The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, January 25, 1995 – 9:15 a.m. to 12:15 p.m., only

Notice . . .

Calculators must be available to all students taking this examination.

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

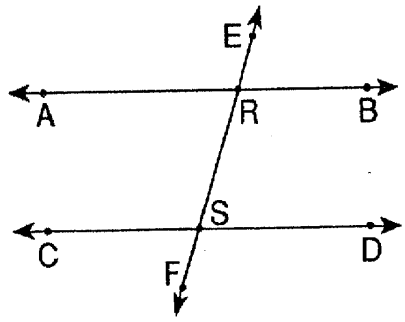
Part I

Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will b allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answer may be left in terms of π or in radical form. [60]

1 Let p represent "The outside temperature is 30°C," and let q represent "It is summer." Write in symbolic form, using p and q, "If it is not summer, then the outside temperature is not 30°C."

2 Solve for x: $8x + 9 = 5x + 6$

3 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{EF}$ at R and S, respectively. If $m\angle ERB = 72$, find $m\angle RSC$.



4 Find the value of $a^2 - b$ if $a = 3$ and $b = -5$.

5 What is the slope of the graph of the equation $y = 2x - \frac{3}{2}$?

6 Solve for x: $\frac{x}{4} + 7 = 5$

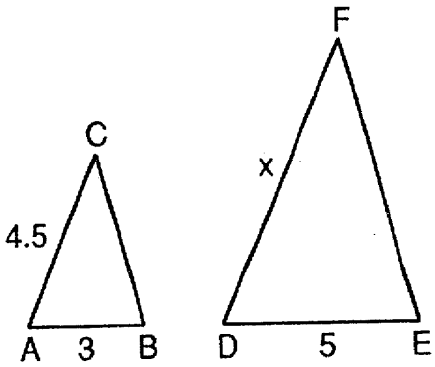
7 Two cubes whose faces are numbered 1 through 6 are tossed. What is the probability that both cubes show the same number?

8 Gabe took five tests and got different scores on each test. If one of these scores is selected at random, what is the probability that the score selected is less than the median score?

9 If the sum of a number and four is multiplied b two, the result is 28. What is the number?

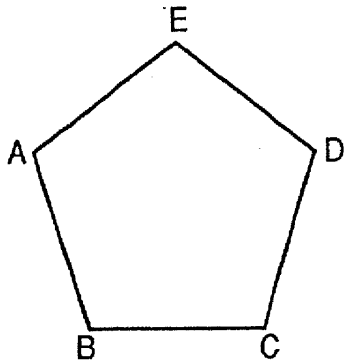
10 The measures of the three angles of a triangle ar represented by x, $3x$, and $x + 30$. Find the valu of x.

11 In the accompanying diagram, $\triangle ABC$ is simil to $\triangle DEF$ with $\angle A \cong \angle D$ and $\angle B \cong \angle E$. $AC = 4.5$, $AB = 3$, $DF = x$, and $DE = 5$, find th value of x.



12 Factor: $x^2 - x - 6$

13 In the accompanying diagram, $ABCDE$ is a reg lar pentagon with the measure of $\overline{AB}$ represent by $2x + 1$. If the perimeter of the pentagon is find the value of x.



14 Solve the following system of equations for x:

$$4x + y = 11$$
$$x + y = 2$$

15 When Paula went bowling, she scored 118 and 138 in her first two games. What must she score in a third game to have an average score of 132?

16 Express as a single fraction in lowest terms:

$$\frac{x}{2} + \frac{2x}{3}$$

17 Express the sum of $\sqrt{18} + 5\sqrt{2}$ in simplest radical form.

18 What is the radius of a circle whose circumference is 16π?

19 If the number 0.00048 is written in the form 4.8×10^n, what is the value of n?

20 The ratio of the measures of two complementary angles is 5:4. What is the measure of the larger angle?

Directions (21–35): 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.

21 Which statement has the same truth value as $r \rightarrow \sim s$?

(1) $s \rightarrow r$
(2) $r \rightarrow s$
(3) $\sim s \rightarrow \sim r$
(4) $s \rightarrow \sim r$

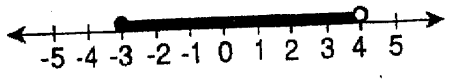
22 Which letter has both line and point symmetry?

