THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, January 23, 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.**

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 x: $0.2x + 4.1 = 12.5$

2 Raúl has 5 shirts, 3 pairs of pants, and 6 pairs of shoes. What is the total number of different outfits that he can put together consisting of 1 shirt, 1 pair of pants, and 1 pair of shoes?

3 In the accompanying diagram of $\triangle MAT$, $\overline{MT}$ is extended to H, m$\angle A = 72$, and m$\angle ATH = 131$. Find m$\angle AMT$.
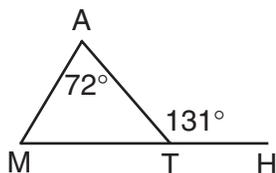
4 If y varies directly as x and $y = 30$ when $x = 6$, find x when $y = 45$.

5 Solve for x: $\dfrac{x + 3}{10} = \dfrac{4}{5}$

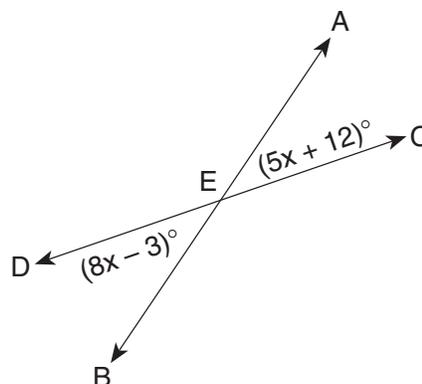6 Solve for x: $3(x - 2) + 5 = 2(5x - 4)$

7 Find the value of $-5xy^2$ when $x = -2$ and $y = 3$.

8 Find the number of degrees in the measure of the vertex angle of an isosceles triangle if each base angle measures 36°.

9 Evaluate: $_6P_2$

10 If 75% of a number is 60, what is the number?

11 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E, m$\angle AEC = 5x + 12$, and m$\angle DEB = 8x - 3$. Find the number of degrees in the measure of $\angle AEC$.

12 In symbolic form, write the inverse of $q \rightarrow \sim p$.

13 Express $(2x - 4)(x + 7)$ as a trinomial.

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 A bag has 10 blue, 12 green, 8 yellow, 11 pink, and 10 orange pieces of candy. What is the probability of reaching in the bag, without looking, and choosing either a blue or a yellow piece of candy?

(1) $\dfrac{8}{51}$ (3) $\dfrac{18}{51}$

(2) $\dfrac{10}{51}$ (4) $\dfrac{33}{51}$

15 The fraction $\dfrac{-12x^3 + 4x^2 - 8x}{2x}$, $x \neq 0$, is equivalent to

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

16 What is the solution set of the following system of equations?

$$x + y = 7$$
$$x - y = 3$$

(1) (3,4)　　　　　　　(3) (10,–3)
(2) (5,2)　　　　　　　(4) (8,–1)

17 The biconditional statement $p \leftrightarrow q$ is true when

(1) p is true and q is false
(2) p is false and q is true
(3) p and q have the same truth values
(4) q is true

18 If the width of a rectangle is represented by w and its length is represented by k, then the perimeter of the rectangle can be represented by

(1) $w + k$　　　　　　(3) $\frac{1}{2}(w+k)$

(2) $2w + 2k$　　　　　(4) $\sqrt{w^2 + k^2}$

19 The scientific notation 4.5×10^{-3} is equivalent to

(1) 4500　　　　　　　(3) 0.045
(2) 0.450　　　　　　　(4) 0.0045

20 What is the product of $3a^2b$ and $-4a^3b^4$?

(1) $-12a^5b^5$　　　　　(3) $-12a^6b^4$
(2) $-a^5b^5$　　　　　　(4) $-a^6b^4$

21 The sum of $\frac{x}{3}$ and $\frac{x+2}{4}$ is equivalent to

(1) $\frac{2x+2}{7}$　　　　　(3) $\frac{7x+6}{7}$

(2) $\frac{7x+6}{12}$　　　　　(4) $\frac{x+1}{6}$

22 Which inequality is represented in this graph?

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

23 The sum of $8a + 3b - 4c$ and $4a - 3b + c$ is

(1) $12a + 6b - 3c$　　　(3) $12a - 3c$
(2) $12a + 6b - 4c$　　　(4) $12a^2 - 3c^2$

24 For which value of x is the expression $\frac{5}{x+3}$ undefined?

(1) 0　　　　　　　　　(3) 3
(2) 2　　　　　　　　　(4) –3

25 Which figures shown below have horizontal line symmetry?

(1) I and III　　　　　　(3) II and IV
(2) I and IV　　　　　　(4) I, II, and III

26 What is the solution set of the equation $x^2 - x - 6 = 0$?

(1) {3,–2}　　　　　　　(3) {–6,1}
(2) {–3,–2}　　　　　　(4) {3,2}

27 Maria received the following scores on five English tests.

75, 85, 54, 76, 85

What was her median score?

(1) 54　　　　　　　　　(3) 76
(2) 75　　　　　　　　　(4) 85

28 The slope of the line $y = 6x - \frac{1}{3}$ is

(1) $\frac{1}{3}$　　　　　　　　(3) –1

(2) $-\frac{1}{3}$　　　　　　　(4) 6

29 The average score on the first two tests that Melita took was 88. On the third test she received a score of 94. What was her average for the three tests?

