### The University of the State of New York

### REGENTS HIGH SCHOOL EXAMINATION

### THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

# **COURSE I**

Friday, June 18, 1982 — 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.

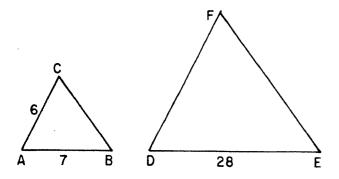
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

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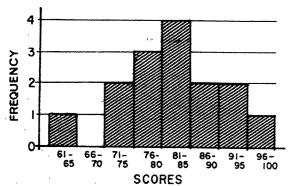
### Part I

Answer 30 questions from this part. Each correct answer will receive 2 credits. Write your answers in the spaces provided on the separate answer sheet.

- 1 Solve for y:  $\frac{y}{12} = \frac{4}{3}$
- 2 In the accompanying figure, triangle ABC is similar to triangle DEF. If AC = 6, AB = 7, DE = 28,  $\angle B \cong \angle E$ , and  $\angle C \cong \angle F$ , find DF.



3 The graph below shows the distribution of scores on a math test. How many students took the math test?



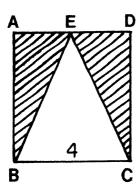
- 4 Solve for x:
- 5 Solve for x: 0.02x = 32.6
- 6 In a class of 20 students, 12 are boys and 8 are girls. If a student is randomly selected, what is the probability that the student will be a boy?
- 7 If p represents the perimeter of a square, represent the length of a side of the square in terms of p.
- 8 Express the mean of (2x + 1), (x + 1), and (3x 8)in terms of x.
- 9 The probability that an event will not occur is  $\frac{7}{12}$ . What is the probability that the event will occur?

- 10 The circumference of a circle is  $12\pi$ . What is the radius of the circle?
- 11 What percent of 30 is 9?
- 12 Let p represent the statement "The base angles are congruent," and let q represent the statement "A triangle is isosceles." Using p and q, write in symbolic form: "A triangle is isosceles if and only if the base angles are congruent."
- 13 Express  $\frac{2a}{3} \frac{a}{4}$  as a single fraction.
- 14 If the point (2,3) lies on the graph of the equation 2x + ky = -2, find the value of k.
- 15 Factor:  $25x^2 - 16$
- 16 How many different arrangements of four digits can be formed from the digits 2, 5, 6, and 7, if each digit is used only once in each arrangement?
- 17 Solve for b in terms of V and h:  $V = \frac{bh}{2}$
- 18 The test scores for a group of students are 70, 80, 30, 80, 60, 65, and 90. What is the median score for this group of students?
- 19 Solve the following system of equations for x: 3x + y = 5 y = 5x 3

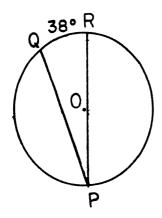
$$3x + y = 5$$
$$y = 5x - 3$$

- 20 The lengths of two legs of a right triangle are 3 and 5. Find, in radical form, the length of the hypotenuse.
- 21 The length of a rectangle is represented by (x + 3), and the width of the rectangle is represented by (x - 8). Express the area of the rectangle as a trinomial in terms of x.
- 22 If two angles of a triangle are complementary, find the number of degrees in the third angle of the triangle.

23 In the accompanying diagram, triangle BCE is inscribed in square ABCD. If the length of side  $\overline{BC}$  is 4 centimeters, what is the area in square centimeters of the shaded portion of the diagram?



24 As shown in the accompanying diagram, angle OPR is inscribed in circle O. If arc QR measures 38°, what is the measure in degrees of angle QPR?



25 Factor:  $x^2 - 6x + 9$ 

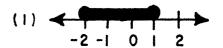
Directions (26-35): For each question chosen, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.

- 26 The product  $(-4x^2)(3x^3)$  is equal to
  - $(1) -12x^5$
- (3)  $12x^5$
- (2)  $-12x^6$
- $(4) 12x^6$
- 27 Which is an irrational number?
  - (1)  $\sqrt{9}$

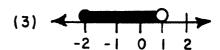
(2)  $\sqrt{2}$ 

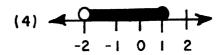
- (4) 0
- 28 The expression  $6 \le x + 4$  is equivalent to
  - (1)  $x \ge 2$
- $(3) x \leq -2$
- $(2) x \leq 2$
- $(4) x \ge 10$

29 Which graph represents the solution set of  $-2 \le x < 1$ ?









- 30 Which expression is undefined or meaningless when
  - (1)  $x^{\frac{0}{5}}$

(3)  $\frac{1}{x-5}$ 

(2)  $x^{-5}$ 

- (4)  $\frac{1}{r+5}$
- 31 Let p represent the statement: "x is even." Let q represent the statement: " $x \le 12$ ." Which is true if x = 20?
  - $\begin{array}{ccc} (1) & p \rightarrow & q \\ (2) & p \wedge & q \end{array}$
- $\begin{array}{c} (3) \sim p \vee q \\ (4) p \wedge \sim q \end{array}$

- 32 Which is the equation of a line parallel to the line whose equation is y = 3x + 1?
  - (1)  $y = -\frac{1}{3}x + 1$  (3) y = 3x 1
  - (2) y = 2x + 1
- (4) y = -3x + 1
- 33 One of the factors of  $3x^3 6x^2$  is
  - (1)  $3x^2$

(2)  $3x^3$ 

- $\begin{array}{ccc} (3) & -6x^2 \\ (4) & (x 6x^2) \end{array}$
- 34 Which is always false?
  - $(1) p \rightarrow q$
- $\begin{array}{ccc} (3) & \sim p & \rightarrow & \sim q \\ (4) & p & \wedge & \sim p \end{array}$
- (2)  $q \rightarrow p$
- 35 The solution set of  $x^2 7x + 10 = 0$  is
  - $(1) \{2,-5\}$
- (2)  $\{2,5\}$
- (3) {-2,5} (4) {-2,-5}

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.