(1) **A**
(2) **S**
(3) **Z**
(4) **H**

23 How many different 5-letter arrangements can be formed from the letters in the name "CATHY" if each letter is used only once in each arrangement?

(1) 1
(2) 5
(3) 120
(4) 3125

24 Which inequality is represented by the graph below?

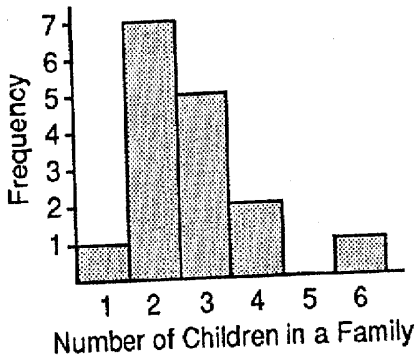


(1) $-3 < x \leq 4$
(2) $-3 < x < 4$
(3) $-3 \leq x \leq 4$
(4) $-3 \leq x < 4$

25 A car is traveling at 60 miles per hour. How many miles per minute is the car traveling?

(1) 1
(2) $\frac{1}{60}$
(3) $\frac{1}{360}$
(4) 3600

26 The histogram below shows the distribution of the number of children in the families of the students in a ninth-grade class.



The mode of the set of data in the histogram is

(1) 5
(2) 2
(3) 3
(4) 7

27 If $12x^2 - 3x$ is divided by $3x$, the quotient is

(1) $4x - 3$
(2) $4x - 1$
(3) $3x$
(4) $4x$

28 A quadrilateral with four congruent sides and an angle measuring 60° must be a

(1) rhombus
(2) square
(3) rectangle
(4) trapezoid

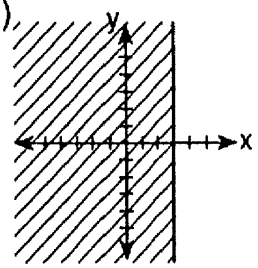
29 The sum of two numbers is s. If one of the numbers is n, the second number can be expressed as

(1) $s + n$
(2) $s \div n$
(3) $s - n$
(4) $n - s$

[OVER]

30 Which diagram below represents the graph of the statement $x \geq 3$?

(1)



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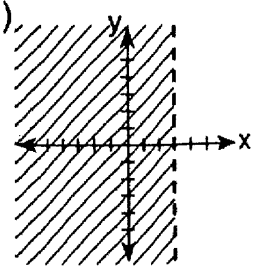
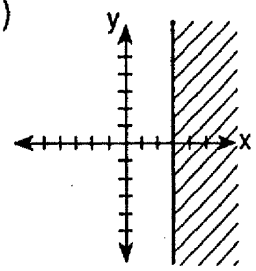
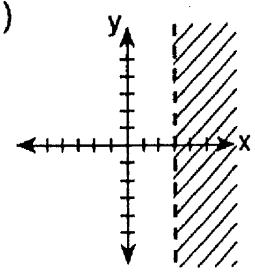


(2)



(4)



31 If the hypotenuse of a right triangle is 6 and one leg is 5, the other leg is

(1) $\sqrt{61}$
(2) 61
(3) $\sqrt{11}$
(4) 11

32 Which statement is true if r is true and s is false?

(1) $(r \wedge s) \rightarrow s$
(2) $r \wedge (r \wedge s)$
(3) $r \rightarrow (r \wedge s)$
(4) $r \longrightarrow (r \wedge s)$

33 Which expression is equal to $(x + 3)^2$?

(1) $x^2 + 6$
(2) $x^2 + 9$
(3) $x^2 + 6x + 9$
(4) $x^2 + 3x + 9$

34 The roots of a quadratic equation are 4 and -5. Which quadratic equation has these roots?

(1) $(x - 4)(x + 5) = 0$
(2) $(x + 4)(x - 5) = 0$
(3) $(x - 4)(x - 5) = 0$
(4) $(x + 4)(x + 5) = 0$

