The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 24, 1980 — 1:15 to 4:15 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

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 x: $\dfrac{3}{5} = \dfrac{9}{x}$

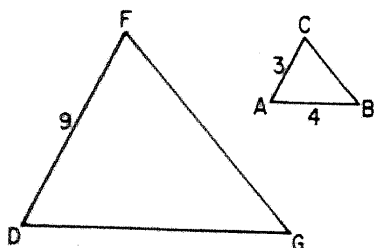2 Solve for x: $3(2x - 1) = 21$

3 Express as a trinomial: $(2x + 3)(x - 4)$

4 Solve for x: $x - 0.4 = 1.6$

5 Factor: $4x^2 - 25$

6 If the sides of a triangle are represented by $2x$, $x + 5$, and $3x - 6$, express the perimeter of the triangle in terms of x.

7 In the accompanying diagram of triangles ABC and DGF, $\angle A \cong \angle D$ and $\angle B \cong \angle G$. If $AC = 3$, $AB = 4$, and $DF = 9$, what is the length of $\overline{DG}$?

8 If the replacement set for x is $\{-3, -1, 0, 1, 3\}$, write the members of the solution set for $3x < 0$.

9 Solve the following system of equations for x:

$$3x + y = 5$$
$$2x - y = 5$$

10 Solve for x in terms of a, b, and c:

$$ax + b = c$$

11 If two angles of a triangle are complementary, find the number of degrees in the third angle.

12 If $x = -3$ and $y = 2$, find the value of $(xy)^2$.

13 Express the mean (average) of $x + 1$ and $3x - 3$ as a binomial.

14 A card is drawn from a standard deck of 52 cards. What is the probability that it is a king or an ace?

15 An advertising display has 20 red lights, 15 blue lights, 15 green lights, and 10 yellow lights. What is the probability that the first light to burn out is red?

16 If the probability that Robin's team will win is $\dfrac{4}{5}$, what is the probability that they will *not* win?

17 How many arrangements of two letters can be formed from the letters O,L,Y,M,P,I,C,S if each letter is used only once in each arrangement?

18 There are 6 roads between Plattsburgh and Lake Placid. In how many different ways can a person travel from Plattsburgh to Lake Placid and back to Plattsburgh?

19 Which whole number, when substituted for x, makes the following sentence true?

$$(3x > 6) \wedge (x < 4)$$

20 If one base angle of an isosceles triangle measures $35°$, find the measure of the vertex angle of the triangle.

21 As shown in the accompanying figure, vertical angles have degree measures of x and $2x - 35$. Find x.
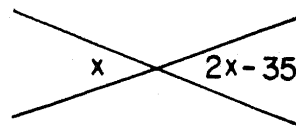
22 If the area of a circle is 64π, what is the radius of the circle?

23 In the accompanying figure, equilateral triangle ABC is inscribed in circle O. Find the number of degrees in arc AB.
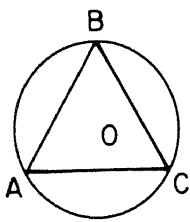
24 The length and width of a rectangle are 15 and 8, respectively. Find the length of a diagonal.

25 If p represents "Today is Monday" and q represents "Tomorrow is Wednesday," write in symbolic form using p and q: "If today is Monday, then tomorrow is not Wednesday."

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 When $-15x^6$ is divided by $-5x^3$, the quotient is
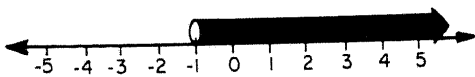(1) $3x^2$
(2) $-3x^2$
(3) $3x^3$
(4) $-3x^3$

27 For which set of numbers will the mean, median, and mode all be equal?
(1) 2,2,5
(2) 2,5,5
(3) 2,3,3,4
(4) 2,2,5,5

28 Which pair of numbers represents a point that does *not* lie on the graph of $2x + 3y = 6$?
(1) (0,2)
(2) (2,3)
(3) (3,0)
(4) (6,−2)

29 Which solution set is represented by the graph below?

(1) $\{x|x \geq -1\}$
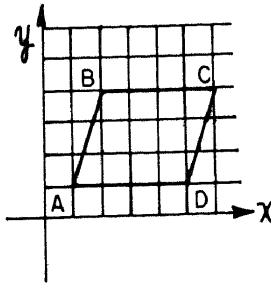(2) $\{x|x \leq -1\}$
(3) $\{x|x < -1\}$
(4) $\{x|x > -1\}$

30 The expression $\sqrt{90}$ is equivalent to
(1) $9\sqrt{10}$
(2) $6\sqrt{15}$
(3) $3\sqrt{10}$
(4) $10\sqrt{3}$

31 Parallelogram $ABCD$ is shown in the accompanying figure. Which must be true?

(1) slope of $\overline{AB}$ = slope of $\overline{BC}$
(2) slope of $\overline{AB}$ = slope of $\overline{DC}$
(3) slope of $\overline{AB}$ = slope of $\overline{AD}$
(4) slope of $\overline{DC}$ = slope of $\overline{AD}$

32 The graph of which equation has a slope of 3 and a y-intercept of -2?
(1) $y = 3x - 2$
(2) $y = 3x + 2$
(3) $y = 2x - 3$
(4) $y = 2x + 3$

33 Which is the inverse of $\sim p \rightarrow q$?
(1) $q \rightarrow \sim p$
(2) $p \rightarrow \sim q$
(3) $\sim q \rightarrow p$
(4) $p \rightarrow q$

34 Given the true statement: "If a figure is a square, then it is a rectangle."

Which sentence is also true?

