

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

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

**COURSE I**

Thursday, January 28, 1982 — 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.

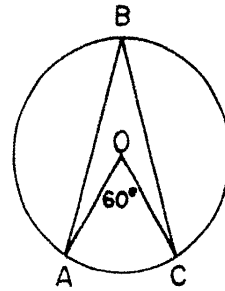
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN

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  $\pi$  or in radical form.

- 1 Solve for  $x$ :  $4(x - 1) - 3 = 17$
- 2 Factor:  $x^2 - 10x + 25$
- 3 In a scale drawing, 2 centimeters represent 3 meters. How many centimeters will represent 36 meters?
- 4 Solve the following system of equations for  $x$ :
 
$$\begin{aligned} x + y &= 6 \\ 2x - y &= 0 \end{aligned}$$
- 5 A student's scores on five tests were 86, 85, 85, 91, and 89. What is the student's median grade?
- 6 Express, in terms of  $x$ , the mean of  $(2x - 8)$  and  $(6x + 4)$ .
- 7 What percent of 20 is 4?
- 8 If the probability that an event will *not* happen is  $\frac{2}{3}$ , what is the probability that the event will happen?
- 9 The lengths of the sides of  $\triangle ABC$  are 16, 20, and 24. If  $\triangle DEF$  is similar to  $\triangle ABC$  and the shortest side of  $\triangle DEF$  is 12, find the length of the longest side of  $\triangle DEF$ .
- 10 Let  $p$  represent "The temperature is  $20^\circ\text{C}$ ," and let  $q$  represent "The room is comfortable." Using  $p$  and  $q$ , write in symbolic form: "If the room is comfortable, then the temperature is  $20^\circ\text{C}$ ."
- 11 Write in symbolic form the converse of  $p \rightarrow q$ .
- 12 If the perimeter of a polygon with 5 sides of equal measure is represented by  $(15x - 20)$ , express the length of one side of the polygon in terms of  $x$ .
- 13 A purse contains 3 pennies, 2 nickels, 4 dimes, and 5 quarters. If one coin is drawn at random from the purse, what is the probability of drawing a dime?

- 14 In the accompanying diagram,  $\angle AOC$  is a central angle of circle  $O$  and  $m\angle AOC = 60$ . Find the number of degrees in the measure of inscribed angle  $ABC$ .



- 15 From  $5x^2 + 3xy + 6y^2$  subtract  $4x^2 + 3xy + 2y^2$ .
- 16 The measures of the legs of a right triangle are 3 centimeters and 4 centimeters. Find the number of square centimeters in the area of the triangle.
- 17 The area of square  $ABCD$  is 36 square centimeters. What is the number of centimeters in the perimeter of the square?
- 18 Solve for  $x$  in terms of  $a$ ,  $b$ , and  $c$ :  $ax - b = c$

*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 What is the value of  $x^2y$  when  $x = 2$  and  $y = -3$ ?
 

(1) -6	(3) -12
(2) 6	(4) 12
- 20 Which group of numbers has a mode of 5?
 

(1) 1,2,5,6,6	(3) 2,2,5,7,9
(2) 1,5,6,6,7	(4) 5,5,8,9,13
- 21 An expression equivalent to  $4!$  is
 

(1) $4(3)$	(3) $4(3)(2)(1)$
(2) $4(4)$	(4) $4(4)(4)(4)$

22 Which point is on the graph of  $2x - y = 8$ ?

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

23 Assume that there is an equal probability of a baby being born on any given day of the week and that there is also an equal probability of a baby being either male or female. What is the probability that a baby will be male *and* born on a Wednesday?

- (1)  $\frac{1}{14}$  (3)  $\frac{2}{9}$   
(2)  $\frac{9}{14}$  (4)  $\frac{1}{4}$

24 If the circumference of a circle is doubled, the diameter of the circle

- (1) increases by 2 (3) is multiplied by 4  
(2) is doubled (4) remains the same

25 An expression equivalent to  $3x - 2 < 7$  is

- (1)  $x > \frac{5}{3}$  (3)  $x > 3$   
(2)  $x < \frac{5}{3}$  (4)  $x < 3$

26 What is the radius of a circle whose area is  $100\pi$ ?

- (1) 100 (3) 10  
(2) 50 (4) 5

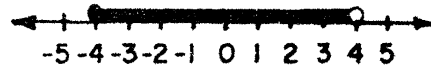
27 The sum of the measures of two angles is  $120^\circ$ . If the measure of one of the angles is five times that of the other, which statement must be true?

- (1) The angles are supplementary.  
(2) The angles are complementary.  
(3) Both angles are acute angles.  
(4) One angle is an acute angle and the other is an obtuse angle.

