The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, January 27, 1986—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. [60]

1 Solve for x: $\frac{4}{6} = \frac{x}{15}$

2 Let p represent "He is able" and let q represent "He will win." Using p and q, write in symbolic form: "He is able and he will win."

3 If 4 more than twice a number is 18, find the number.

4 Solve for x: $1.5x = 30$

5 A man has 8 shirts, 5 pairs of pants, and 6 ties. Find the total number of possible outfits he can wear consisting of a shirt, a pair of pants, and a tie.

6 Solve for x: $5x + 7 = 2x - 2$

7 Given the formula $P = K^2W$, find the value of P if $K = 5$ and $W = -3$.

8 Express as a single fraction in simplest form:

$$\frac{a}{3} + \frac{2a}{5}$$

9 Solve the following system of equations for x:

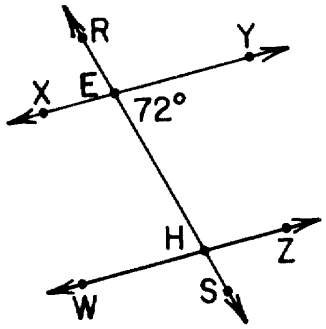
$$x + y = 6$$
$$x - y = 2$$

10 Given the following table, which score is the mode?

Score	Frequency
98	2
95	3
92	2
87	1
84	2

11 Factor: $x^2 + 5x - 24$

12 In the accompanying diagram, transversal $\overleftrightarrow{RS}$ intersects parallel lines $\overleftrightarrow{XY}$ and $\overleftrightarrow{WZ}$ at E and H, respectively. If $m\angle HEY = 72$, what is $m\angle ZHS$?



13 If $(k,3)$ is a point on the graph of the equation $x + 2y = 8$, what is the value of k?

14 A tree casts a shadow 24 feet long at the same time a man 6 feet tall casts a shadow 4 feet long. Find the number of feet in the height of the tree.

15 In how many different ways can the subjects math, English, social studies, and science be scheduled during the first four periods of the school day?

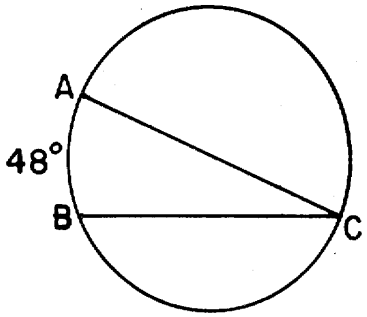
16 The measure of the vertex angle of an isosceles triangle is 70. Find the measure of a base angle of the triangle.

17 Find the sum of $5x^3 - 3x^2 + 5$ and $-2x^3 + 6x^2 - 5$.

18 What is the volume, in cubic centimeters, of a cube whose edge measures 2 centimeters?

19 Solve for x: $5x - 2(x + 1) = 10$

20 In the accompanying diagram, the measure of arc AB is 48. What is the measure of inscribed angle ACB?



21 The measures of two supplementary angles are in the ratio of 7:2. Find the measure of the *larger* angle.

22 Solve for a in terms of b and c:

$$3a + 4b = c$$

Directions (23 – 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.

23 If two fair dice are tossed once, the probability of getting 12 is $\frac{1}{36}$. What is the probability of not getting 12?

(1) $\frac{35}{36}$ (3) $\frac{6}{36}$

(2) $\frac{30}{36}$ (4) $\frac{34}{36}$

24 If x represents an even number, which expression represents an odd number?

(1) x^3 (3) $3x$

(2) $x + 3$ (4) $\frac{x}{3}$

25 Each side of a regular hexagon is represented by $(x + 6)$. Which expression represents the perimeter of the hexagon?

(1) $36x$ (3) $6x + 6$

(2) $5x + 30$ (4) $6x + 36$

26 From a standard deck of 52 cards, one card is drawn. What is the probability that it will be either a club or a diamond?

(1) $\frac{8}{52}$ (3) $\frac{26}{52}$

(2) $\frac{2}{52}$ (4) $\frac{12}{52}$

27 The y-intercept of the graph of the equation $y = 2x - 3$ is

(1) -2 (3) 3

(2) 2 (4) -3

28 The inequality $3x + 2 > x + 8$ is equivalent to

(1) $x > -\frac{3}{2}$ (3) $x > 3$

(2) $x > \frac{3}{2}$ (4) $x < 3$

29 The circumference of a circle is represented by $2\pi r$. If the radius of the circle is doubled, then the circumference is

(1) multiplied by 4 (3) squared

(2) increased by 2 (4) doubled

30 The quotient of $\frac{-18x^6}{6x^3}$ is equal to

(1) $-3x^3$ (3) $-12x^2$

(2) $-3x^2$ (4) $-12x^3$

31 What is the converse of the statement $q \rightarrow p$?

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

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

32 Which represents an irrational number?

(1) 0 (3) $\sqrt{3}$

(2) $\frac{3}{4}$ (4) $\sqrt{4}$

33 For which value of x is the expression $\frac{x}{x - 2}$ undefined?

(1) 1 (3) -2

(2) 2 (4) 0

34 Let p represent the statement "x is prime" and let q represent the statement "$x < 10$." If $x = 11$, which statement is true?