36 a On your answer paper, copy and complete the truth table for the statement  $\neg q \rightarrow [(p \rightarrow q) \land \neg p]$ 

p	$\boldsymbol{q}$	$p \rightarrow q$	$\sim p$	~q	$(p \rightarrow$	$q) \wedge$	~p	$\sim q \rightarrow [(p \rightarrow q) \land \sim p]$
T	T						····	
T	F					<del></del>		
F	T							
F	F					**********		

b Is  $\sim q \rightarrow [(p \rightarrow q) \land \sim p]$  a tautology? [1] c Justify the answer you gave in part b. [1]

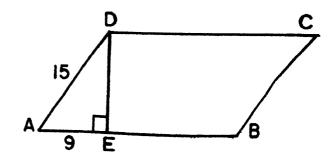
37 a Solve the following system of equations algebraically:

$$\begin{array}{ccc} x - y = 1 \\ 3x + y = 9 \end{array} \quad [4]$$

- b On a set of coordinate axes, graph the system of equations in part a. [6]
- 38 An architect wants to design a rectangular room so that its length is 8 meters more than its width, and its perimeter is greater than 56 meters. If each of the dimensions of the room must be a whole number of meters, what are the smallest possible measures in meters of the length and width? [Only an algebraic solution will be accepted.] [5,5]
- 39 Mary chose one of the four numbers, 1, 2, 3, and 6, at random. She then chose one of the two numbers, 1 and 5, at random.
  - a Draw a tree diagram or list the sample space of all possible pairs of numbers that Mary could choose.

    [3]
  - b Find the probability that Mary chose an even number first followed by an odd number. [2]
  - c Find the probability that Mary chose at least one even number. [2]
  - d Find the probability that both choices were the same number. [2]
  - same number. [2]
    e Find the probability that Mary chose two even numbers. [1]

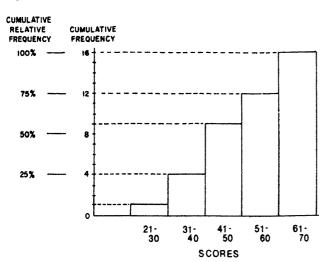
- 40 Find three consecutive odd integers such that the square of the first is equal to the second plus twice the third. [Only an algebraic solution will be accepted.] [5,5]
- 41 In the diagram of parallelogram ABCD,  $\overline{DE}$  is perpendicular to  $\overline{AB}$ , AD = 15, and AE = 9.



- a Find DE. [2]
  b If BE is 2 less than twice AE, find BE. [1]
  c Find AB. [1]
  d Find the area of triangle AED. [2]
- e Find the area of triangle AED. [2]
  f Find the area of trapezoid EBCD. [2]

GO RIGHT ON TO THE NEXT PAGE.

42 The diagram below is a cumulative frequency histogram of raw scores on a mathematics examination.



- a How many students took the examination? [2]
- b How many students had a score less than or equal to 60? [2]
- c What percent of the students had a score less than or equal to 60? [2]
- d Which interval contains the median? [2]
- e Which interval contains the lower quartile? [2]

### The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## **SEQUENTIAL MATH — COURSE I**

Friday, June 18, 1982 — 9:15 a.m. to 12:15 p.m., only

Part 1 Score:
Rater's Initials:

### **ANSWER SHEET**

Pupil		Teacher	
School			Grade
	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

Math.-Course I-June '82

[8]

# FOR TEACHERS ONLY

### SCORING KEY

### THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

## **COURSE I**

Friday, June 18, 1982 — 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 26-35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 16	(11) 30	$(21) x^2 - 5x - 24$	(31) 4
(2) 24	$(12) \ q \leftrightarrow p$	(22) 90	(32) 3
(3) 15	(13) $\frac{5a}{12}$	(23) 8	(33) 1
(4) 3	(14) -2	(24) 19	(34) 4
(5) 1630	(15) (5x + 4)(5x - 4)	(25) (x - 3)(x - 3)	(35) 2
(6) $\frac{12}{20}$	(16) 24	(26) 1	
$(7) \ \frac{p}{4}$	$(17) \ \frac{3V}{h}$	(27) 2	

(28) 1

(29) 3

(19) 1

(18) 70

(8) 2x - 2

### SEQUENTIAL MATH-COURSE I — concluded

### Part II

Please refer to the Department's pamphlet Suggestions on the Rating of Regents Examination Papers 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.

- 36 *b* No [1]
- $37 \ a \ x = \frac{5}{2}$   $y = \frac{3}{2}$ [4]
- 38 Analysis [5] 19,11 [5]
- 39  $b \frac{4}{8}$  [2]
  - $c \frac{4}{8} \qquad [2]$
  - $d \frac{1}{8} \qquad [2]$
  - e 0 [1]

- 40 Analysis [5] 5,7,9 [5]
- 42 a 16 [2] b 12 [2] c 75 [2] d 41-50 [2] e 31-40 [2]