The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, June 15, 1981 — 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

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 π or in radical form.

1 Solve for x: $4x - 3 = 41$

2 Factor: $3x + 6y$

3 Factor: $a^2 - 4a - 21$

4 What is 12.5% of 80?

5 Solve for a: $3a + 0.2 = 5$

6 What is the positive root of the equation $(x - 4)(x + 3) = 0$?

7 If the length of the hypotenuse of a right triangle is 13 and the length of one leg is 12, find the length of the other leg.

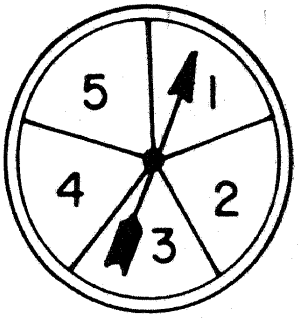
8 The lengths of the sides of $\triangle ABC$ are 5, 6, and 7. Triangle RST is similar to $\triangle ABC$. The longest side of $\triangle RST$ is 21. Find the length of the *shortest* side of $\triangle RST$.

9 The heights of the starting five players on a high school basketball team are 77", 72", 69", 74", and 77". What is the median height of these players?

10 Two angles of a triangle are equal in measure and the measure of the third angle is 150°. Find the number of degrees in one of the two equal angles.

11 If 25 pennies weigh 42 grams, find the weight in grams of 75 pennies.

12 In the accompanying figure, the spinner has five equal sections numbered 1 through 5. If the arrow is equally likely to land on any of the sections, what is the probability that it will land on an even number on the next spin?



13 Let p represent "It is summer" and q represent "I go swimming." Using p and q, write in symbolic form: "If I go swimming, then it is summer."

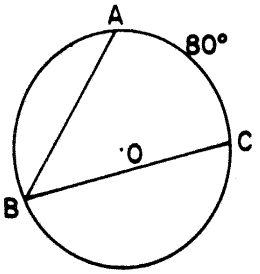
14 Solve the following system of equations for x:

$$3x + 2y = 19$$
$$x - 2y = 9$$

15 An urn contains 2 red marbles, 4 blue marbles, and 3 yellow marbles. If a single marble is randomly picked from the urn, what is the probability that a red or a blue marble is picked?

16 If the point $(k,4)$ lies on the graph of $2x + y = 10$, what is the value of k?

17 As shown in the accompanying diagram, angle ABC is inscribed in circle O and the measure of arc $AC = 80°$. Find the number of degrees in the inscribed angle ABC.



18 If the probability that Jones will win the election is 0.6, what is the probability that Jones will *not* win the election?

19 A student received test scores of 72, 84, and 86. What score must the student receive on a fourth test so that the mean of these scores will be 85?

20 The high temperatures during five days were 82°, 86°, 91°, 79°, and 91°. Find the mode for these temperatures.

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Directions (21–34): 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 If the length of a rectangle is represented by $2x - 3$ and its width is represented by $3x$, what is the area of the rectangle in terms of x?

(1) $6x^2 - 9x$
(2) $6x^2 - 3$
(3) $10x - 6$
(4) $5x - 3$

22 One member of the solution set of $-5 < x \leq -1$ is

(1) -1
(2) -5
(3) 3
(4) -6

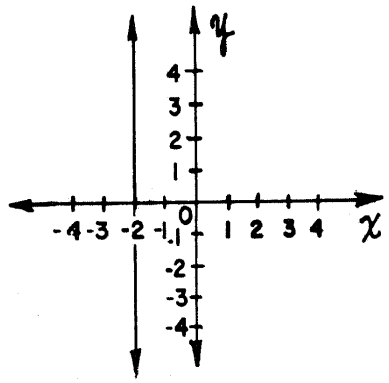
23 Which is a rational number?

(1) $\sqrt{6}$
(2) $\sqrt{16}$
(3) $\sqrt{18}$
(4) $\sqrt{24}$

24 If $p \leftrightarrow q$ is true, which statement must also be true?

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

25 In the accompanying diagram, the vertical line that intersects the x-axis at -2 is the graph of which equation?



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

26 The product of $3x^5$ and $2x^4$ is

(1) $5x^9$
(2) $5x^{20}$
(3) $6x^9$
(4) $6x^{20}$

27 What is the inverse of $p \rightarrow \sim q$?

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

28 Which has the same truth value as the statement, "If Bill pitched, then we won the game"?

(1) If we won the game, then Bill pitched.
(2) If we did not win the game, then Bill did not pitch.
(3) If Bill pitched, then we did not win the game.
(4) If Bill did not pitch, then we did not win the game.

29 The y-intercept of the graph of $y = \frac{2}{3}x + \frac{8}{3}$ is

(1) $\frac{3}{2}$
(2) 8
(3) $\frac{2}{3}$
(4) $\frac{8}{3}$

30 If the radius of a circle is 10, the area of the circle is

(1) 10π
(2) 20π
(3) 100π
(4) 100

31 An equation whose graph is parallel to the graph of $y = 3x + 4$ is

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

32 A booklet contains 30 pages. If 9 pages in the booklet have drawings, what percent of the pages in the booklet have drawings?

