

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 18, 1981 — 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.

1 On a test of 50 questions, a student answered 90% of the questions correctly. How many questions did the student answer correctly?

2 Solve for x : $2(x + 3) = 12$

3 Factor: $x^2 - 49$

4 Find the mode of the following data:
10, 12, 14, 20, 14, 15, 12, 17, 12

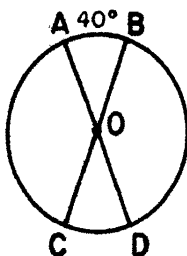
5 If a car can travel 51 kilometers on 3 liters of gasoline, how many kilometers can it travel under the same conditions on 7 liters?

6 A fair die is tossed. What is the probability of the die showing an odd number?

7 If each base angle of an isosceles triangle measures 50° , find the measure in degrees of the vertex angle of the triangle.

8 If the perimeter of a square is 24, find the area of the square.

9 In the accompanying diagram, \overline{AD} and \overline{BC} are diameters which intersect at the center of circle O and $m\widehat{AB} = 40$. Find the number of degrees in angle COD .



10 A tree casts a 20-meter shadow at the same time that a 6-meter pole casts an 8-meter shadow. Find the height of the tree in meters.

11 An equation of a straight line is $3x + y = 18$. If $(5, k)$ are the coordinates of a point on this line, find the numerical value of k .

12 Perform the indicated operations and express the result as a trinomial:

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

13 The area of a rectangle is represented by $x^2 + 2x$ and the length by $(x + 2)$. Express the width of the rectangle in terms of x .

14 Let p represent "Today is Wednesday" and let q represent "Today is a holiday." Using p and q , write in symbolic form "If today is Wednesday, then today is not a holiday."

15 What is the total number of possible 5-letter arrangements of the letters E , X , P , O , and S , if each letter is used only once in each arrangement?

16 Solve for n : $3n + 1.4n = 8.8$

17 If the probability of winning the first game is $\frac{1}{4}$ and the probability of winning the second game is $\frac{2}{5}$, what is the probability of winning both the first and the second games?

Directions (18–35): 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.

18 The slope of the graph of $y = \frac{3}{4}x - 8$ is

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

19 Which ordered pair satisfies both of the following equations?

$$\begin{aligned} x + y &= 5 \\ y &= 2 \end{aligned}$$

- | | |
|------------|------------|
| (1) (3, 2) | (3) (5, 0) |
| (2) (2, 3) | (4) (0, 5) |

20 The product of $9x^3$ and $2x^4$ is

- | | |
|----------------|----------------|
| (1) $11x^7$ | (3) $18x^7$ |
| (2) $11x^{12}$ | (4) $18x^{12}$ |

21 The statement $p \wedge q$ is true when

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

22 If $(x + 2)$ represents an even integer, which expression must represent an odd integer?

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

23 From a standard deck of 52 cards, a single card is drawn at random. What is the probability that the card drawn is a king or a three?

- (1) $\frac{4}{52}$
- (2) $\frac{8}{52}$
- (3) $\frac{13}{52}$
- (4) $\frac{26}{52}$

24 Which is a root of the equation $x^2 = 3x + 10$?

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

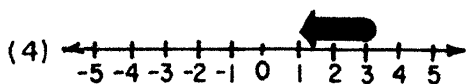
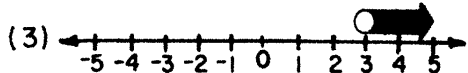
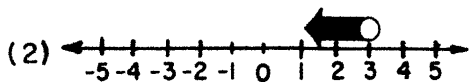
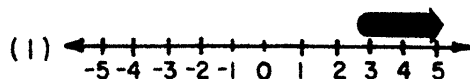
25 For the data, 2,2,4,5,12, which statement is true?

- (1) mean = median
- (2) mean > mode
- (3) mean < mode
- (4) mode = median

26 What is the y -intercept of the line whose equation is $y = 2x - 5$?

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

27 Which graph represents the solution set of $3x > 9$?



28 When drawn on the same set of axes, the graphs of the equations $y = x + 1$ and $y = 2x - 1$ intersect at the point

- (1) $(-2, 1)$
- (2) $(2, 2)$
- (3) $(2, 3)$
- (4) $(-2, -5)$

29 The expression $\sqrt{125} + 2\sqrt{5}$ is equivalent to

- (1) 35
- (2) $7\sqrt{5}$
- (3) $3\sqrt{5}$
- (4) $3\sqrt{130}$

30 What is the length of a diagonal of a rectangle whose dimensions are 5 by 7?

- (1) 5
- (2) 8
- (3) $\sqrt{24}$
- (4) $\sqrt{74}$

31 What is the converse of the statement, "If I worked hard, then I did well"?

- (1) If I did well, then I worked hard.
- (2) If I did well, then I did not work hard.
- (3) If I did not do well, then I did not work hard.
- (4) If I did not work hard, then I did not do well.

32 If the measures of the angles of a triangle are in the ratio 2:2:5, the triangle is

- (1) a right triangle
- (2) an acute triangle
- (3) an isosceles triangle
- (4) an equilateral triangle

33 Given the following table:

Interval	Frequency
91-100	2
81-90	2
71-80	3
61-70	4

Which interval contains the median?

