The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 14, 1985—8:30 to 11:30 a.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. [60]

1 A six-sided fair die is rolled. What is the probability of rolling a 3 or a 6?

2 David has d dollars. If he spends s dollars, express, in terms of d and s, the number of dollars he will have left.

3 Solve for x: $5x = x + 28$

4 If 2 gallons of paint are needed to paint 3,000 square feet of wall, how many gallons are needed to paint 15,000 square feet of wall?

5 Pat buys one of the top 10 record albums and one of 3 posters as a birthday gift. How many different gifts can Pat buy consisting of one top 10 album and one poster?

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

7 A student recorded the number of minutes spent on math homework for a week as follows: 25, 35, 35, 30, and 20. What is the mean number of minutes spent on math homework?

8 Given the replacement set {2,4,6,8}, find the solution set for the inequality $4x \leq 8$.

9 If the perimeter of a square is 20, find the area of the square.

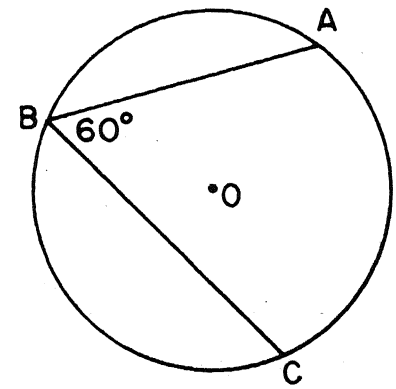
10 Evaluate the expression $(6a)^2b$ if $a = 2$ and $b = -1$.

11 Solve the following system of equations for x:

$$2x + y = 10$$
$$y = 3x$$

12 Solve for x: $1.4x + 4.4 = 10$

13 In the accompanying diagram, the measure of inscribed angle ABC of circle O is 60. Find the measure of minor arc AC.

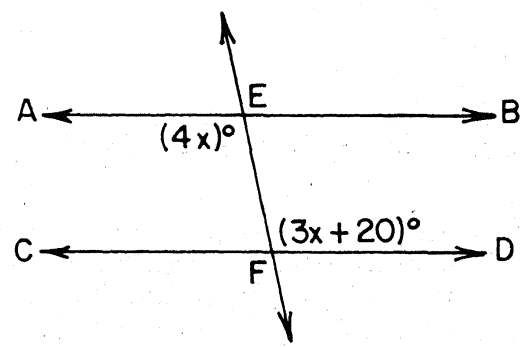


14 Solve for x: $\frac{3x}{4} = 24$

15 Find the product of $8y^3$ and $3y^6$.

16 What is the total number of possible 4-letter arrangements of the letters E, X, A, and M, if each letter is used only once in each arrangement?

17 In the accompanying diagram, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$, $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ at E and $\overleftrightarrow{CD}$ at F. If $m\angle AEF = 4x$ and $m\angle EFD = 3x + 20$, find x.



18 Let p represent "Today is Monday," and let q represent "The school week begins." Using p and q, write in symbolic form: "If the school week begins, then today is Monday."

19 If the angles of a triangle are represented by x, $3x$, and $5x$, what is the value of x?

20 Factor: $x^2 - y^2$

21 Find the radius of a circle whose circumference is 8π.

22 If point $(k,-2)$ lies on the graph of the equation $2x + 3y = 4$, what is the value of k?

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

$$ax - b = c$$

Directions (24 – 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.

24 Which represents a fraction whose denominator is 2 less than the numerator?

(1) $\frac{n}{2}$ (3) $\frac{2n}{n}$

(2) $\frac{n}{n-2}$ (4) $\frac{n-2}{n}$

25 If $\frac{x}{y} = -1$, which is true?

(1) $x = 0$ (3) $x = y$

(2) $y = 0$ (4) $x = -y$

26 The length of a rectangle is represented by $x - 5$ and the width by $x + 2$. The area of the rectangle is represented by

(1) $x^2 + 3x - 10$ (3) $x^2 - 3x - 10$

(2) $2x - 3$ (4) $4x - 6$

27 The product of $\frac{2}{3}$ and its reciprocal is equivalent to

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

(2) -1 (4) $-\frac{4}{9}$

28 Which is the contrapositive of the statement $p \rightarrow \sim q$?

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

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

29 Let p represent the statement "$x \geq 5$" and let q represent the statement "$2x = 4$." Which is true if $x = 6$?

(1) $p \wedge q$ (3) $p \rightarrow q$

(2) $p \vee q$ (4) $p \leftrightarrow q$

30 A card is drawn from a standard deck of 52 cards. What is the probability that the card drawn is a king and a spade?

(1) $\frac{1}{52}$ (3) $\frac{16}{52}$

(2) $\frac{2}{52}$ (4) $\frac{4}{52}$

31 If p is true and q is false, which statement must be false?

(1) $p \vee q$ (3) $p \rightarrow q$

(2) $q \rightarrow p$ (4) $p \wedge \sim q$

32 If the measure of each base angle of an isosceles triangle is represented by x, then the measure of the vertex angle is represented by

(1) $2x - 180$ (3) $180 - x$

(2) $2x$ (4) $180 - 2x$

33 The probability of an event happening is represented by $P(E)$. Which is a true statement?

(1) $0 < P(E) \leq 1$ (3) $0 < P(E) < 1$

(2) $0 \leq P(E) < 1$ (4) $0 \leq P(E) \leq 1$

34 The solution set of the equation $x^2 - 5x - 6 = 0$ is

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

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

35 *On the answer sheet*, using a compass and straightedge, construct an angle congruent to angle *ABC*, using $\overrightarrow{RS}$ as one ray of the angle.