(1) 30%
(2) 9%
(3) 3%
(4) $\frac{3}{10}$%

33 The value of 5! is

(1) $\frac{1}{5}$
(2) 15
(3) 120
(4) 5

34 If $p \vee q$ is false, then

(1) p is true and q is false
(2) p is false and q is true
(3) both p and q are true
(4) both p and q are false

Directions (35): Leave all construction lines on the answer sheet.

35 *On the answer sheet,* using point B as the vertex, construct an angle congruent to angle A. [Use compasses and straightedge.]

☞ 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 Solve graphically and check:

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

37 The length of a rectangle is twice the length of a side of a square and the width of the rectangle is one less than the side of the square. If the perimeter of the rectangle is eight more than the perimeter of the square, find the length of a side of the square. [*Only an algebraic solution will be accepted.*] [5,5]

38 A contest offers a first prize of $10,000 or a car. The second prize is $500 or a television set or a set of encyclopedias.

a Make a tree diagram *or* write the sample space of all possible pairs of first and second prizes. [4]

b If each prize is equally likely to be chosen, find the probability that:

(1) both prizes are money [2]
(2) neither prize is money [2]
(3) one prize is money but the other is not [2]

39 The test scores of 15 students are 86, 57, 69, 82, 91, 87, 75, 84, 68, 65, 91, 88, 81, 62, 72.

a *On your answer paper,* copy and complete the table below. [3]

Interval	Frequency
90–99	
80–89	
70–79	
60–69	
50–59	

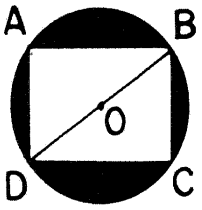
b *On graph paper,* draw a frequency histogram based on the data. [3]

c In which interval does the median lie? [2]

d What is the probability that a student, selected at random, scored above 89 on this test? [2]

40 The length of one leg of a right triangle is 8. The lengths of the other leg and the hypotenuse are consecutive odd integers. Find the length of the hypotenuse. [*Only an algebraic solution will be accepted.*] [6,4]

41 In the accompanying figure, rectangle $ABCD$ is inscribed in circle O and $\overline{DB}$ is a diameter. The radius of the circle is 5. [Answers may be left in terms of π.]



a Find the area of the circle. [2]
b If $CD = 8$, find BC. [3]
c Find the area of $\triangle BCD$. [2]
d Find the area of rectangle $ABCD$. [1]
e Find the area of the shaded portion of the figure. [2]

Question 42 is located on the next page.

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42 *a* *On your answer paper,* copy and complete the truth table for the statement $\sim(p \rightarrow q) \leftrightarrow (p \wedge \sim q)$. [8]

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

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

c Justify the answer you gave in part *b*. [1]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Monday, June 15, 1981 — 1:15 to 4:15 p.m., only

Part I 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 **Answer question 35 on the other side of this sheet.**
6.....	16.....	26.....	
7.....	17.....	27.....	
8.....	18.....	28.....	
9.....	19.....	29.....	
10.....	20.....	30.....	

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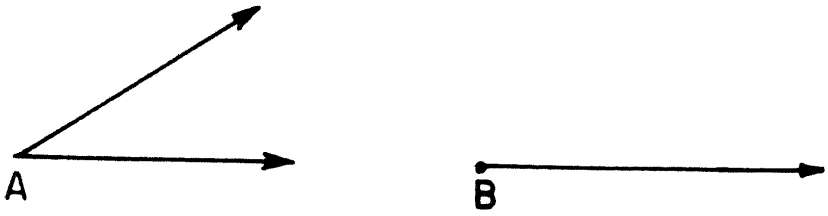

Your answers for Part II should be placed on paper provided by the school.

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.

Signature

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FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, June 15, 1981 — 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.] Allow no partial credit. For questions 21–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 11

(2) $3(x + 2y)$

(3) $(a - 7)(a + 3)$

(4) 10

(5) 1.6

(6) 4

(7) 5

(8) 15

(9) 74″ *or* 74

(10) 15

(11) 126

(12) $\frac{2}{5}$

(13) $q \rightarrow p$

(14) 7

(15) $\frac{6}{9}$

(16) 3

(17) 40

(18) 0.4

(19) 98

(20) 91 *or* 91°

(21) 1

(22) 1

(23) 2

(24) 4

(25) 1

(26) 3

(27) 3

(28) 2

(29) 4

(30) 3

(31) 2

(32) 1

(33) 3

(34) 4

(35) construction

[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 [5]

(38) *b* (1) $\frac{1}{6}$ [2]
(2) $\frac{2}{6}$ [2]
(3) $\frac{3}{6}$ [2]

(39) *c* 80–89 [2]
d $\frac{2}{15}$ [2]

(40) Analysis [6]
17 [4]

(41) *a* 25π [2]
b 6 [3]
c 24 [2]
d 48 [1]
e $25\pi - 48$ [2]