

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 22, 1981 — 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.

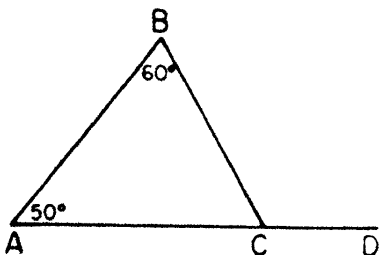
When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during 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

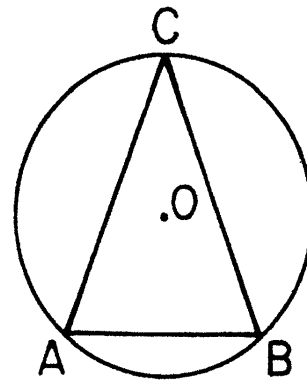
Part I

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.

- 1 Solve for c : $3(2 + c) = 12$
- 2 What is the value of $3x^3$ if $x = 2$?
- 3 Solve for z : $3z + 9 = 1 - z$
- 4 If a car can travel 60 kilometers on 3 liters of gasoline, how many kilometers can it travel under the same conditions on 7 liters?
- 5 Find the circumference of a circle whose radius is 6. [Answer may be left in terms of π .]
- 6 Solve for x : $0.2x + 6 = 80$
- 7 Express the product $(x + 2)(x - 5)$ as a trinomial.
- 8 Solve for r in terms of S , π , and h : $S = 2\pi rh$
- 9 A student received test scores of 82, 94, and 96. What must she receive as a fourth score so that the mean of these four scores will be exactly 90?
- 10 If p represents the statement, "I try," and q represents the statement, "I will succeed," write in symbolic form, using p and q : "If I try, then I will succeed."
- 11 If the three angles of a triangle are in the ratio 1:3:5, find the number of degrees in the *smallest* angle.
- 12 In the accompanying figure, $\angle BCD$ is an exterior angle to $\triangle ABC$ at vertex C . If $m\angle A = 50$ and $m\angle B = 60$, find the number of degrees in the measure of $\angle BCD$.



- 13 Factor: $x^2 + 2x - 3$
- 14 The lengths of the sides of a triangle are represented by $a + 2b$, $a + b$, and $2a - b$. Express the perimeter of the triangle as a binomial.
- 15 If the sales tax rate is 4%, what is the amount of sales tax which must be paid on a \$350 motorcycle?
- 16 The expression $\frac{4}{(x - 3)}$ is undefined for what value of x ?
- 17 In the accompanying figure, $\triangle ABC$ is inscribed in circle O and $m\widehat{AB} = 80$. Find the number of degrees in $\angle ACB$.



- 18 What is the *positive* root of the equation $x^2 - 49 = 0$?
- 19 A letter is chosen at random from the letters of the word "HUNDRED." What is the probability that the letter chosen is an "E"?
- 20 Solve the following system of equations for x :

$$\begin{aligned} x + y &= 8 \\ x - y &= 2 \end{aligned}$$
- 21 The lengths of two legs of a right triangle are 5 and 12. Find the length of the hypotenuse.

Directions (22–35): For each question chosen write in the space provided on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.

- 22 The symbol for n factorial is $n!$. The value of $3!$ is
 (1) 6 (3) 3
 (2) 5 (4) -3

- 23 The quotient $\frac{12x^3y^6}{4xy^2}$ is equivalent to
 (1) $3x^2y^3$ (3) $3x^3y^4$
 (2) $3x^2y^4$ (4) $3x^3y^3$

- 24 The sum of $\sqrt{18}$ and $15\sqrt{2}$ is
 (1) $18\sqrt{2}$ (3) $15\sqrt{20}$
 (2) $24\sqrt{2}$ (4) $16\sqrt{20}$

- 25 If a boy has 5 shirts and 4 pairs of jeans, how many different outfits of a shirt and a pair of jeans does he have?
 (1) 20 (3) 5
 (2) 9 (4) 4

- 26 What is the slope of the line whose equation is $y = 3x - 7$?
 (1) -7 (3) 3
 (2) -3 (4) 7

- 27 Which set of data has more than one mode?
 (1) 2,2,4,6,7,9 (3) 2,2,2,6,7,9
 (2) 2,2,4,6,9,9 (4) 2,3,4,6,9,9

- 28 What is the contrapositive of the statement $p \rightarrow q$?
 (1) $p \leftrightarrow q$ (3) $\sim p \rightarrow \sim q$
 (2) $q \rightarrow p$ (4) $\sim q \rightarrow \sim p$

- 29 The graph of $3x - y = 6$ contains the point
 (1) (0,2) (3) (4,-6)
 (2) (5,9) (4) (1,9)

- 30 The number line below shows the solution set of which inequality?