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

Part II

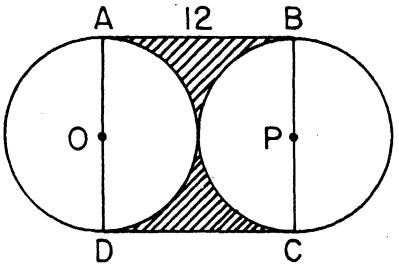
Answer four questions from this part. Show all work unless otherwise directed. [40]

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

$$y > -2$$
$$y \leq 3x - 4$$ [8,2]

37 The length of a side of a square is one more than twice the length of a side of another square. The perimeters of the two squares differ by 24 centimeters. Find, in centimeters, the length of a side of the *smaller* square. [*Only an algebraic solution will be accepted.*] [6,4]

38 In the accompanying diagram, $\overline{AD}$ is a diameter of circle *O*, $\overline{BC}$ is a diameter of circle *P*, *ABCD* is a square, and side $AB = 12$. [Answers may be left in terms of π.]



Find:

a the circumference of circle *O* [2]
b the area of circle *O* [2]
c the area of a semicircle of circle *P* [2]
d the area of square *ABCD* [2]
e the area of the shaded portion [2]

39 The length of the hypotenuse of a right triangle is 10. The length of the longer leg exceeds the length of the shorter leg by 2. Find the length of the *shorter* leg. [*Only an algebraic solution will be accepted.*] [5,5]

40 Solve the following system of equations algebraically and check:

$$3x - 2y = 5$$
$$4x + 3y = 18$$ [8,2]

41 An urn contains 3 red marbles and 2 green marbles. One marble is randomly selected, its color is noted, and it is *not* replaced. A second marble is randomly selected and its color is noted.

a Make a tree diagram or list the sample space showing all possible outcomes. [4]
b Find the probability that:
(1) both marbles are green [2]
(2) neither marble is green [2]
(3) at least one marble is green [2]

☞ **GO RIGHT ON TO THE NEXT PAGE.**

42 *a* *On your answer paper*, copy and complete the truth table for the statement $[p \vee (\sim p \wedge q)] \leftrightarrow (p \vee q)$. [9]

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

b Using your results from part *a*, is $[p \vee (\sim p \wedge q)] \leftrightarrow (p \vee q)$ a tautology? [1]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Wednesday, August 14, 1985—8:30 to 11:30 a.m., only

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

ANSWER SHEET

Pupil ..... Teacher .....

School ..... Grade .....

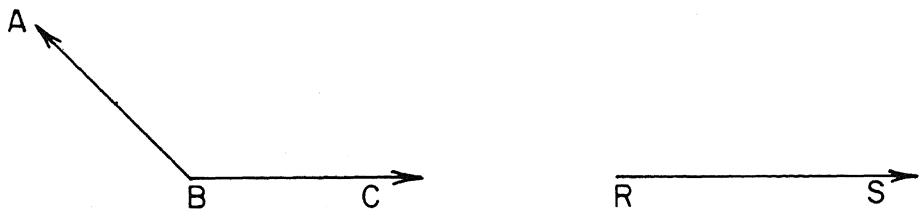
Your answers to Part I should be recorded on this answer sheet.

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	

35



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

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 14, 1985 — 8:30 to 11:30 a.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 24 – 34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{2}{6}$

(2) $d - s$

(3) 7

(4) 10

(5) 30

(6) –1

(7) 29

(8) 2 *or* {2}

(9) 25

(10) –144

(11) 2

(12) 4

(13) 120

(14) 32

(15) $24y^9$

(16) 24

(17) 20

(18) $q \rightarrow p$

(19) 20

(20) $(x - y)(x + y)$

(21) 4

(22) 5

(23) $\frac{b + c}{a}$

(24) 2

(25) 4

(26) 3

(27) 1

(28) 2

(29) 2

(30) 1

(31) 3

(32) 4

(33) 4

(34) 1

(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 [6]
5 [4]

(38) *a* 12π [2]
b 36π [2]
c 18π [2]
d 144 [2]
e $144 - 36\pi$ [2]

(39) Analysis [5]
6 [5]

(40) $x = 3$ [8]
$y = 2$
Check [2]

(41) *b* (1) $\frac{2}{20}$ [2]
(2) $\frac{6}{20}$ [2]
(3) $\frac{14}{20}$ [2]

(42) *b* Yes [1]