

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 17, 1983 — 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

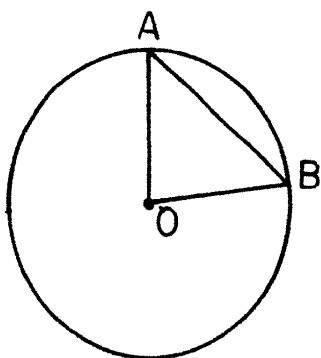
Part I

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.

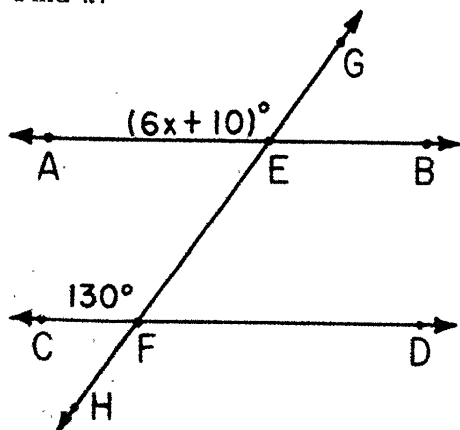
1 Solve for x : $3(2x - 5) = 9$

2 Solve for x : $\frac{x}{150} = \frac{2}{3}$

3 In the accompanying diagram of circle O , \overline{OA} and \overline{OB} are radii and $m\angle AOB = 80$. Find $m\angle OAB$.



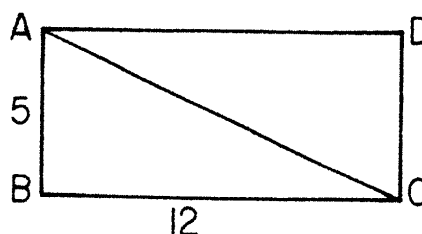
4 In the accompanying diagram, parallel lines \overleftrightarrow{AB} and \overleftrightarrow{CD} are intersected by transversal \overleftrightarrow{GH} at points E and F , respectively. The degree measure of $\angle AEG$ is $(6x + 10)$ and of $\angle CFE$ is 130. Find x .



5 Let p represent "I am hungry" and let q represent "I am tired." Write in symbolic form, using p and q , "I am hungry and I am tired."

6 The weather bureau predicted a 35% chance of rain. What is the probability, according to the weather bureau, that it will *not* rain?

7 In the accompanying diagram of rectangle $ABCD$, $\overline{AB} = 5$ and $\overline{BC} = 12$. What is the length of \overline{AC} ?



8 What integer does $\frac{4!}{3!}$ equal?

9 Emily is planning a trip from Boston to New York City to visit her cousin. She can go to New York by plane, train, or bus. Once she gets to New York, she can go to her cousin's house by taxi or subway. How many different ways can she get from Boston to her cousin's house?

10 Solve for x : $1.04x + 8 = 60$

11 The measures of the sides of a triangle can be represented by $(3a - 7)$, $(2a + 10)$, and $(5a - 9)$. Express the perimeter of the triangle as a binomial in terms of a .

12 Express $\frac{15x^2}{-3x}$ in simplest form.

13 What is the point of intersection of the graphs of $x = 1$ and $y = 4$?

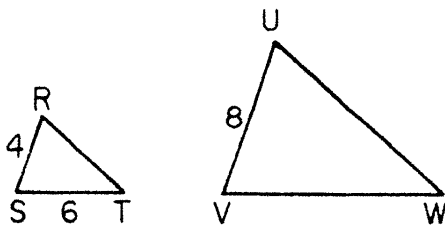
14 Factor: $x^2 - 5x$

15 If the point $(3, 2)$ lies on the graph of the equation $kx + 2y = -2$, find the value of k .

16 Using the formula $V = x^2h$, find V when $x = 6$ and $h = 2$.

17 The perimeter of a square is represented by $8x - 8$. Express the length of one side of the square in terms of x .

18 In the accompanying diagrams of triangles RST and UVW , $\angle R \cong \angle U$ and $\angle S \cong \angle V$. If $RS = 4$, $ST = 6$ and $UV = 8$, find VW .



19 In a class of 350 students, 42 students are on the honor roll. What percent of the class is on the honor roll?

20 Express the product $(2x - 7)(x + 3)$ as a trinomial.

21 The area of a triangle is 24 square centimeters and the base measures 6 centimeters. Find the number of centimeters in the measure of the altitude to that base.

22 In triangle ABC , $m\angle A = x$, $m\angle B = (x + 10)$, and $m\angle C = (2x + 10)$. What is the number of degrees in the measure of $\angle A$?

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 The sum of $2\sqrt{3}$ and $\sqrt{12}$ is

- (1) $4\sqrt{6}$ (3) $3\sqrt{15}$
 (2) $8\sqrt{3}$ (4) $4\sqrt{3}$

24 The length and width of a rectangle are represented by $(x + 7)$ and $(x - 3)$. If the area of the rectangle is 24, which equation can be used to find x ?

