### The University of the State of New York

## REGENTS HIGH SCHOOL EXAMINATION

# THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

# COURSE I

Friday, June 20, 1986-9:15 a.m. to 12:15 p.m., only

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.

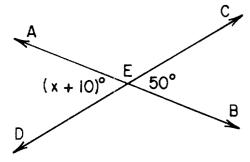
When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during 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 In the accompanying diagram, lines  $\stackrel{\longleftrightarrow}{AB}$  and  $\stackrel{\longleftrightarrow}{CD}$  intersect at point E. If  $m \angle AED = (x + 10)$  and  $m \angle CEB = 50$ , find x.

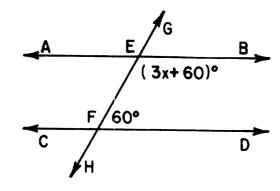


- 2 Solve for x: 5x 1 = 3x + 7
- 3 Let *p* represent "I can run," and let *q* represent "I can walk." Using *p* and *q*, write in symbolic form: "If I can run, then I can walk."
- 4 Solve for x: 0.6x + 1.5 = 3.9
- 5 Find the value of  $(x^2 5x + 4)$  if x = 7.
- 6 Solve the following system of equations for x:

$$3x + y = 9$$
$$2x - y = 6$$

- 7 In a class of 24 students, 25% of them failed a test. How many students failed the test?
- 8 On level ground, a person 6 feet tall casts a shadow of 8 feet. At the same time, a nearby tree casts a shadow of 20 feet. Find the number of feet in the height of the tree.
- 9 From a standard deck of 52 cards, one is drawn at random. What is the probability that the card is *not* a heart?
- 10 Solve for x: 3(x 8) = x + 4

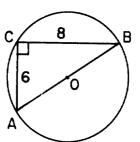
11 In the accompanying diagram, parallel lines  $\overrightarrow{AB}$  and  $\overrightarrow{CD}$  are cut by transversal  $\overrightarrow{GH}$  at E and F, respectively. If  $m \angle BEF = (3x + 60)$  and  $m \angle EFD = 60$ , find the value of x.



- 12 Two numbers whose sum is 24 are in the ratio of 1:3. Find the *smaller* number.
- 13 Solve for x:  $\frac{2}{3}x = -12$
- 14 Find the sum of  $2x^2 5x 2$  and  $4x^2 6x + 8$ .
- 15 Solve for x in terms of b and c:

$$2x - b = c$$

- 16 Find the perimeter of a square whose area is 25
- 17 In the accompanying diagram, right triangle ABC is inscribed in circle O and  $\overline{AOB}$  is a diameter. If AC = 6 and BC = 8, find the length of the radius of the circle.



- 18 Find the measure of a base angle of an isosceles triangle whose vertex angle measures 72.
- 19 Express  $x^2 + 5x 6$  as the product of two
- 20 Express  $\frac{x}{6} + \frac{x}{8}$  as a single fraction in lowest terms.

Directions (21-35): 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.

- 21 A bag contains 2 red marbles and 3 blue marbles. If one marble is drawn at random, what is the probability that it is red?
  - $(1) \frac{1}{5}$

- $(2) \frac{2}{5}$
- 22 When x = 2 and y = 3, which expression has the smallest value?
  - (1) x y
- $(2) x \cdot y$
- $\begin{array}{ccc} (3) x + y \\ (4) x + y \end{array}$
- 23 The smallest whole number that satisfies the inequality 3x - 1 > 2 is
  - (1) 1

(2) 2

- 24 John has 6 pairs of pants and 3 shirts. How many possible outfits consisting of one shirt and one pair of pants can he select?
  - (1) 9

(3) 12

(2) 2

- (4) 18
- 25 The product of  $3x^2y^3$  and  $-4x^3y^4$  is

  (1)  $-7x^5y^7$ (2)  $-x^5y^7$ (3)  $-12x^5y^7$ (4)  $-12x^6y^{12}$

- 26 What is the measure of an inscribed angle that intercepts an arc whose measure is 200?
  - (1) 100

(3) 300

(2) 200

- (4) 50
- 27 Which point satisfies the equation 2x + 3y = 8?

- (2) (2,2)
- (3) (-1,3)(4) (-2,4)
- 28 For the group of data, 3, 3, 5, 8, 18, which is true?
  - (1) median > mean
- (3) mean > median
- (2) mode > mean
- (4) median = mode
- 29 If the length of a rectangular solid is unchanged but the width and height are tripled, then the volume of the original figure is multiplied by a factor of
  - (1) 6

 $(3) \ 3$ 

(2) 9

- (4) 27
- 30 What is the y-intercept of the graph of the equation  $y = \frac{1}{4}x - \frac{2}{3}$ ?

  - $(1) -\frac{2}{3} \qquad (3) -\frac{1}{4}$
- $(4) \frac{1}{4}$
- 31 Which is the contrapositive of  $\sim p \rightarrow q$ ?

- $\begin{array}{ccc}
  (3) & \sim p & \leftrightarrow q \\
  (4) & \sim q & \to p
  \end{array}$
- 32 The sum of  $\sqrt{18}$  and  $6\sqrt{2}$  is
  - (1)  $7\sqrt{20}$
- (3)  $15\sqrt{2}$
- (2)  $9\sqrt{2}$
- (4) 18
- 33 If the replacement set for x is the set of real numbers, which graph represents the inequality  $x + 6 \ge 3$ ?



