New York State Education Department Three-year Sequence for High School Mathematics Course I

Final Examination

In Lieu of the Ninth Year Mathematics Regents Examination Thursday, January 25, 1979—1:15 to 4:15 p.m., only

When you have completed the examination, you must sign the statement printed on the back of the answer sheet, 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.

Part I

Answer only 30 of the 35 questions in this part. Each correct answer will receive 2 credits. 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: 4x = x + 21
- 2 Solve for B in terms of V and h: $V = \frac{1}{3}Bh$
- 3 Express as a product of two binomials: $36 x^2$
- 4 Two complementary angles are in the ratio of 1:4. Find the measure of the smaller angle.
- 5 Express in radical form the length of the diagonal of a square whose sides are each 2.
- 6 Solve the following system of equations for x:

$$2x + y = 7$$
$$x - y = 2$$

- 7 If the perimeter of a square is 36, find the area of the square.
- 8 The expression $\sqrt{50} + 3\sqrt{2}$ can be written in the form $x\sqrt{2}$. Find x.
- 9 If p represents "I have studied" and q represents "I will pass this test," write in symbolic form using p and q: "I have studied, or I will not pass this test."
- 10 Find the sum of $2x^2 + 3x 1$ and $3x^2 2x + 4$.
- 11 A jar contains 5 white marbles, 3 blue marbles, and 2 green marbles. If one marble is drawn at random, what is the probability that it will be blue?

- 12 The lengths of the sides of a triangle are 12, 8, and 6. If the shortest side of a similar triangle is 12, what is the length of its longest side?
- 13 If x = 3 and y = -1, find the value of $2x + y^2$.
- 14 If the area of a circle is 16π , what is the length of the radius of the circle?
- 15 How many four-digit numbers can be formed from the digits 3,4, 5, and 6 if no repetition is allowed?
- 16 Find the area of a triangle whose vertices are (4,0), (0,6), and (0,0).
- 17 If the base angles of an isosceles triangle each measure 40°, find the number of degrees in the measure of the vertex angle.
- 18 What is the slope of the line whose equation is 3y = 2x 1?
- 19 Solve for n: $\frac{n}{2} + \frac{n}{4} = 6$
- 20 A single die is thrown once. What is the probability of obtaining a 1 or a 2?
- 21 The edge of a cube has length 3. What is the volume of the cube?

 Directions (22-35): For each of those chosen, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.
- 22 If each side of a square is doubled, then its perimeter
 - (1) remains the same
- (3) is multiplied by 4
- (2) is multiplied by 2
- (4) is increased by 4
- 23 When $p \rightarrow q$ is true, which related conditional is also true?
 - (1) q + p

 $(3) \sim q \rightarrow \sim p$

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

- $(4) \quad p \rightarrow \sim q$
- 24 Which is an irrational number?
 - (1) 0

 $(3) \sqrt{3}$

(2) $\frac{1}{2}$

- (4) $\sqrt{4}$
- 25 A magazine has 40 pages. If 16 of the 40 pages are advertising, what percent of the magazine is advertising?
 - $(1) \frac{2}{5}$ %

(3) 24%

(2) 16%

(4) 40%

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26	The y	y-intercept of line $y = 3x$	- 4	is
	(1) (2)		(3) (4)	
27	When	$p \rightarrow q$ is false, then		
	(1) (2)	p is true and q is false p is false and q is true	(3) (4)	<pre>p and q are both true p and q are both false</pre>
28		girl has 6 shirts and 4 p its of a shirt and slacks		of slacks, how many different she have?
	(1) (2)		(3) (4)	
29	When	$4x^3y^3$ is multiplied by $8x$	y, t	he product is
	(1) (2)	12x ³ y ⁶ 12x ⁴ y ⁶	(3) (4)	32x ³ y ⁶ 32x ⁴ y ⁵
30	What and		tes	t results of 60, 60, 70, 75,
۸.	(1) (2)		(3) (4)	70 75
31	is d	rawn, its color noted and its color noted. What is	retu	n marbles in an urn. One marble rned. A second marble is drawn probability that both marbles
	(1)	9 25	(3)	$\frac{6}{20}$
	(2)	<u>6</u> 25	(4)	<u>4</u> <u>25</u>
32	From	an ordinary deck of 52 ca	rds,	one card is drawn. What is the

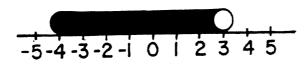
probability that it will either be a spade or a club?

(1)

(2) $\frac{2}{52}$

 $(4) \frac{26}{52}$

Which inequality is represented by the accompanying graph? 33



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

(3) $-4 < x \le 3$ (4) $-4 \le x < 3$

34 If each side of regular pentagon ABCDE is represented by (3x + 2), which expression represents the perimeter of the pentagon?

