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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, August 16, 1990 — 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

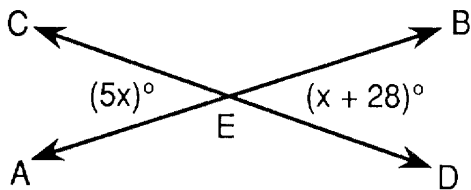
Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answers may be left in terms of π or in radical form. [60]

1 The probability that an event will occur is $\frac{5}{8}$. What is the probability that the event will *not* occur?

2 A number is selected at random from the set $\{1,3,5,8,11,15\}$. What is the probability the number is greater than 8 or less than 3?

3 Solve for x : $7(x - 2) = 5(x + 4)$

4 In the accompanying diagram, \overleftrightarrow{AB} and \overleftrightarrow{CD} intersect at point E . If $m\angle AEC = 5x$ and $m\angle BED = x + 28$, find the value of x .



5 The data 6, 12, x , 7 have a mean of 10. Find the value of x .

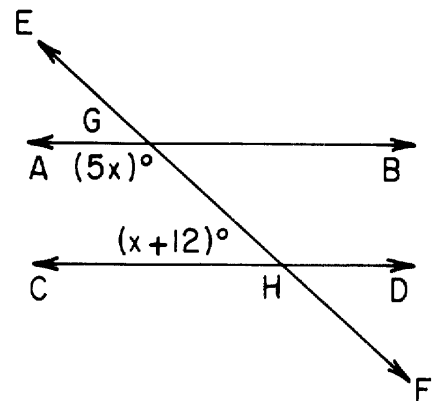
6 A machine can manufacture 1800 pencils in 30 minutes. At this same rate, how many minutes will it take to manufacture 3000 pencils?

7 The length of a side of a square is represented by $(3x - 1)$. If the perimeter of the square is 68, find the value of x .

8 Let p represent "Mary Hardy pitches," and let q represent "The Warriors will win the softball game." Write in symbolic form, using p and q , "The Warriors will win the softball game if and only if Mary Hardy pitches."

9 Solve for x : $0.06x + 0.3x = 7.2$

10 In the accompanying diagram, parallel lines \overleftrightarrow{AB} and \overleftrightarrow{CD} are intersected by \overleftrightarrow{EF} at G and H , respectively. If $m\angle AGH = 5x$ and $m\angle CHG = x + 12$, find the value of x .



11 Express the sum of $-2x^2 + 7x - 6$ and $3x^2 - 8x - 1$ as a trinomial.

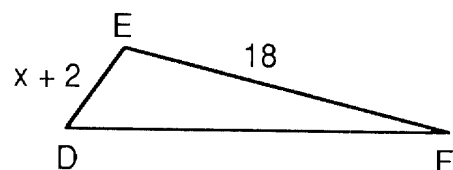
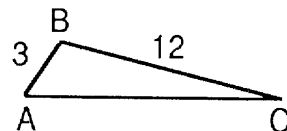
12 Solve for r in terms of P , t , and I :

$$I = Prt$$

13 Find the positive solution for the equation $4x^2 = 64$.

14 The ratio of the measures of the angles of a triangle is 1:2:2. Find the measure of the *smallest* angle.

15 In the accompanying diagram, $\triangle ABC$ is similar to $\triangle DEF$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$. If $AB = 3$, $BC = 12$, $DE = x + 2$, and $EF = 18$, find the value of x .



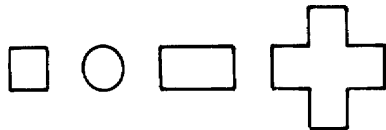
16 If the volume of a cube is 64 cubic centimeters, how many centimeters are in the length of an edge of the cube?

17 Solve for x : $\frac{x}{3} + \frac{x}{2} = 5$

18 Express $2x^2 - 3x - 5$ as the product of two binomial factors.

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 Which kind of symmetry do all of these figures have?



- (1) vertical line, only
- (2) horizontal line, only
- (3) both vertical line and horizontal line
- (4) neither vertical line nor horizontal line

20 The length of a diameter of a circle is $\frac{2}{a}$. What is the length of a radius of the circle?

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

21 The width of a rectangle is represented by $2x$ and the length is represented by $x^2 - x + 3$. Which expression represents the area of the rectangle?