35 If the ratio of the measures of corresponding sides of two similar triangles is 4:9, then the ratio of their perimeters is

(1) 2:3
(2) 4:9
(3) 16:81
(4) 8:27

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

Part II

Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 *a* On the same set of coordinate axes, graph the following lines:

$$x + y = 8 \quad [3]$$

$$y = \frac{1}{2}x - 1 \quad [3]$$

$$x = -2 \quad [2]$$

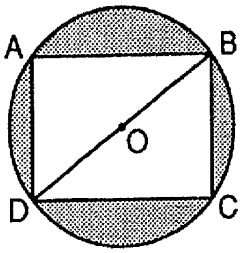
b Find the area of the triangle formed by the intersection of the lines drawn in part *a*. [2]

37 The larger of two positive integers is five more than twice the smaller integer. The product of the integers is 52. Find the integers. [*Only an algebraic solution will be accepted.*] [4,6]

38 Solve the following system of equations algebraically and check:

$$\begin{aligned} 2y &= 8 - x \\ y - 2x &= -1 \end{aligned} \quad [8,2]$$

39 In the accompanying diagram, *ABCD* is a rectangle inscribed in circle *O*. The ratio of *AB* to *BC* is 4:3. The area of the rectangle is 48 square centimeters.



a Find *DB* in centimeters. [7]

b Find, in terms of π, the area of the shaded portion. [3]

40 Ben has five chips in a hat. The chips are numbered 1, 2, 3, 4, and 5. One chip is drawn at random and its number is noted. The chip is put back into the hat and a second chip is drawn at random and noted.

a Draw a tree diagram or list the sample space showing all possible outcomes. [2]

b Find the probability that

(1) one of the two numbers drawn is odd and the other is even [2]

(2) the two numbers drawn are not the same number [2]

(3) the sum of the two numbers drawn is less than 7 [2]

(4) the sum of the two numbers drawn is greater than 10 [2]

41 Vincent has cut three pieces of rope to complete a science project. Two pieces are of equal length. The third piece is one-quarter the length of each of the others. He cut the three pieces from a rope 54 meters long without any rope left over. Find the number of meters in each piece. [*Show or explain the procedure used to obtain your answer.*] [10]

42 Let *p* represent: "I go to football games."
Let *q* represent: "I watch football games on television."

a Write *each* of these sentences in symbolic form:

(1) I do not go to football games and I do not watch football games on television. [1]

(2) If I go to football games, then I do not watch football games on television. [1]

b Construct a truth table for *each* sentence written in part *a*, determine whether or not the sentences are logically equivalent, and justify the answer. [8]

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SEQUENTIAL MATH – COURSE I

Wednesday, January 25, 1995 – 9:15 a.m. to 12:15 p.m., only

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

ANSWER SHEET

Pupil ..... Sex: ☐ Male ☐ Female Grade .....

Teacher ..... School .....

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

Tear Here

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, January 25, 1995 – 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 student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 21–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

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

(2) -1

(3) 108

(4) 14

(5) 2

(6) -8

(7) $\frac{6}{36}$

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

(9) 10

(10) 30

(11) 7.5

(12) $(x - 3)(x + 2)$

(13) 4

(14) 3

(15) 140

(16) $\frac{7x}{6}$

(17) $8\sqrt{2}$

(18) 8

(19) –4

(20) 50

(21) 4

(22) 4

(23) 3

(24) 4

(25) 1

(26) 2

(27) 2

(28) 1

(29) 3

(30) 2

(31) 3

(32) 1

(33) 3

(34) 1

(35) 2

[OVER]

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics* and its supplement. 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* 48 [2]

(37) 4 and 13 [4,6]

(38) $x = 2$
$y = 3$ [8,2]

(39) *a* 10 [7]

b $25\pi - 48$ [3]

(40) *b* (1) $\frac{12}{25}$ [2]

(2) $\frac{20}{25}$ [2]

(3) $\frac{15}{25}$ [2]

(4) 0 [2]

(41) 24, 24, and 6 [10]

(42) *a* (1) $\sim p \wedge \sim q$ [1]

(2) $p \rightarrow \sim q$ [1]