(1) 15x + 10

(3) 8x + 7

(2) 15x + 2

(4) 25x

35 The solution set of $x^2 - 2x = 0$ is

(1) {0}

 $(3) \{0,2\}$

(2) $\{2\}$

(4) {0,-2}

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 Answer either a or b but not both:

a Solve graphically and check:

$$x + y = 4$$
 [8,2]
 $x - 2y = 1$

OR

b On the same set of coordinate axes, graph the following system of inequalities and label the solution set A:

$$y > x$$
 [8,2] $x + y \le 5$

- Find the smallest of three consecutive positive integers such that the product of the two smaller integers is 2 more than twice the largest integer. [Only an algebraic solution will be accepted.] [5,5]
- The base of an isosceles triangle is 2 less than the sum of the lengths of the two legs. If the perimeter of the triangle is 22, find the length of the base of the triangle. [Only an algebraic solution will be accepted.] [5,5]

39 a On your answer paper, copy and complete the truth table for the statement $[p \land (p \rightarrow q)] \rightarrow q$. [9]

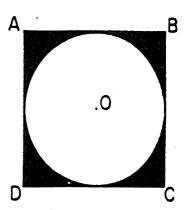
р	q	p → q	p / (p + q)	$[b \lor (b \to d)] \to d$

- b Is $[p \land (p \rightarrow q)] \rightarrow q$ a tautology? [1]
- 40 Three coins are tossed simultaneously.
 - a Draw a tree diagram or list the sample space for all possible outcomes. [4]
 - b What is the probability that all three coins will come up heads? [2]
 - c In how many ways can a head and two tails appear? [2]
 - d What is the probability of obtaining a head and two tails? [2]
- 41 The following data represent the examination marks of 10 students in a certain class: 87, 71, 80, 84, 83, 81, 86, 90, 99, 89.
 - a On your answer paper, copy and complete the table below. [2]

Interval	Number (frequency)	
69-76		
77-84		
85-92		
93-100		

- b On graph paper, construct a frequency histogram based on the data. [6]
- c The median is contained in which interval? [2]

42 In the accompanying figure, square ABCD is circumscribed about circle 0. The length of a side of the square and the diameter of the circle are both 10. [Answers may be left in terms of π .]



a	What	is	the	circumfe	renc	e of the	circle	?	[2]			
b	What	is	the	perimete	r of	the squ	are?		[2]			
C	What	is	the	area of	the	square?			[2]			
d	What	is	the	area of	the	circle?			[2]			
e	What	is	the	area of	the	shaded r	portion	of	the	diagr	am?	[2]

Part	I	
Score	2:	

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Final Examination

Thursday,		1070		5 n m On	10
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Pupil			Tea	cher	• • • • • • • • •
School	• • • • • • • • •				
Your answers to I	Part I sho	ould be re	ecorded on	this answe	r sheet.
		Part I			
Ai	nswer 30 c	questions	in this pa	art.	
1	_ 13		25	5	
2	14		26		
3	15		27	7	
4	16		28	3	
5	17		29		
6	18		30)	
7	19		3.	1	
8	20		32	2	
9	21		3	3	
10	22		3	4	
11	23		3.	5.	

24

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 25, 1979 — 1:15 to 4:15 p.m., only

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 the 30 of the following: [If more than 30 are answered, only the first 30 answered should be considered.] For questions 22-35, allow credit if the pupil has written the correct answer instead of the numeral 1,2,3, or 4

(1)	7	(13)	7	(25)	4
(2)	3V h	(14)	4	(26)	2
(3)	(6 - x) (6 + x)	(15)	24	(27)	1
(4)	18	(16)	12	(28)	1,
(5)	$2\sqrt{2}$ or $\sqrt{8}$	(17)	100	(29)	4
(6)	3	(18)	<u>2</u>	(30)	2
(7)	81	(19)	8	(31)	1
(8)	8	(20)	$\frac{1}{3}$	(32)	4
(9)	p ∨ ∿q	(21)	27	(33)	4
	$5x^2 + x + 3$	(22)	2	(34)	ĺ
	$\frac{3}{10}$	(23)	3	(35)	3

(24)

(12)

24

[OVER]

Part II

Please refer to the Department's pamphlet <u>Suggestions</u> on the <u>Rating of Regents Examination Papers in Mathematics</u>. 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) Analysis [5] 3 [5]
- (38) Analysis [5] 10 [5]
- (39) b yes [1]
- (40) b $\frac{1}{8}$ [2] c 3 [2] d $\frac{3}{8}$ [2]

- (41) a Number 1 4 [2]
 - c 85-92 [2]