

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

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

# **COURSE I**

**Thursday**, August 16, 2001 — 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 the answer sheet.

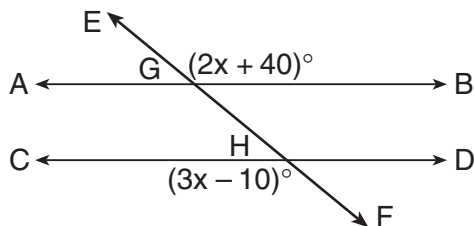
When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. The answer sheet 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 What is the additive inverse of  $-5a$ ?
- 2 Solve for  $n$ :  $\frac{3}{2}n - 4 = 5$
- 3 If  $x = 3$ ,  $y = 4$ , and  $z = -2$ , what is the value of  $\frac{x^2y}{z}$ ?
- 4 What is the value of  $n$  if  $3.56 \times 10^n = 35,600$ ?
- 5 Stephanie has six blouses, four skirts, and three sweaters in her closet. What is the total number of different outfits that she can select consisting of one blouse, one skirt, and one sweater?
- 6 Solve for  $x$ :  $7x + 3 = 4x - 9$
- 7 In the accompanying diagram, transversal  $\overleftrightarrow{EF}$  intersects parallel lines  $\overleftrightarrow{AB}$  and  $\overleftrightarrow{CD}$  at  $G$  and  $H$ , respectively. If  $m\angle EGB = 2x + 40$  and  $m\angle FHC = 3x - 10$ , what is the value of  $x$ ?



- 8 If the probability that Geraldo will be elected president of the senior class is 0.8, what is the probability that Geraldo will *not* be elected president of the senior class?
- 9 If the mean of the numbers 9, 10, 11, 12, and  $x$  is 13, what is the value of  $x$ ?
- 10 Solve for  $m$ :  $0.04m - 1.6 = -0.8$

- 11 What is the product of  $-2x^2y^3$  and  $5x^3y$ ?
- 12 If 8 ounces of a sports drink contains 110 milligrams of sodium, what is the total number of milligrams of sodium in 20 ounces of the sports drink?
- 13 Solve the following system of equations for  $x$ :
 
$$\begin{aligned} 2x + y &= 2 \\ x - y &= 7 \end{aligned}$$
- 14 If  $(k, 3)$  is a point on the line whose equation is  $4x + y = -9$ , what is the value of  $k$ ?
- 15 The measures of two complementary angles are in the ratio 5:1. What is the measure, in degrees, of the smaller angle?

*Directions (16–35):* 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.

- 16 The probability that a red block is selected from a bucket is  $\frac{3}{8}$ , and the probability that a blue block is selected is  $\frac{2}{8}$ . What is the probability that a red block or a blue block is selected?
 

(1) 1	(3) $\frac{5}{8}$
(2) $\frac{1}{2}$	(4) $\frac{6}{8}$
- 17 What is the volume of a rectangular solid with a length of 12, a width of 3, and a height of 4?
 

(1) 12	(3) 84
(2) 19	(4) 144

18 When  $18x^4 - 12x^3 + 6x^2$  is divided by  $6x^2$ , the quotient is

- (1)  $3x^2 - 2x + 1$                       (3)  $18x^4 - 12x^3 + 1$   
 (2)  $12x^2 - 6x + 1$                       (4)  $3x^2 - 12x^3 + 6x^2$

19 Which shape is *not* a parallelogram?

- (1) rhombus                                  (3) trapezoid  
 (2) square                                    (4) rectangle

20 The statement “ $n$  is even and a perfect square” is true when  $n$  equals

- (1) 1    (3) 25  
 (2) 18    (4) 4

21 The enlargement of a photograph is an example of a

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

22 A garden is planted in the shape of a regular pentagon. If the garden is enclosed with 30 feet of fence, what is the number of feet in each side of the garden?

- (1) 5    (3) 3  
 (2) 6    (4) 10

23 When solved for  $y$ , the equation  $ay - b = c$  is equal to

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

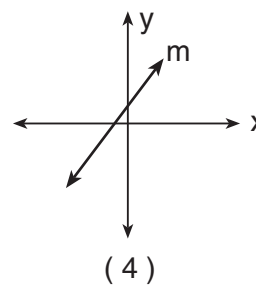
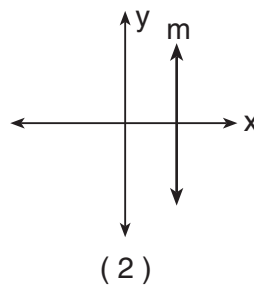
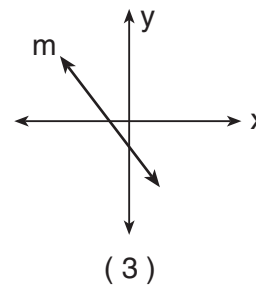
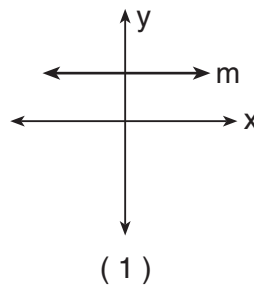
24 If 25% of a number is equal to  $6x$ , then the number is

- (1)  $2.4x$                                       (3)  $1.5x$   
 (2)  $24x$                                         (4)  $15x$