- (1) 91-100
- (2) 81-90
- (3) 71-80
- (4) 61-70

34 When is the statement $p \leftrightarrow q$ true?

- (1) only when both p and q are true
- (2) only when both p and q are false
- (3) when p is true and q is false
- (4) either when both p and q are true or when both p and q are false

35 If each side of a square is tripled, the perimeter of the square

- (1) remains the same
- (2) is increased by 3
- (3) is multiplied by 3
- (4) is multiplied by 9

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

$$\begin{aligned} y &> 2x - 4 \\ y &< -x + 4 \end{aligned} \quad [8]$$

- b What is an ordered pair in the solution set of this system? [2]

- 37 A jar contains x red marbles, $(2x - 1)$ blue marbles, and $(2x + 1)$ white marbles. One marble is drawn at random.

- a Express in terms of x the total number of marbles in the jar. [2]

- b Express in terms of x the probability of drawing a blue marble. [2]

- c If the probability of drawing a blue marble is $\frac{1}{3}$, find the value of x . [4]

- d If the probability of drawing a red marble is $\frac{1}{5}$, what is the probability of *not* drawing a red marble? [2]

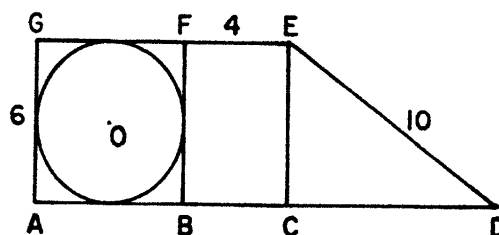
- 38 Solve algebraically and check:

$$\begin{aligned} 3x - 2y &= 14 \\ x + y &= 3 \end{aligned} \quad [8,2]$$

- 39 Let x represent the smaller of two integers whose sum is greater than 40. The larger integer is 7 times the smaller. Find the *smallest* possible value of x . [Only an algebraic solution will be accepted.] [5,5]

- 40 Two numbers are positive consecutive integers. The sum of their squares is 25. Find the two integers. [Only an algebraic solution will be accepted.] [4,6]

- 41 As shown in the accompanying figure, circle O is inscribed in square $ABFG$, $ACEG$ is a rectangle, $ADEG$ is a trapezoid, $AG = 6$, $FE = 4$, and $ED = 10$.



- a Find the area of circle O in terms of π . [2]
 b Find the area of rectangle $ACEG$. [2]
 c Find CD . [2]
 d Find the area of triangle CDE . [2]
 e Find the area of trapezoid $ADEG$. [2]

- 42 Below are three statements symbolized by p , q , and r :

Let p represent: 7 is an even number.
 Let q represent: 9 is a prime number.
 Let r represent: 25 is a perfect square.

- a Write in words and tell whether the statement is true or false:

- (1) $p \vee r$ [1,1]
 (2) $r \rightarrow q$ [1,1]
 (3) $\sim p \wedge \sim q$ [1,1]

- b Write in symbolic form and give the truth value of the following statements:

- (1) 25 is a perfect square if and only if 7 is an even number. [1,1]
 (2) 9 is not a prime number or 7 is not an even number. [1,1]

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Tuesday, August 18, 1981 — 8:30 to 11:30 a.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..... |
| 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

Tuesday, August 18, 1981 — 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 18–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 45	(11) 3	(21) 1	(31) 1
(2) 3	(12) $3x^2 + 7x - 4$	(22) 3	(32) 3
(3) $(x + 7)(x - 7)$	(13) x	(23) 2	(33) 3
(4) 12	(14) $p \rightarrow \sim q$	(24) 3	(34) 4
(5) 119	(15) 120	(25) 2	(35) 3
(6) $\frac{3}{6}$	(16) 2	(26) 4	
(7) 80	(17) $\frac{2}{20}$	(27) 3	
(8) 36	(18) 3	(28) 3	
(9) 40	(19) 1	(29) 2	
(10) 15	(20) 3	(30) 4	

[OVER]

SEQUENTIAL MATH—COURSE I — *concluded*

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) $a \ 5x$ [2]

$b \ \frac{2x - 1}{5x}$ [2]

$c \ 3$ [4]

$d \ \frac{4}{5}$ [2]

(38) $x = 4$ [8]
 $y = -1$ [8]
 Check [2]

(39) Analysis [5]
 6 [5]

(40) Analysis [4]
 3, 4 [6]

(41) $a \ 9\pi$ [2]
 $b \ 60$ [2]
 $c \ 8$ [2]
 $d \ 24$ [2]
 $e \ 84$ [2]

- (42) *a (1) Seven is an even number or twenty-five is a perfect square.
 True [1,1]
 (2) If twenty-five is a perfect square then nine is a prime number.
 False [1,1]
 (3) Seven is not an even number and nine is not a prime number.
 True [1,1]
 b (1) $r \leftrightarrow p$
 False [1,1]
 (2) $\sim q \vee \sim p$
 True [1,1]

* Do not penalize students who wrote numerals instead of words in part a.