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

22 What is the number of inches in x feet?

- (1) $12x$
- (2) $\frac{x}{12}$
- (3) $3x$
- (4) $\frac{x}{3}$

23 The table below represents the distribution of the ages of neighborhood children. Which interval contains the median?

Ages	Frequency
16-18	5
13-15	8
10-12	4
7-9	6
4-6	2
1-3	5

- (1) 4-6
- (2) 7-9
- (3) 10-12
- (4) 13-15

24 If $(a,3)$ is a point on the graph of the equation $2x + 3y = 5$, then the value of a is

- (1) 1
- (2) 2
- (3) -2
- (4) 7

25 What is the sum of $3\sqrt{5}$ and $\sqrt{20}$?

- (1) 15
- (2) $5\sqrt{5}$
- (3) $5\sqrt{10}$
- (4) $6\sqrt{5}$

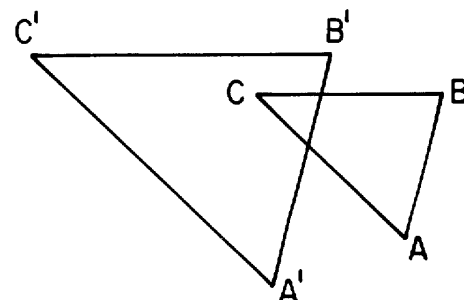
26 The binomials $(x - 2)$ and $(2x + 3)$ are the factors of which polynomial?

- (1) $2x^2 - 6$
- (2) $2x^2 - x - 6$
- (3) $2x^2 + x - 6$
- (4) $2x^2 + 7x - 6$

27 What is the slope of the line whose equation is $y + 2x = 4$?

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

28 In the diagram below, $\triangle ABC$ is similar but not congruent to $\triangle A'B'C'$. Which transformation is represented by $\triangle A'B'C'$?

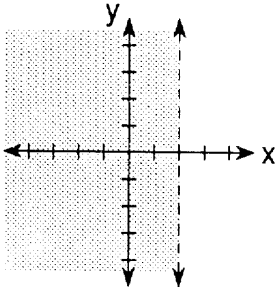


- (1) rotation
- (2) translation
- (3) reflection
- (4) dilation

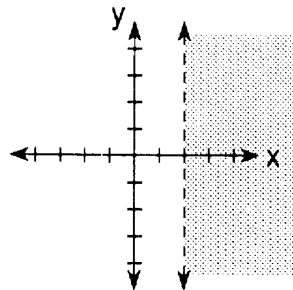
29 If $p \wedge \sim q$ is true, which statement must be true?

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

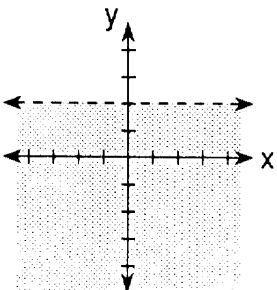
30 Which graph represents the inequality $x < 2$?



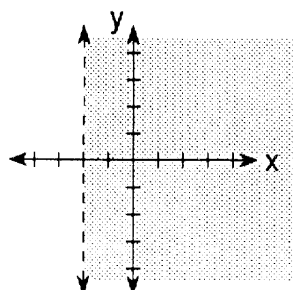
(1)



(3)



(2)



(4)

31 Which expression is equivalent to $(-2x^4)^2$?

- (1) $4x^6$ (3) $-4x^8$
 (2) $4x^8$ (4) $4x^{16}$

32 What is the sum of $\frac{3}{2x}$ and $\frac{4}{6x}$, $x \neq 0$?

- (1) $\frac{7}{8x}$ (3) $\frac{7}{6x}$
 (2) $\frac{13}{6x}$ (4) $\frac{13}{8x}$

33 The inverse of a given statement is $\sim s \rightarrow r$. What is the given statement?

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

34 Which table is an example of y varying directly with x ?

(1)

x	y
3	5
4	6
5	7

(3)

x	y
3	9
4	16
5	25

(2)

x	y
3	5
4	4
5	3

(4)

x	y
3	6
4	8
5	10

35 Which expression represents the number 0.00017 written in scientific notation?

- (1) 1.7×10^{-4} (3) 1.7×10^{-3}
 (2) 1.7×10^4 (4) 1.7×10^3

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. [40]

36 a Each part below consists of three sentences. On your answer paper, write the numbers 1 through 3, and next to each number, write the truth value (TRUE or FALSE) for the third sentence in each part, based on the truth values given for the first two sentences. If the truth value cannot be determined from the information given, write "CANNOT BE DETERMINED."

(1)	It rains or it is cold. It is cold. It rains.	TRUE FALSE ?	[2]
(2)	The month is June and it is not warm. The month is June. It is warm.	FALSE TRUE ?	[2]
(3)	If I study, I pass math. I pass math. I study.	TRUE TRUE ?	[2]

b On your answer paper, copy and complete the truth table for the statement $(p \rightarrow q) \leftrightarrow (\sim p \vee q)$. [4]

p	q	$p \rightarrow q$	$\sim p$	$\sim p \vee q$	$(p \rightarrow q) \leftrightarrow (\sim p \vee q)$
T	T	T	F		
T	F	F	F		
F	T	T	T		
F	F	T	T		

37 a On the same set of coordinate axes, graph the following system of equations:

$$\begin{aligned} y &= x + 4 \\ x + y &= 6 \\ y &= 2 \end{aligned} \quad [6]$$

b Find the area of the triangle whose vertices are the points of intersection of the lines graphed in part a. [4]

38 The length of a rectangle is $\sqrt{65}$ centimeters. The diagonal of the rectangle is 5 centimeters more than the width. Find, in centimeters, the width of the rectangle. [5.5]

39 Lunch at the school cafeteria consists of a sandwich, a dessert, and a beverage. The sandwich choices are tuna, ham, or peanut butter. Dessert is a cookie or Jell-O, and the beverage is either milk or orange juice.

