

The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

**THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS**

**COURSE I**

Thursday, August 14, 1997 — 8:30 to 11:30 a.m., only

**Notice . . .**

Scientific calculators must be available to all students taking this examination.

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  $\pi$  or in radical form. [60]

1 If a letter is chosen at random from the word "SUCCESS," what is the probability that the letter will be a C?

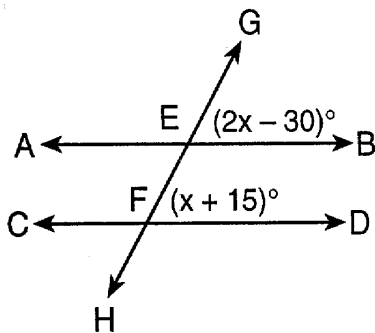
2 Solve for  $s$ :  $7s + 4(3 - s) = 18$

3 In five basketball games, a player scores the following points: 13, 21, 21, 21, and 24. What is the mean of the points scored?

4 At Mario's Restaurant, pizza is available with a choice of 3 different crusts, 6 different vegetable toppings, and 5 different meat toppings. How many different pizzas can be ordered consisting of one kind of crust, one vegetable topping, and one meat topping?

5 Let  $p$  represent "I study" and let  $q$  represent "I will pass." Using  $p$  and  $q$ , write in symbolic form: "If I do not study, then I will not pass."

6 In the accompanying diagram, parallel lines  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{CD}$  are cut by transversal  $\overleftrightarrow{GH}$  at  $E$  and  $F$ , respectively. If  $m\angle GEB = (2x - 30)$  and  $m\angle EFD = (x + 15)$ , find the value of  $x$ .



7 Solve for  $x$ :  $7.32 = 0.05x - 0.18$

8 What is the reciprocal of  $-\frac{2}{7}$ ?

9 If the number 0.00074 is expressed in the form  $7.4 \times 10^n$ , what is the value of  $n$ ?

10 Solve for  $x$ :  $\frac{5x}{6} - 2 = 8$

11 If  $s$  varies directly as  $t$  and  $s = 7$  when  $t = 3.5$ , find  $s$  when  $t = 4$ .

12 The probability of an event occurring is 0.4. What is the probability of the event *not* occurring?

13 Write an equation of the line whose slope is 2 and whose  $y$ -intercept is  $-3$ .

14 In right triangle  $ABC$ ,  $AC = 40$ ,  $CB = 9$ , and  $m\angle C = 90$ . Find the length of  $\overline{AB}$ .

15 Factor:  $x^2 - 4x - 5$

16 Find the value of  $4x^2 - 2y$  when  $x = -2$  and  $y = -1$ .

17 Solve the following system of equations for  $x$ :

$$\begin{aligned} 2x + y &= 10 \\ 3x &= y \end{aligned}$$

18 What is the sum of  $4\sqrt{12}$  and  $2\sqrt{27}$  in simplest form?

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.

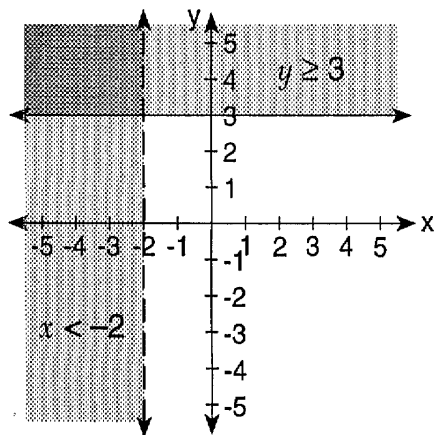
19 John's father weighs 20 pounds more than twice what John weighs. If John's weight is represented by  $y$ , then his father's weight may be represented by

- (1)  $2y$  (3)  $2y + 20$   
 (2)  $2y - 20$  (4)  $\frac{y}{2} + 20$

20 Which statement is the contrapositive of the statement "If a triangle is a right triangle, then it has two complementary angles"?

- (1) If a triangle is a right triangle, then it does not have two complementary angles.  
 (2) If a triangle does not have two complementary angles, then it is not a right triangle.  
 (3) If a triangle is not a right triangle, then it has two complementary angles.  
 (4) If a triangle does not have two complementary angles, then it is a right triangle.