- (1) $(x + 7) + (x - 3) = 24$
 (2) $2(x + 7) + 2(x - 3) = 24$
 (3) $(x + 7)^2 + (x - 3)^2 = 24$
 (4) $(x + 7)(x - 3) = 24$

25 Which number is *not* a member of the solution set of $3x \leq 6$?

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

26 What is the slope of a line parallel to the line whose equation is $y = 3x + 2$?

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

27 The solution set of the equation $x^2 - 7x + 10 = 0$ is

- (1) {2,5} (3) {-2,5}
 (2) {2,-5} (4) {-2,-5}

28 The statement $p \rightarrow q$ is false whenever

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

29 If a and b are integers, which statement is *always* true?

- (1) $a - b = b - a$ (3) $\frac{a}{b} = \frac{b}{a}$
 (2) $a + b = b + a$ (4) $a + 2b = b + 2a$

30 The inverse of $p \rightarrow \sim q$ is

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

31 A single card is drawn at random from a standard deck of 52 cards. Which event has the *smallest* probability of occurring?

- (1) drawing a red card
 (2) drawing a club
 (3) drawing a king
 (4) drawing a club or a heart

32 The expression $(3x^2y^3)^2$ is equivalent to

- (1) $9x^4y^6$ (3) $3x^4y^6$
 (2) $9x^4y^5$ (4) $6x^4y^6$

33 If x represents an odd integer, the next larger odd integer is represented by

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

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

34 What is the mean of the following scores?
70, 70, 80, 85, 90

- (1) 70
- (2) 79

- (3) 80
- (4) 85

35 Which inequality is represented by the accompanying graph?



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

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

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 Solve the following system of equations graphically and check:

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

- 37 a Construct a truth table for the statement $(p \rightarrow q) \leftrightarrow (\sim p \vee q)$. [8]

b Is $(p \rightarrow q) \leftrightarrow (\sim p \vee q)$ a tautology? [1]

c Justify the answer you gave in part b. [1]

- 38 The measure of each of the base angles of an isosceles triangle is 10 less than twice the measure of the vertex angle. Find the measure of each angle of the triangle. [Only an algebraic solution will be accepted.] [5,5]

- 39 Find two consecutive positive integers such that the square of the smaller is one more than four times the larger. [Only an algebraic solution will be accepted.] [5,5]

- 40 A coach has to purchase uniforms for a team. A uniform consists of one pair of pants and one shirt. The colors available for the pants are black and white. The colors available for the shirt are green, orange, and yellow.

a Make a tree diagram or list the sample space showing all possible color combinations for one pair of pants and one shirt. [4]

b What is the probability that:

- (1) the pants are black and the shirt is orange [2]
- (2) the shirt is green [2]
- (3) the pants and shirt are of different colors [2]

- 41 The PLAY-CRAFT COMPANY, maker of table tennis paddles, listed the following salaries in its annual report:

Employee	Position	Salary
Pat Thomas	Manager	\$100,000
Don Pierce	Assistant Manager	\$50,000
Linda Jones	Foreman	\$25,000
Jim Jeffrey	Skilled worker	\$16,000
Donna Love	Skilled worker	\$15,000
John Hanna	Skilled worker	\$14,000
Jill Walker	Skilled worker	\$14,000
Ben Black	Skilled worker	\$13,000
Tony Burch	Secretary	\$11,750
John Slack	Custodian	\$10,000

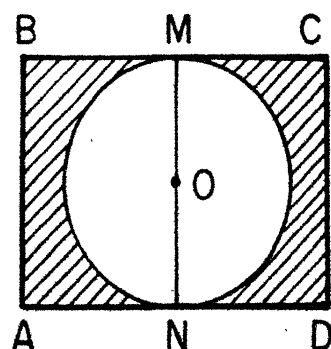
a Using all ten salaries,

- (1) find the mean [3]
- (2) find the median [3]
- (3) find the mode [1]

b How much more than the mean is the manager's salary? [1]

c If an employee is selected at random, what is the probability that this person's salary is greater than the mean? [2]

- 42 In the accompanying diagram, $ABCD$ is a rectangle. Diameter \overline{MN} of circle O is perpendicular to \overline{BC} at M and to \overline{AD} at N , $AD = 8$, and $CD = 6$. [Answers may be left in terms of π .]



- a What is the perimeter of rectangle $ABCD$? [2]
- b What is the circumference of circle O ? [2]
- c What is the area of rectangle $ABCD$? [2]
- d What is the area of circle O ? [2]
- e What is the area of the shaded region of the diagram? [2]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Wednesday, August 17, 1983 — 8:30 to 11:30 a.m., only

Part I Score:

Rater's Initials:

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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

Tear Here

Tear Here

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, August 17, 1983 — 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 23–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 4	(11) $10a - 6$	(21) 8	(31) 3
(2) 100	(12) $-5x$	(22) 40	(32) 1
(3) 50	(13) (1,4)	(23) 4	(33) 4
(4) 20	(14) $x(x - 5)$	(24) 4	(34) 2
(5) $p \wedge q$	(15) -2	(25) 3	(35) 3
(6) 65%	(16) 72	(26) 3	
(7) 13	(17) $2x - 2$	(27) 1	
(8) 4	(18) 12	(28) 1	
(9) 6	(19) 12	(29) 2	
(10) 50	(20) $2x^2 - x - 21$	(30) 1	

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) b yes [1]

(38) Analysis [5]
40, 70, 70 [5]

(39) Analysis [5]
5, 6 [5]

(40) b (1) $\frac{1}{6}$ [2]

(2) $\frac{2}{6}$ [2]

(3) 1 [2]

(41) a (1) \$26,875 [3]

(2) \$14,500 [3]

(3) \$14,000 [1]

b \$73,125 [1]

c $\frac{2}{10}$ [2]

(42) a 28 [2]

b 6π [2]

c 48 [2]

d 9π [2]

e $48 - 9\pi$ [2]