- 34 If p represents "x is prime" and q represents "2x = 10," then which statement is true when x = 3?
  - $\begin{array}{cccc} (1) \ p \ \lor \ q \\ (2) \ p \ \land \ q \end{array}$
- $\begin{array}{ccc} (3) & p & \rightarrow & q \\ (4) & q & \end{array}$

- 35 How many different ways can 3 students be seated in a row of 3 fixed chairs?
  - (1) 1 (2) 6

(4) 9

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

#### Part II

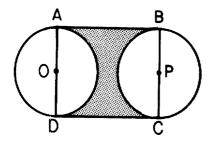
Answer four questions from this part. Show all work unless otherwise directed. [40]

36 On the same set of coordinate axes, graph the following system of inequalities and label the solution set S:

$$\begin{array}{ccc}
x & + & y & < 3 \\
y & \leq & 2x
\end{array} [8,2]$$

- 37 The square of a positive number is 12 more than 4 times the number. Find the number. [Only an algebraic solution will be accepted.]

  [5,5]
- 38 In the accompanying diagram, circles O and P have diameters  $\overline{AD}$  and  $\overline{BC}$ , respectively,  $\overline{AD} \cong \overline{BC}$ , AD = 12, ABCD is a rectangle, and side AB = 15. [Answers may be left in terms of  $\pi$ .]



- a What is the perimeter of rectangle ABCD? [2]
- b What is the area of rectangle ABCD? [2]
- c What is the length of the radius of circle O? [2]
- d What is the area of circle O? [2]
- e What is the area of the shaded region in the diagram? [2]
- 39 Solve the following system of equations algebraically and check:

$$3x + 2y = 6 
5x - 3y = -28$$
[8,2]

- 40 The longer leg of a right triangle is 7 more than the shorter leg. The hypotenuse is 8 more than the shorter leg. The perimeter of the triangle is 30.
  - a Find the length of each leg. [Only an algebraic solution will be accepted.] [8]
  - b Find the area of the triangle. [2]
- 41 Each of 20 students was asked to select *one* number from the following choices: 6, 7, 8, 9, 10. The table below gives the distribution of these selections.

Number	Frequency	
6	3	
7	10	
8	1	
9	4	
10	2	

- a On your answer paper, draw a frequency histogram for the given data. [4]
- b Find the mode. [2]
- c What is the probability that a student selected the number 7? [2]
- d What is the probability that a student selected a number less than 6? [2]

GO RIGHT ON TO THE NEXT PAGE.

42 a On your answer paper, copy and complete the truth table for the statement  $(p \rightarrow q) \rightarrow (\sim p \lor q)$ .

[8]					
p	q	~ p	$(p \rightarrow q)$	$(\sim p \lor q)$	$(p \to q) \leftrightarrow (\sim p \lor q)$
Т					
Т					
F					
F					

- b What is logically equivalent to "If Rob can borrow a car, then he will take Susan to the prom"? [2]
  - (1) If Rob can not borrow a car, then he will not take Susan to the prom.
  - (2) Rob can borrow a car and he will take Susan to the prom.
  - (3) It is not the case that Rob will borrow a car or take Susan to the prom.
  - (4) Rob can not borrow a car or he will take Susan to the prom.

## The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

# SEQUENTIAL MATH — COURSE I

Friday, June 20, 1986-9:15 a.m. to 12:15 p.m., only

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

## ANSWER SHEET

Pupil	•••••••••	Teacher			
School	• • • • • • • • • • • • • • • • • • • •	•••••••••	· · · · · · · · · · · Grade · · · · · · · · ·		
		be recorded on this answer			
		art 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			
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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.

# FOR TEACHERS ONLY

#### **SCORING KEY**

## THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

# **COURSE I**

Friday, June 20, 1986-9:15 a.m. to 12:15 p.m., only

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use checkmarks to indicate pupil 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 21–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(30) 1

(1) 40	(11) 20	(21) 2
(2) 4	(12) 6	(22) 1
$(3) p \rightarrow q$	(13) -18	(23) 2
(4) 4	$(14) \ 6x^2 - 11x + 6$	(24) 4
(5) 18	$(15) \ \frac{b+c}{2}$	(25) 3
(6) 3	(16) 20	(26) 1
(7) 6	(17) 5	(27) 4
(8) 15	(18) 54	(28) 3
$(9) \frac{39}{52}$	(19) (x + 6)(x - 1)	(29) 2

(10) 14

(31) 4

(32) 2

 $(33) \ 3$ 

(34) 1

(35) 2

### SEQUENTIAL MATH-COURSE I — concluded

#### Part II

Please refer to the Department's pamphlet Guide for Rating Regents Examinations in Mathematics. 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) Analysis 6	[5] [5]	$(40) \begin{array}{ccc} a & 5, & 12 \\ b & 30 \end{array}$	[8] [2]
$\begin{array}{c} (38) \ a \ 54 \\ b \ 180 \\ c \ 6 \\ d \ 36\pi \\ e \ 180 \ - \ 36\pi \end{array}$	[2] [2] [2] [2] [2]	$\begin{array}{ccc} (41) & b & 7 \\ & c & \frac{10}{20} \\ & d & 0 \end{array}$	[2] [2] [2]
(39) $(-2,6)$ or $\begin{array}{ccc} x &=& -2 \\ y &=& 6 \end{array}$	[8]	(42) b 4	[2]
Check	[2]		