21 The accompanying diagram represents the graphs of the inequalities  $y \geq 3$  and  $x < -2$ .



Which ordered pair names a point in the solution set of this system of inequalities?

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

22 What is the product of  $1.45x^3y^6$  and  $2.6xy^3$ ?

- (1)  $3.77x^4y^9$  (3)  $3.77x^3y^{18}$   
 (2)  $4.05x^4y^9$  (4)  $4.05x^3y^9$

23 Two triangles are similar. The measure of the shortest side of the first triangle is 12 and the measure of the shortest side of the second triangle is 5. If the longest side of the first triangle measures 15, what is the measure of the longest side of the second triangle?

- (1) 2.4 (3) 24  
 (2) 6.25 (4) 36

24 If the perimeter of an equilateral triangle is represented by  $6x - 9$ , the length of a side of this triangle can be expressed as

- (1)  $x - 9$  (3)  $3x - 3$   
 (2)  $2x - 3$  (4)  $x$

25 In the truth table below, which statement should be the heading for column 3?

Column 1	Column 2	Column 3
$p$	$q$	?
T	T	T
T	F	F
F	T	F
F	F	T

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

26 The sum of  $4x^2 + x - 8$  and  $x^2 + 9$  can be expressed as

- (1)  $4x^2 + x + 1$  (3)  $5x^2 + x + 1$   
 (2)  $4x^4 + x + 1$  (4)  $5x^4 + x + 1$

27 Let  $p$  represent "x is even" and let  $q$  represent " $x < 6$ ." Which statement is true when  $x = 10$ ?

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

28 A right circular cylinder has a base whose area is  $12\pi$ . If the height of the cylinder is 6, the volume of the cylinder is

- (1)  $18\pi$                       (3)  $36\pi$   
(2)  $24\pi$                       (4)  $72\pi$

29 Which expression represents an irrational number?

- (1)  $\pi$                               (3)  $\bar{3}$   
(2)  $-\frac{2}{3}$                           (4)  $\sqrt{9}$

30 For which value of  $y$  is the fraction  $\frac{2y}{6-y}$  undefined?

- (1) 0                                  (3) 3  
(2) 6                                  (4) -6

31 If the median for the following set is 50, what is the value of  $x$ ?

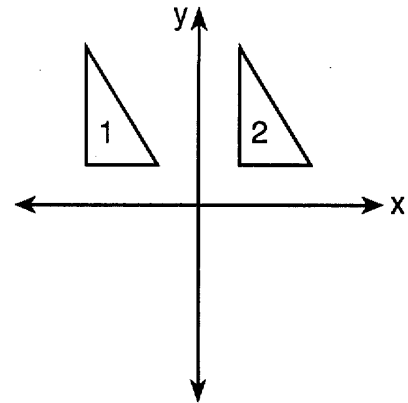
{20,40, $x$ ,52,60,63}

- (1) 48                                  (3) 50  
(2) 49                                  (4) 51

32 What is the circumference of a circle whose area is  $16\pi$ ?

- (1)  $64\pi$                               (3)  $8\pi$   
(2)  $32\pi$                               (4)  $4\pi$

33 In the accompanying diagram, which transformation makes triangle 2 the image of triangle 1?



- (1) reflection in the  $y$ -axis  
(2) dilation  
(3) translation  
(4) rotation centered at the origin

34 If  $A = p + prt$ , then  $t$  equals

- (1)  $\frac{A-1}{r}$                               (3)  $\frac{A+p}{pr}$   
(2)  $\frac{A}{pr} - p$                           (4)  $\frac{A-p}{pr}$

35 Triangle  $ABC$  is drawn in Quadrant III. If  $\triangle ABC$  is reflected in the  $y$ -axis, its image will lie in Quadrant

- (1) I                                      (3) III  
(2) II                                      (4) IV

Answers to the following questions are to be written on paper provided by the school.