- (1) $-3 < x < 5$ (3) $-3 \leq x < 5$
 (2) $-3 < x \leq 5$ (4) $-3 \leq x \leq 5$

- 31 The statement $r \vee s$ is false if and only if
 (1) r is true and s is true
 (2) r is true and s is false
 (3) r is false and s is true
 (4) r is false and s is false

- 32 If the length of each side of a square is represented by $2x$, which expression represents its area?
 (1) $8x$ (3) $4x^2$
 (2) $4x$ (4) $2x^2$

- 33 The volume of a cylinder is found by using the formula $V = \pi r^2 h$. If h is doubled, then the volume is
 (1) doubled (3) increased by 4
 (2) increased by 2 (4) multiplied by 4

- 34 From a standard deck of playing cards, what is the probability of randomly drawing a black card or a king on one draw?
 (1) $\frac{2}{52}$ (3) $\frac{28}{52}$
 (2) $\frac{4}{52}$ (4) $\frac{30}{52}$

- 35 Which represents the inverse of the statement, "If the base angles of a triangle are congruent, then the triangle is isosceles"?
 (1) If the base angles of the triangle are not congruent, then the triangle is not isosceles.
 (2) If the triangle is isosceles, then the base angles are congruent.
 (3) If the triangle is not isosceles, then the base angles are not congruent.
 (4) If the base angles of a triangle are not congruent, then the triangle is isosceles.

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 coordinate axes, graph the following system of inequalities:

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

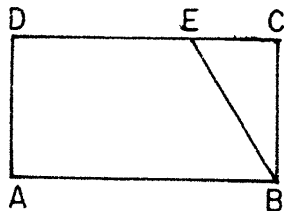
b Write the coordinates of a point which is *not* in the solution set of the system of inequalities graphed in part a. [2]

37 Solve for x and y and check:

$$\begin{aligned} 2x + y &= -1 \\ y &= x + 5 \end{aligned} \quad [8,2]$$

38 One number is 10 more than another number. If the product of the two numbers is -21 , find both numbers. [Only an algebraic solution will be accepted.] [5,5]

39 As shown in the accompanying diagram, $ABCD$ is a rectangle and a line segment drawn from B intersects \overline{CD} at E .



- a If the measure of \overline{AB} is 9 and the area of the rectangle is 36, find AD . [2]
- b The point E separates \overline{DC} into two segments such that $DE:EC = 2:1$. Find DE and EC . [2]
- c Find BE . [3]
- d Find the area of trapezoid $ABED$. [3]

40 A student has the following five books in his locker: math, history, Latin, science, and English. Without looking at the books, he pulls out one book and then, without replacing the first book, pulls out a second book.

- a Using the letters M, H, L, S, and E, draw a tree diagram or write the sample space for pulling two books from the locker. [6]
- b What is the probability that he first pulled the math book and then the English book? [2]
- c What is the probability that he pulled out two different books? [2]

41 a On your answer paper, copy and complete the truth table for the statement $(p \rightarrow q) \leftrightarrow (\sim p \rightarrow \sim q)$. [8]

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

b Which statement is true? [2]

- (1) A conditional and its inverse always have the same truth value.
- (2) A conditional and its contrapositive do not always have the same truth value.
- (3) A conditional and its converse always have the same truth value.
- (4) A conditional and its inverse do not always have the same truth value.

42 A class record showed the following number of misspelled words in each of 25 essays.

Misspelled Words	Frequency (Number of Essays)
0	1
1	0
2	3
3	5
4	4
5	9
6	3

- a On graph paper, construct a frequency histogram based on the data. [3]
- b Find the mean number of misspelled words. [3]
- c Find the median number of misspelled words. [2]
- d Find the mode number of misspelled words. [2]

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Thursday, January 22, 1981 — 1:15 to 4:15 p.m., only

Part I Score:
Rater's Initials:

ANSWER SHEET

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

SchoolGrade.....

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

Thursday, January 22, 1981 — 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 22–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

- | | | |
|------------------------|-------------------------------|--------|
| (1) 2 | (13) $(x + 3)(x - 1)$ | (25) 1 |
| (2) 24 | (14) $4a + 2b$ or $2(2a + b)$ | (26) 3 |
| (3) -2 | (15) \$14 | (27) 2 |
| (4) 140 | (16) 3 | (28) 4 |
| (5) 12π | (17) 40 | (29) 2 |
| (6) 370 | (18) 7 | (30) 3 |
| (7) $x^2 - 3x - 10$ | (19) $\frac{1}{7}$ | (31) 4 |
| (8) $\frac{S}{2\pi h}$ | (20) 5 | (32) 3 |
| (9) 88 | (21) 13 | (33) 1 |
| (10) $p \rightarrow q$ | (22) 1 | (34) 3 |
| (11) 20 | (23) 2 | (35) 1 |
| (12) 110 | (24) 1 | |

[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) $x = -2$ [8]
 $y = 3$
 Check [2]

(40) $b \frac{1}{20}$ [2]
 $c 1$ [2]

(38) Analysis [5]
 $-7,3$ or $-3,7$ [5]

(41) $b 4$ [2]

(39) $a 4$ [2]
 $b 6,3$ [1,1]
 $c 5$ [3]
 $d 30$ [3]

(42) $b 4$ [3]
 $c 4$ [2]
 $d 5$ [2]