \sim q$  [1]  
(2)  $q \rightarrow p$  [1]

(37) a 6.7 [3]  
b 13 [7]

(41) (-6,1) [8]  
Check [2]

(38) a (1)  $\frac{5}{16}$  [1]  
(2)  $\frac{12}{16}$  [2]  
b (1)  $\frac{20}{240}$  [3]  
(2)  $\frac{132}{240}$  [4]

(42) Analysis [4]  
-9,-7 [6]

(39) a 207 [2]  
d Yes [1]  
Justification [1]