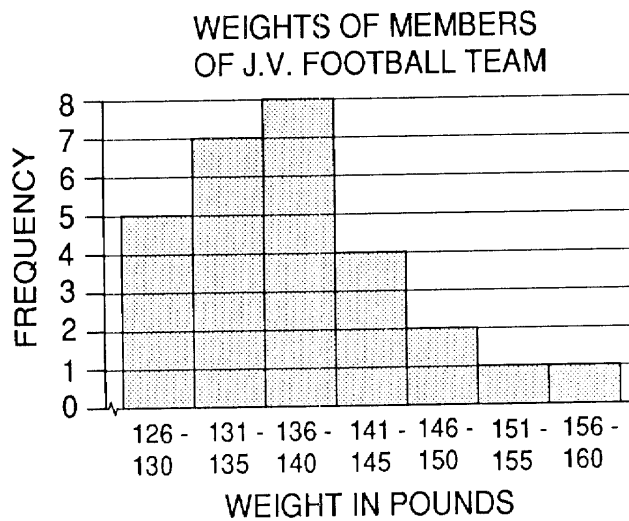
a Draw a tree diagram or list the sample space for all possible lunches. [4]

b Find the probability of a student having a tuna sandwich, Jell-O, and milk. [2]

c Find the probability of a student having milk as the beverage. [2]

d Find the probability of a student having a ham sandwich, a cookie or Jell-O, and orange juice. [2]

40 The frequency histogram below shows the weights of the members of a Junior Varsity football team at Union High School.



a On your answer paper, copy and complete the tables below using the data shown in the frequency histogram. [4]

Interval	Frequency
156-160	
151-155	
146-150	
141-145	
136-140	
131-135	
126-130	5

Interval	Cumulative Frequency
126-160	
126-155	
126-150	
126-145	
126-140	
126-135	
126-130	5

- b Which interval of the frequency table contains the upper quartile? [2]
- c If one member of the team is selected at random, what is the probability the member will weigh less than 146 pounds? [2]
- d What percent of the team weighs at least 141 pounds but less than 156 pounds? [2]

41 A jar contains white marbles and blue marbles only. The number of white marbles is three more than twice the number of blue marbles. The ratio of the number of blue marbles to the total number of marbles in the jar is 2:7. Find the number of marbles in the jar. [Only an algebraic solution will be accepted.] [5,5]

- 42 a On graph paper, plot and label the points $A(1,3)$, $B(3,7)$, and $C(8,7)$. [1]
- b If D has coordinates $(12,y)$, find the value of y such that $ABCD$ is a trapezoid. [2]
- c Find the area of trapezoid $ABCD$. [5]
- d If diagonal AC is drawn, what is the area of $\triangle ADC$? [2]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Thursday, August 16, 1990 — 8:30 to 11:30 a.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.

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, August 16, 1990 – 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 19–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{3}{8}$	(11) $x^2 - x - 7$	(21) 4	(31) 2
(2) $\frac{3}{6}$	(12) $\frac{I}{Pt}$	(22) 1	(32) 2
(3) 17	(13) 4	(23) 3	(33) 4
(4) 7	(14) 36	(24) 3	(34) 4
(5) 15	(15) 2.5	(25) 2	(35) 1
(6) 50	(16) 4	(26) 2	
(7) 6	(17) 6	(27) 3	
(8) $q \leftrightarrow p$	(18) $(2x - 5)(x + 1)$	(28) 4	
(9) 20	(19) 3	(29) 3	
(10) 28	(20) 1	(30) 1	

Part II

Please refer to the Department publication *Guide for Rating Regents Examinations 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.

- | | |
|----------------------------------|------------------------------|
| (36) <i>a</i> (1) TRUE [2] | (40) <i>b</i> 141-145 [2] |
| (2) TRUE [2] | <i>c</i> $\frac{24}{28}$ [2] |
| (3) CANNOT BE DETERMINED [2] | <i>d</i> 25 [2] |
| (37) <i>b</i> 9 [4] | (41) 21 [5.5] |
| (38) 4 [5.5] | (42) <i>b</i> 3 [2] |
| (39) <i>b</i> $\frac{1}{12}$ [2] | <i>c</i> 32 [5] |
| <i>c</i> $\frac{6}{12}$ [2] | <i>d</i> 22 [2] |
| <i>d</i> $\frac{2}{12}$ [2] | |