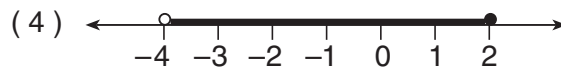
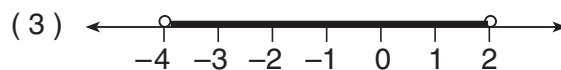
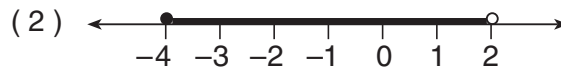
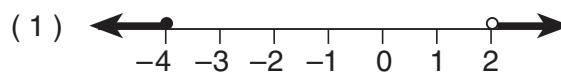
25 The greatest common factor of  $12x^2y^3$  and  $24xy^2$  is

- (1)  $6xy$                                         (3)  $12xy^2$   
 (2)  $24xy^2$                                   (4)  $2xy$

26 In which graph does line  $m$  have a slope of 0?



27 Which graph represents the solution set of the inequality  $-4 \leq x < 2$ ?



28 The converse of  $\sim q \rightarrow \sim p$  is

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

29 What is the quotient of  $\frac{6\sqrt{48}}{3\sqrt{3}}$  expressed in simplest form?

- (1) 32    (3) 8  
 (2) 12    (4) 4

- 30 Which equation illustrates the distributive property?
- (1)  $p(q + r) = pq + pr$   
(2)  $(p + q) + r = p + (q + r)$   
(3)  $pq = qp$   
(4)  $p + 0 = p$
- 31 If  $\frac{5!}{6!} = \frac{1}{n+1}$ , what is the value of  $n$ ?
- (1) 0 (3)  $\frac{1}{6}$   
(2)  $\frac{1}{5}$  (4) 5
- 32 Written in factored form, the trinomial  $2x^2 - 3x - 5$  is equivalent to
- (1)  $(2x - 1)(x + 5)$  (3)  $(2x - 5)(x + 1)$   
(2)  $(2x + 5)(x - 1)$  (4)  $(2x + 1)(x - 5)$
- 33 Triangle  $ABC$  has coordinates  $A(-3,0)$ ,  $B(0,3)$ , and  $C(3,0)$ . The number of square units in the area of  $\triangle ABC$  is
- (1) 6 (3) 12  
(2) 9 (4) 18
- 34 The expression  $\frac{x+3}{2x-2}$  is undefined when  $x$  is equal to
- (1) 1 (3) -3  
(2) 0 (4) -1
- 35 What is the greatest number of different two-letter arrangements that can be formed from the letters S, P, R, I, N, and G, if each letter is used only once in an arrangement?
- (1) 720 (3) 12  
(2) 30 (4) 6
-

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

$$\begin{aligned} y &\geq -3x + 1 \\ 2y - 4x &< 6 \end{aligned} \quad [8]$$

b Write the coordinates of a point in the solution set of the inequalities graphed in part a. [2]

37 On your answer paper, construct a truth table for  $\sim(p \wedge q) \leftrightarrow (q \rightarrow \sim p)$ . [10]

38 The distribution of math scores for 25 students on a test was 92, 87, 60, 76, 90, 83, 99, 55, 82, 76, 90, 71, 88, 94, 87, 75, 94, 87, 98, 62, 80, 97, 86, 78, and 65.

a On your answer paper, copy and complete the frequency table for these scores. [4]

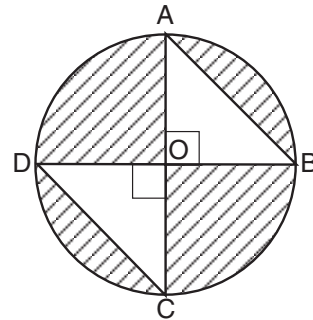
Test Score	Tally	Frequency
53–58		
59–64		
65–70		
71–76		
77–82		
83–88		
89–94		
95–100		

b If a score of at least 65 represents a passing grade, what is the probability that a student chosen at random passed the test? [2]

c Which interval contains the upper quartile? [2]

d What is the total number of students who scored in the interval containing the median? [2]

39 In the accompanying diagram, right triangles  $AOB$  and  $COD$  are inscribed in circle  $O$ , which has a diameter of 10. Diameters  $\overline{DB}$  and  $\overline{AC}$  are drawn.



a Express the area of circle  $O$  in terms of  $\pi$ . [2]

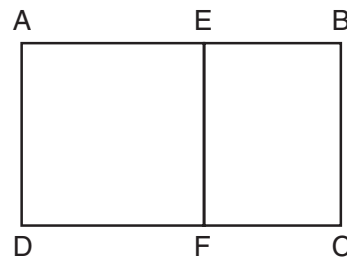
b Find the area of  $\triangle AOB$ . [2]

c Find the area of  $\triangle COD$ . [1]

d Express the area of the shaded region in terms of  $\pi$ . [2]

e Find  $AB$  to the nearest tenth. [3]

40 In the accompanying diagram, square  $ADFE$  is inscribed in rectangle  $ABCD$ ,  $EB:AB = 3:7$ , and the perimeter of  $ABCD$  is 132.



Find:

a the length of  $\overline{AE}$  [5]

b the area of rectangle  $ABCD$  [2]

c the ratio of the area of rectangle  $EBCF$  to the area of rectangle  $ABCD$ , in simplest form [3]

- 41 Jennifer's Bakery sold half as many marble cakes as strawberry shortcakes. The price of a marble cake is \$6 and the price of a strawberry shortcake is \$8.50. If the total amount of sales for these cakes was \$391, what was the total number of *each* kind of cake that was sold? [*Show or explain the procedure used to obtain your answer.*] [10]
- 42 What is the largest of three consecutive odd integers if the product of the first and third integers is 6 more than three times the second integer? [*Only an algebraic solution will be accepted.*] [4,6]
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SEQUENTIAL MATH – COURSE I

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

ANSWER SHEET

Student ..... 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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