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

35 The solution set of the equation $x^2 - 4x = 0$ is

(1) $\{0,4\}$
(2) $\{4,-4\}$
(3) $\{-4\}$
(4) $\{4\}$

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 *a* On the same set of coordinate axes, graph the following system of inequalities:

$$y < 2x + 4$$
$$x + y \leq 7$$ [8]

b Based on your answer to part *a*, write the coordinates of a point which is *not* in the solution set of the system of inequalities. [2]

37 The square of a positive number decreased by 4 times the number is 12. Find the positive number. [*Only an algebraic solution will be accepted.*] [5,5]

38 The length of a rectangle is 7 more than the side of a square. The width of the rectangle is equal to the side of the square. The area of the square is 56 less than the area of the rectangle. Find the width of the rectangle. [*Only an algebraic solution will be accepted.*] [6,4]

39 Solve the following system of equations algebraically and check:

$$x - 4y = 16$$
$$y = 1 - x$$ [8,2]

40 Let p represent: x is an even integer.
Let q represent: x is a prime number.
Let r represent: x is divisible by 3.

a Write each statement in sentence form:

(1) $\sim r \vee q$ [2]

(2) $p \rightarrow r$ [2]

b Write each statement in symbolic form:

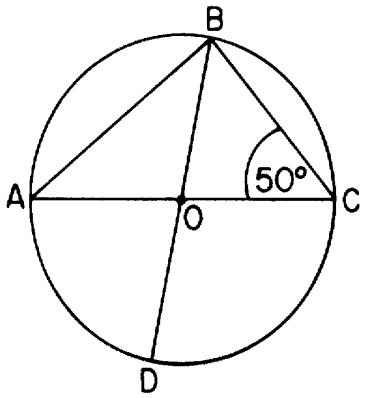
(1) x is an even integer, if and only if x is divisible by 3. [2]

(2) If x is a prime number and x is divisible by 3, then x is an even integer. [2]

c Write in symbolic form the contrapositive of:

If x is not an even number, then x is a prime number. [2]

41 In the accompanying diagram, $\overline{AC}$ and $\overline{BD}$ are diameters of circle O and the measure of $\angle ACB$ is 50.



a Find the measure of minor arc AB. [2]

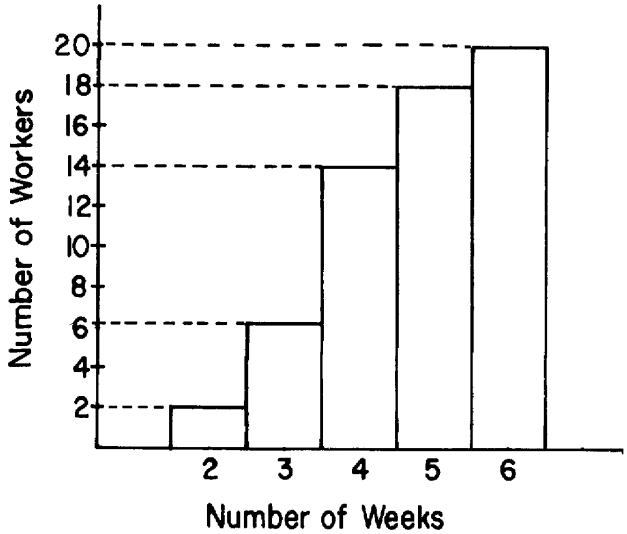
b Find $m\angle BOC$. [2]

c Find $m\angle BAC$. [2]

d Find the measure of minor arc AD. [2]

e Find $m\angle ABC$. [2]

42 The cumulative frequency histogram below shows the number of weeks of annual vacation for workers at a company.



a How many workers are employed by the company? [2]

b How many workers receive more than 4 weeks of vacation? [2]

c Find the median number of weeks of vacation. [2]

d Using the data from parts *a*, *b*, and *c*, draw a frequency histogram on your paper. [4]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Monday, January 27, 1986—1:15 to 4:15 p.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 .....
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

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Monday, January 27, 1986 – 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 23 – 35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 10

(2) $p \wedge q$

(3) 7

(4) 20

(5) 240

(6) -3

(7) -75

(8) $\frac{11a}{15}$

(9) 4

(10) 95

(11) $(x + 8)(x - 3)$

(12) 72

(13) 2

(14) 36

(15) 24

(16) 55

(17) $3x^3 + 3x^2$

(18) 8

(19) 4

(20) 24

(21) 140

(22) $\frac{c - 4b}{3}$

(23) 1

(24) 2

(25) 4

(26) 3

(27) 4

(28) 3

(29) 4

(30) 1

(31) 2

(32) 3

(33) 2

(34) 3

(35) 1

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]
6 [5]

(38) Analysis [6]
8 [4]

(39) (4,–3) *or* $x = 4$, $y = -3$ [8]
Check [2]

(40) *b* (1) $p \leftrightarrow r$ [2]
(2) $(q \wedge r) \rightarrow p$ [2]
c $\sim q \rightarrow p$ [2]

(41) *a* 100 [2]
b 80 [2]
c 40 [2]
d 80 [2]
e 90 [2]

(42) *a* 20 [2]
b 6 [2]
c 4 [2]