Part II

Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

- 36 Solve the following system of equations graphically and check:

$$\begin{aligned} y + x &= 4 \\ 3y - x &= -12 \end{aligned} \quad [8,2]$$

- 37 a Solve for  $x$  algebraically:

$$(x + 1)^2 + 3(x - 4) = x(x - 1) + 1 \quad [6]$$

- b Perform the indicated operation and express in simplest form:

$$\frac{x + 10}{3x} + \frac{7 - 2x}{6x}, x \neq 0 \quad [4]$$

- 38 Find three positive consecutive even integers such that the product of the first and second is 8 more than 38 times the third. [Only an algebraic solution will be accepted.] [5,5]

- 39 In rhombus  $ABCD$ , the measure of angle  $A$  and the measure of angle  $B$  are in the ratio 2:1,  $AB = 2x + 8$ , and  $BC = 5x - 10$ .

- a Find the measures in degrees of angle  $A$  and of angle  $B$ . [6]

- b Find the perimeter of rhombus  $ABCD$ . [4]

- 40 A jar contains four coins: a penny, a nickel, a dime, and a quarter. Kathy shakes the jar and two coins fall out.

- a Draw a tree diagram or list the sample space for all possible outcomes of the two coins that fell out. [2]

- b Of the coins that fell out of the jar, find the probability that

- (1) the total value of both coins is 35¢ [2]
- (2) one coin is a nickel [2]
- (3) the total value of both coins is at most 15¢ [2]
- (4) both coins are pennies [2]

- 41 In the time trials for the 400-meter run at the 1996 Olympics, the 24 runners recorded the following times, in seconds.

54.5, 54.7, 51.8, 53.8, 50.6, 51.4, 53.2, 52.2, 50.3, 54.8, 53.3, 54.0, 51.7, 52.9, 52.6, 53.5, 54.8, 51.4, 52.3, 53.4, 52.1, 52.1, 54.2, 52.1

- a On your answer sheet, copy the table below and complete the frequency column. [2]

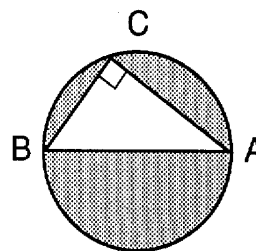
Time (sec)	Frequency
50.0–50.9	
51.0–51.9	
52.0–52.9	
53.0–53.9	
54.0–54.9	

- b Using your data from the frequency column, draw a frequency histogram. [4]

- c What percent of the runners completed the time trial between 52.0 and 53.9 seconds? [2]

- d If one runner is chosen at random, what is the probability that this runner completed the time trial in less than 52.0 seconds? [2]

- 42 In the accompanying diagram, right triangle  $ABC$  is inscribed in a circle,  $BA$  is a diameter,  $BC = 6$  centimeters, and  $AC = 8$  centimeters. Find the area of the shaded portion to the nearest tenth of a square centimeter. [Use  $\pi = 3.14$ .] [10]





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SEQUENTIAL MATH – COURSE I

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Part I Score	.....
Part II Score	.....
Total Score	.....
Rater's Initials:	.....

Tear Here

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.

\_\_\_\_\_  
Signature

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Tear Here



# FOR TEACHERS ONLY

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REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

## COURSE I

Thursday, August 14, 1997 — 8:30 to 11:30 a.m., only

### SCORING KEY

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{2}{7}$	(11) 8	(21) 3	(31) 1
(2) 2	(12) 0.6	(22) 1	(32) 3
(3) 20	(13) $y = 2x - 3$	(23) 2	(33) 3
(4) 90	(14) 41	(24) 2	(34) 4
(5) $\sim p \rightarrow \sim q$	(15) $(x - 5)(x + 1)$	(25) 4	(35) 4
(6) 45	(16) 18	(26) 3	
(7) 150	(17) 2	(27) 1	
(8) $-\frac{7}{2}$	(18) $14\sqrt{3}$	(28) 4	
(9) -4	(19) 3	(29) 1	
(10) 12	(20) 2	(30) 2	

[OVER]

**Part II**

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics*, 1996 Edition. 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) (6, -2)	[8]	(40) $b$	(1) $\frac{2}{12}$	[2]
Check	[2]		(2) $\frac{6}{12}$	[2]
(37) $a$	2	[6]	(3) $\frac{6}{12}$	[2]
$b$	$\frac{9}{2x}$	[4]	(4) 0	[2]
(38) Analysis	[5]	(41) $c$	50	[2]
40, 42, 44	[5]	$d$	$\frac{6}{24}$	[2]
(39) $a$	60, 120	[6]	(42) 54.5	[10]
$b$	80	[4]		