28 The expression  $-3x(-3x^3)$  is equivalent to

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

29 Which inequality is represented by the graph below?



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

30 If  $p \vee q$  is false, then

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

31 If  $x + 2y < 9$  and  $(3, k)$  is an element of the solution set, then  $k$  could equal

- (1) 5 (3) 3  
(2) 2 (4) 6

32 Which is a root of the equation  $x^2 + 6x + 8 = 0$ ?

- (1) -8 (3) 6  
(2) -2 (4) 4

33 What is the slope of the graph of the equation  $y = 3^2$ ?

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

34 What is the total value in cents of  $n$  nickels and  $d$  dimes?

- (1)  $n + d$  (3)  $0.05n + 0.10d$   
(2)  $5n + 10d$  (4)  $15nd$

35 The sum of  $7\sqrt{2}$  and  $\sqrt{50}$  is

- (1)  $7\sqrt{52}$  (3)  $12\sqrt{2}$   
(2)  $8\sqrt{52}$  (4) 24

GO RIGHT ON TO THE NEXT PAGE.

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

Part II

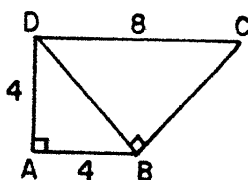
Answer four questions from this part. Show all work unless otherwise directed.

36 Solve graphically and check:

$$\begin{aligned} x + y &= 7 \\ y &= 2x - 8 \end{aligned} \quad [8,2]$$

37 Two positive numbers are consecutive odd integers. The square of the smaller is four more than five times the larger. Find the integers. [Only an algebraic solution will be accepted.] [5,5]

38 In the accompanying figure, quadrilateral  $ABCD$  is a trapezoid with  $AB \parallel DC$ ,  $AD \perp AB$ , and  $DB \perp BC$ ;  $AB = AD = 4$ , and  $DC = 8$ .



- a Find  $DB$  in radical form. [3]
- b Find the area of  $\triangle ABD$ . [2]
- c Find the area of trapezoid  $ABCD$ . [3]
- d Find the area of  $\triangle DBC$ . [2]

39 On a test, 15 students received the following grades: 17, 14, 16, 18, 17, 19, 15, 15, 16, 13, 17, 12, 18, 16, 17.

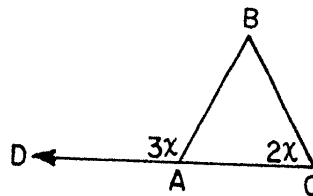
a On your answer paper, copy and complete the table below. [3]

GRADES	FREQUENCY	CUMULATIVE FREQUENCY
12		
13		
14		
15		
16		
17		
18		
19		

- b Find the median. [2]
- c Find the mode. [2]
- d Find the 75th percentile. [3]

- 40 A fair die and a fair coin are tossed simultaneously.
  - a Show the sample space or a tree diagram of all possible outcomes. [4]
  - b What is the probability of getting a tail and an odd number? [2]
  - c What is the probability of getting a head? [2]
  - d What is the probability of getting a 6 or a head? [2]

41 In the accompanying figure, triangle  $ABC$  is an isosceles triangle,  $AB = CB$ , the measure of angle  $BCA$  is  $2x$ , and the measure of the exterior angle  $DAB$  is  $3x$ .



- a Express the measure of angle  $BAC$  in terms of  $x$ . [2]
- b What is the value of  $x$ ? [3]
- c How many degrees are in the measure of angle  $BAC$ ? [1]
- d How many degrees are in the measure of angle  $BAD$ ? [1]
- e How many degrees are in the measure of angle  $ABC$ ? [3]

42 a Construct a truth table for the statement

$$[(p \rightarrow q) \wedge p] \rightarrow q. \quad [9]$$

- b Is this statement a tautology? [1]



Tear Here

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

# SEQUENTIAL MATH — COURSE I

Thursday, January 28, 1982 — 1:15 to 4:15 p.m., only

<b>Part I Score:</b> .....
<b>Rater's Initials:</b> .....

## 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

Thursday, January 28, 1982 — 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 19–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 6	(11) $q \rightarrow p$	(21) 3	(31) 2
(2) $(x - 5)(x - 5)$	(12) $3x - 4$	(22) 1	(32) 2
(3) 24	(13) $\frac{4}{14}$	(23) 1	(33) 4
(4) 2	(14) 30	(24) 2	(34) 2
(5) 86	(15) $x^2 + 4y^2$	(25) 4	(35) 3
(6) $4x - 2$	(16) 6	(26) 3	
(7) 20	(17) 24	(27) 4	
(8) $\frac{1}{3}$	(18) $\frac{c + b}{a}$	(28) 1	
(9) 18	(19) 3	(29) 3	
(10) $q \rightarrow p$	(20) 4	(30) 1	

[OVER]

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) Analysis [5]  
       7,9 [5]

(38)  $a 4\sqrt{2}$  [3]  
        $b 8$  [2]  
        $c 24$  [3]  
        $d 16$  [2]

(39)  $b 16$  [2]  
        $c 17$  [2]  
        $d 17$  [3]

(40)  $b \frac{3}{12}$  [2]  
        $c \frac{6}{12}$  [2]  
        $d \frac{7}{12}$  [2]

(41)  $a 2x$  or  $180 - 3x$  [2]

$b 36$  [3]

$c 72$  [1]

$d 108$  [1]

$e 36$  [3]

(42)  $b$  yes [1]