

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, June 17, 1997 — 9:15 a.m. to 12:15 p.m.. only

Notice . . .

Scientific 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 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]

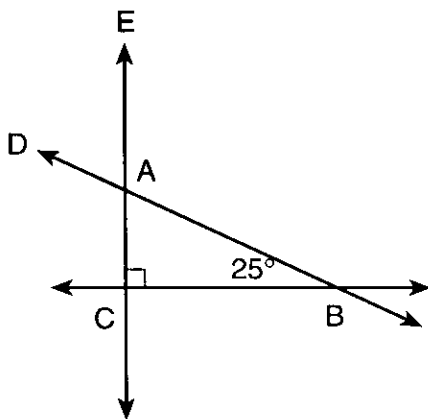
1 The sections of a spinner are shaded in blue and yellow. The probability that the spinner will land on a blue section is $\frac{4}{9}$. What is the probability that the spinner will *not* land on a blue section?

2 The Earth is approximately 93,000,000 miles from the Sun. If this distance is expressed as 9.3×10^n , what is the value of n ?

3 Solve for x : $0.5x + 3 = 4.5$

4 If the scores 18, 20, 25, 11, and x have a mean of 19, what is the value of x ?

5 In the accompanying diagram, \overleftrightarrow{BC} , \overleftrightarrow{BAD} , and \overleftrightarrow{CAE} intersect to form $\triangle ABC$. If $m\angle ABC = 25$ and $m\angle C = 90$, find $m\angle DAE$.



6 Factor: $y^2 - 100$

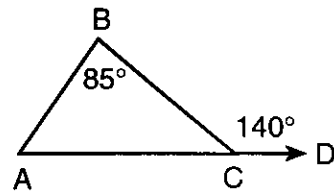
7 Two adjacent sides of a rhombus are represented by $5x + 7$ and $6x - 1$. Find the value of x

8 If two angles are supplementary and one angle is twice as large as the other, find the number of degrees in the measure of the *smaller* angle.

9 Solve for x : $\frac{x}{7} - 5 = -4$

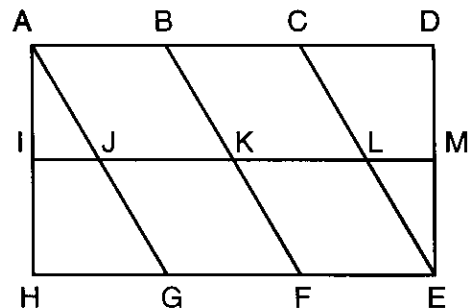
10 If y varies directly as x and $y = 24$ when $x = 4$, find the value of y when $x = 9$.

11 In the accompanying diagram of $\triangle ABC$, \overline{AC} is extended to D , $m\angle BCD = 140$, and $m\angle ABC = 85$. Find $m\angle BAC$.

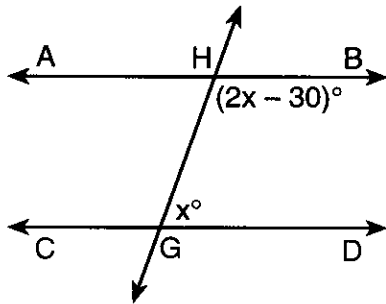


12 The sides of a triangle measure 9, 15, and 18. If the shortest side of a similar triangle measures 6, find the length of the longest side of this triangle.

13 In the accompanying diagram, K is the image of A after a translation. Under the same translation, which point is the image of J ?



- 14 Write, in symbolic form, the inverse of $\sim e \rightarrow p$.
- 15 Point $(k, -2)$ lies on the line whose equation is $x - 3y = 7$. What is the value of k ?
- 16 In the accompanying diagram, transversal \overleftrightarrow{GH} intersects parallel lines \overleftrightarrow{AB} and \overleftrightarrow{CD} , $m\angle DGH = x$, and $m\angle BHG = 2x - 30$. Find the value of x .



- 17 Solve for x in terms of a , b , and c :
- $$ax - 3b = c$$
- 18 Express $\frac{3x}{4} - \frac{x}{5}$ as a single fraction in simplest form.
- Directions (19–35): 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.*
- 19 If $n + 8$ represents an odd integer, the next larger odd integer is represented by
- (1) $n + 10$ (3) $n + 7$
 (2) $n + 9$ (4) $n + 6$
- 20 The product of $(-3xy^2)(5x^2y^3)$ is
- (1) $-8x^3y^5$ (3) $-15x^2y^5$
 (2) $-15x^3y^5$ (4) $-15x^3y^6$
- 21 What is the value of x in the equation $4(2x + 1) = 27 + 3(2x - 5)$?
- (1) 21 (3) $7\frac{1}{2}$
 (2) 9 (4) 4

- 22 Which letter has point symmetry?
- (1) E (3) H
 (2) C (4) T
- 23 The line whose equation is $y = 4x + 2$ has a y -intercept whose coordinates are
- (1) $(0, 0)$ (3) $(4, 0)$
 (2) $(0, 2)$ (4) $(0, 4)$
- 24 Which graph represents the inequality $-1 \leq x < 4$?
- (1)
- (2)
- (3)
- (4)
- 25 The expression $\frac{12z^4 + 20z^3 - 4z^2}{-4z^2}$, $z \neq 0$, is equivalent to
- (1) $-4z^2$ (3) $-3z^2 - 5z + 1$
 (2) $-3z^2 - 5z$ (4) $3z^2 - 5z - 1$
- 26 Which equation represents the line parallel to the y -axis and 4 units to the left of the y -axis?
- (1) $x = 4$ (3) $y = -4$
 (2) $x = -4$ (4) $y = 4$
- 27 What is the greatest number of two-letter arrangements that can be formed from the letters G, R, A, D, and E if each letter is used only once in an arrangement?
- (1) 120 (3) 20
 (2) 60 (4) 5
- 28 If two angles of a triangle each measure 70° , the triangle is described as
- (1) right (3) obtuse
 (2) scalene (4) isosceles