(1) If a figure is a rectangle, then it is a square.
(2) If a figure is not a square, then it is not a rectangle.
(3) If a figure is a square, then it is not a rectangle.
(4) If a figure is not a rectangle, then it is not a square.

35 Let p represent "x is a prime number," and let q represent "x is an odd number."

Which is true if $x = 15$?

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

☞ GO RIGHT ON TO THE NEXT PAGE.

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 Answer *either* a or b but *not* both:

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

$$2x - y \le 3$$
$$3x + y < 7 \qquad [8,2]$$

  OR

  b Solve graphically and check:

$$2x + y = 0$$
$$y = 3x + 5 \qquad [8,2]$$

37 The sides of a rectangle are x and $x + 6$. The area of the rectangle is 55. Find the lengths of the sides. [*Only an algebraic solution will be accepted.*] [5,5]

38 a On your answer paper, copy and complete the truth table for the statement

$$[(p \rightarrow q) \wedge \sim q] \longleftrightarrow \sim p. \qquad [9]$$

p	q	$p \rightarrow q$	$\sim q$	$(p \rightarrow q) \wedge \sim q$	$\sim p$	$[(p \rightarrow q) \wedge \sim q] \leftrightarrow \sim p$
T	T					
T	F					
F	T					
F	F					

  b Is $[(p \rightarrow q) \wedge \sim q] \longleftrightarrow \sim p$ a tautology? [1]

39 One number is 4 more than another number. If four times the smaller number is decreased by twice the larger number, the result is 12. Find *both* numbers. [5,5]

40 As shown in the accompanying figure, $ABCD$ is a rectangle, E is a point on $\overline{AB}$, $DE = 13$, $AE = 5$, and $DC = 20$.
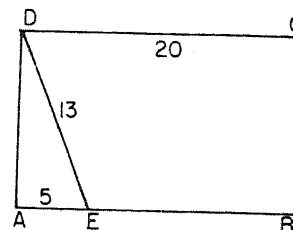
  a Find AD. [2]
  b Find the perimeter of trapezoid $EBCD$. [2]
  c Find the area of $\triangle AED$. [2]
  d Find the area of rectangle $ABCD$. [2]
  e Find the area of trapezoid $EBCD$. [2]

41 The following table represents the ages of the teachers at a school.

Interval	Number (f)
53–57	4
48–52	8
43–47	6
38–42	4
33–37	2
28–32	4
23–27	2

  a In what interval is the median? [2]
  b A teacher is chosen at random from this school. What is the probability that the teacher's age is in the interval 33–37? [2]
  c What is the probability that the age of a teacher from this school is less than 38? [2]
  d What is the probability that a teacher from this school is older than 57? [2]
  e What percent of the teachers are in the interval 43–47? [2]

42 Solve algebraically for x and y and check:

$$3x + 2y = 1$$
$$2x + 3y = 9 \qquad [8,2]$$

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Thursday, January 24, 1980 — 1:15 to 4:15 p.m., only

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.

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FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 24, 1980 — 1:15 to 4:15 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.] For questions 26–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 15	(11) 90	(21) 35	(31) 2
(2) 4	(12) 36	(22) 8	(32) 1
(3) $2x^2 - 5x - 12$	(13) $2x - 1$	(23) 120	(33) 2
(4) 2	(14) $\dfrac{8}{52}$	(24) 17	(34) 4
(5) $(2x + 5)(2x - 5)$	(15) $\dfrac{20}{60}$	(25) $p \rightarrow\, \sim q$	(35) 4
(6) $6x - 1$	(16) $\dfrac{1}{5}$	(26) 3	
(7) 12	(17) 56	(27) 3	
(8) $-3, -1$	(18) 36	(28) 2	
(9) 2	(19) 3	(29) 4	
(10) $\dfrac{c - b}{a}$	(20) 110° *or* 110	(30) 3	

[OVER]

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.

(37) Analysis   [5]
    5,11   [5]

(38) *b* no   [1]

(39) Analysis   [5]
    10,14   [5]

(40) *a* 12   [2]
   b 60   [2]
   c 30   [2]
   d 240 [2]
   e 210 [2]

(41) *a* 43–47   [2]

   b $\dfrac{2}{30}$ [2]

   c $\dfrac{8}{30}$ [2]

   d 0   [2]
   e 20   [2]

(42) $x = -3$
   $y = 5$ [8]

   Check   [2]