(1) 90　　　　　　　　　(3) 88
(2) 91　　　　　　　　　(4) 92

30 If $ac - b = 1$, then c equals

(1) $a - b + 1$ (3) $1 - a + b$

(2) $b + 1 - a$ (4) $\dfrac{b + 1}{a}$

31 A bicyclist travels 6 miles in 20 minutes. Which expression does *not* represent the rate of speed of the bicyclist?

(1) $\frac{3}{10}$ mile per minute   (3) 18 miles per hour

(2) $3\frac{1}{3}$ minutes per mile   (4) 20 miles per hour

32 On a graph, which point is on the line of the equation $2x + 3y = 4$?

(1) (−2,5)   (3) (5,−2)

(2) (5,2)   (4) (−5,2)

33 If the measures of the angles of a triangle are represented by $2x$, $4x$, and $6x$, then the triangle is

(1) right   (3) acute

(2) obtuse   (4) equiangular

34 Which number is irrational?

(1) $2.\overline{6}$ (3) $\frac{3}{4}$

(2) $\sqrt{100}$ (4) $\sqrt{14}$

35 In the accompanying diagram of $\triangle ABC$, a right angle is at C, $AB = 8$, and $AC = 4$.
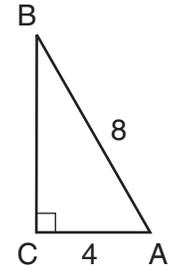
What is the value of BC?

(1) 12   (3) $4\sqrt{5}$

(2) $4\sqrt{3}$ (4) 4

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 inequalities.

$$y \geq 3x + 2$$
$$2y + 3x < 6$$ [8]

b Based on the graph drawn in part *a*, state the coordinates of a point that is in the solution of $y \geq 3x + 2$ and *not* in the solution of $2y + 3x < 6$. [2]

37 At a movie theater, a cashier sold 250 more adult admission tickets than children's admission tickets. The adult's tickets were $6.00 each and the children's tickets were $3.50 each. What is the *least* number of each type of ticket that the cashier had to sell for the total receipts to be *at least* $2,750? [*Show or explain the procedure used to obtain your answer.*] [10]

38 The length of a rectangular solid is 7. The width of the solid is 2 more than the height. The volume of the solid is 105. Find the width and the height of the solid. [*Only an algebraic solution will be accepted.*] [3,7]

39 Let *p* represent "I go to the beach."
Let *q* represent "I get a sunburn."

a Using *p* and *q*, write these statements in symbolic form:
  (1) It is not the case that I went to the beach and I got a sunburn. [1]
  (2) I did not go to the beach or I did not get a sunburn. [1]

b Construct a truth table or construct two truth tables to determine if statements (1) and (2), written in part *a*, are logically equivalent. Justify your answer. [7,1]

40 The frequency table below shows the distribution of scores for 30 students during a bowling tournament.

Scores	Frequency
50–79	1
80–109	8
110–139	11
140–169	7
170–199	3

a What percent of the students bowled a score greater than 109 and less than 170? [2]

*b* What is the probability that a student will bowl a score of *at least* 110? [2]

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

| Interval	Cumulative Frequency
50–79	1
50–109	
50–139	
50–169	
50–199	

d On graph paper, use the cumulative frequency table completed in part *c* to construct a cumulative frequency histogram. [4]

GO RIGHT ON TO THE NEXT PAGE. ⟹

41 In the accompanying diagram, *ABCD* is a parallelogram with m∠*B* = 120, m∠*C* = 60, m∠*D* = $2x + 5y$, and m∠*A* = $4x + y$. Find the values of *x* and *y*. Check your solution. [*Only an algebraic solution will be accepted.*] [8,2]

B $\overset{120°}{\quad}$ $\quad\overset{60°}{}$ C

$(4x + y)°$ $\qquad$ $(2x + 5y)°$

A $\qquad$ D
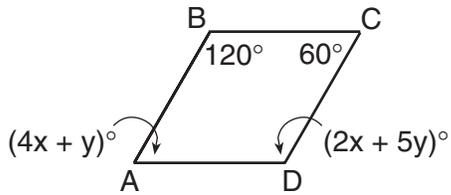
42 In the accompanying diagram, square *ABCD* is inscribed in circle *O* with diagonal *AC* = 8. Find the area of the shaded region in terms of π. [10]
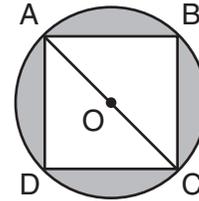
A $\quad$ B

O

D $\quad$ C

SEQUENTIAL MATH — COURSE I

Tuesday, January 23, 2001 — 1:15 to 4:15 p.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

Tear Here

Tear Here

FOR TEACHERS ONLY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, January 23, 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) 42	(11) 37	(21) 2	(31) 4
(2) 90	(12) $\sim q \rightarrow p$	(22) 1	(32) 3
(3) 59	(13) $2x^2 + 10x - 28$	(23) 3	(33) 1
(4) 9	(14) 3	(24) 4	(34) 4
(5) 5	(15) 1	(25) 2	(35) 2
(6) 1	(16) 2	(26) 1	
(7) 90	(17) 3	(27) 3	
(8) 108	(18) 2	(28) 4	
(9) 30	(19) 4	(29) 1	
(10) 80	(20) 1	(30) 4	

[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.

(37) 132 children's tickets   [10]

382 adult's tickets

(38) Analysis   [3]

width = 5   [7]
height = 3

(39) *a* (1) $\sim(p \wedge q)$ [1]

(2) $\sim p \vee \sim q$ [1]

(40) *a* 60   [2]

b $\frac{21}{30}$ [2]

(41) (10,20)   [8]

Check   [2]

(42) $16\pi - 32$ [10]

As a reminder . . .

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