29 What is the value of the expression $2x^2 - 5x + 6$ when $x = -2$?

- (1) 32 (3) 24
(2) -24 (4) 4

30 The value of $(7 - 2)!$ is

- (1) 5 (3) 2520
(2) 120 (4) 5038

31 The expression $\sqrt{200}$ is equivalent to

- (1) $2\sqrt{10}$ (3) $100\sqrt{2}$
(2) $10\sqrt{2}$ (4) $2\sqrt{100}$

32 Which statement has the same truth value as $\sim m \rightarrow p$?

- (1) $m \rightarrow \sim p$ (3) $\sim p \rightarrow \sim m$
(2) $p \rightarrow \sim m$ (4) $\sim p \rightarrow m$

33 Which ordered pair is the solution set for this system of equations?

$$\begin{aligned}x + y &= 8 \\ y &= x - 3\end{aligned}$$

- (1) (2.5, 5.5) (3) (4, 4)
(2) (4, 1) (4) (5.5, 2.5)

34 What is the solution set of the equation $x^2 - 7x - 18 = 0$?

- (1) {9, -2} (3) {-6, 3}
(2) {-9, 2} (4) {6, -3}

35 When $a^2 + a - 3$ is subtracted from $3a^2 - 5$, the result is

- (1) $2a^2 - a - 2$ (3) $-2a^2 + a + 2$
(2) $2a^2 - a + 2$ (4) $4a^2 + a - 8$

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 axes, graph the following system of inequalities. Label the region that represents the solution set with an S. [8]

$$\begin{aligned}y &\geq 3x \\x + y &< 8\end{aligned}$$

- b Write the coordinates of a point that satisfies the inequality $y \geq 3x$ but does not satisfy the inequality $x + y < 8$. [2]

- 37 Solve the following system of equations algebraically and check:

$$\begin{aligned}2x &= 5y + 8 \\3x + 2y &= 31\end{aligned} \quad [8,2]$$

- 38 Find four consecutive positive integers such that the product of the first and fourth is four less than twice the first multiplied by the fourth. [Only an algebraic solution will be accepted.] [4,6]

- 39 A restaurant sells large and small submarine sandwiches. Rolls for the sandwiches are ordered from a baker. The roll for a large sandwich costs \$0.25 and the roll for a small sandwich costs \$0.15. Melissa, the manager of the restaurant, ordered 130 more large rolls than small rolls. What was the greatest number of large rolls she received if she spent less than \$63? [Show or explain the procedure used to obtain your answer.] [10]

- 40 The frequency table below shows the scores on a science quiz.

Interval	Frequency
90–99	6
80–89	8
70–79	10
60–69	4
50–59	2

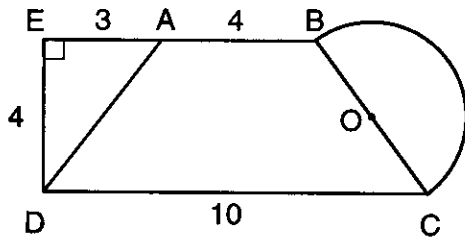
- a Based on the frequency table, which interval contains the median? [2]
- b Which interval contains the 70th percentile? [2]
- c On your answer paper, copy and complete the cumulative frequency table below. [2]

Interval	Cumulative Frequency
50–99	
50–89	
50–79	
50–69	
50–59	2

- d On graph paper, using the cumulative frequency table completed in part c, construct a cumulative frequency histogram. [4]

GO RIGHT ON TO THE NEXT PAGE. 

- 41 In the accompanying diagram, $ABCD$ is an isosceles trapezoid with bases \overline{AB} and \overline{CD} , \overline{BA} is extended to E , and $\overline{DE} \perp \overline{EB}$. Side \overline{BC} is a diameter of semicircle O , $AB = 4$, $AE = 3$, $DE = 4$, and $DC = 10$.



- a Find the length of \overline{AD} . [2]
- b Find the area of the entire figure to the nearest integer. [8]

- 42 Let p represent "It is raining" and let q represent "I am going swimming."

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

(1) It is not true that if it is raining, then I am going swimming. [1]

(2) It is raining and I am not going swimming. [1]

b Construct a truth table for the two sentences written in part a to determine whether or not the sentences are logically equivalent. Justify your answer. [8]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Tuesday, June 17, 1997 — 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

FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

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SCORING KEY

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 19–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{5}{9}$	(11) 55	(21) 4	(31) 2
(2) 7	(12) 12	(22) 3	(32) 4
(3) 3	(13) F	(23) 2	(33) 4
(4) 21	(14) $e \rightarrow \sim p$	(24) 1	(34) 1
(5) 65	(15) 1	(25) 3	(35) 1
(6) $(y + 10)(y - 10)$	(16) 70	(26) 2	
(7) 8	(17) $\frac{c + 3b}{a}$	(27) 3	
(8) 60	(18) $\frac{11x}{20}$	(28) 4	
(9) 7	(19) 1	(29) 3	
(10) 54	(20) 2	(30) 2	

[OVER]

Part II

Please refer to the Department’s publication *Guide for Rating Regents Examinations in Mathematics*, 1996 Edition. 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) $x = 9, y = 2$ [8]
 Check [2]

(38) Analysis [4]
 1, 2, 3, 4 [6]

(39) 206 [10]

(40) a 70–79 [2]
 b 80–89 [2]

(41) a 5 [2]
 b 44 [8]

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

c

Interval	Cumulative Frequency
50–99	30
50–89	24
50–79	16
50–69	6
50–59	2

[2]