

New York State Education Department  
Integrated Sequence for High School Mathematics

Course I

Final Examination

In Lieu of the Ninth Year Mathematics Regents Examination

Monday, June 20, 1977 a.m.

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 30 questions from 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  $\pi$  or in radical form.

- 1 Solve for  $x$ :  $3x - 2 = x + 8$
- 2 Solve for  $x$ :  $.03x = 1.5$
- 3 Find the value of  $xy^2$  if  $x = 3$  and  $y = -2$ .
- 4 Given the formula  $V = LWH$ , solve for  $H$  in terms of  $V$ ,  $W$ , and  $L$ .
- 5 Factor:  $x^2 + 10x$
- 6 Two complementary angles are in the ratio of 1:5. Find the measure of the smaller angle.
- 7 The hypotenuse of a right triangle is 10. If the length of one leg is 8, find the length of the other leg.
- 8 Solve the system of equations for  $x$ :  
 $2x - y = 11$   
 $x + y = 1$
- 9 If the area of a square is 49, what is its perimeter?
- 10 If  $p$  represents "Today is Monday" and  $q$  represents "I am tired," write in symbolic form using  $p$  and  $q$ : "Today is Monday, and I am not tired."

- 11 Find the sum of  $5x^2 - 3x + 2$  and  $3x^2 - 4x - 1$ .
- 12 The digits of the number 1977 are in a bag. What is the probability that a 7 will be drawn on a single draw?
- 13 A single die is rolled twice. What is the probability of obtaining a 3 on the first roll and then a 4 on the second roll?
- 14 A building casts a shadow 15 feet long at the same time a woman 6 feet tall casts a shadow 5 feet long. Find the number of feet in the height of the building.
- 15 If the diameter of a circle is 14, find the area of the circle in terms of  $\pi$ .
- 16 What is the number of possible 4-letter arrangements of the letters F, O, N, and Z if each letter is used only once in each arrangement?
- 17 If the base of a triangle is represented by  $2x$  and the altitude drawn to that base is equal to 10, express the area of the triangle in terms of  $x$ .
- 18 For what value of  $x$  is the expression  $\frac{-8}{x+7}$  undefined?
- 19 The measure of the vertex angle of an isosceles triangle is  $100^\circ$ . Find the number of degrees in one of the base angles of the triangle.
- 20 If  $p$  represents "Two sides of a triangle are congruent," and  $q$  represents "Two angles of a triangle are congruent," write in symbolic form using  $p$  and  $q$ : "Two sides of a triangle are congruent if and only if two angles of a triangle are congruent."

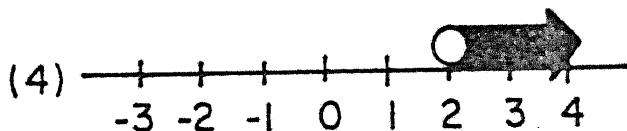
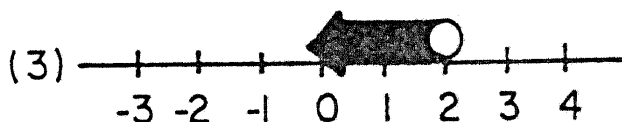
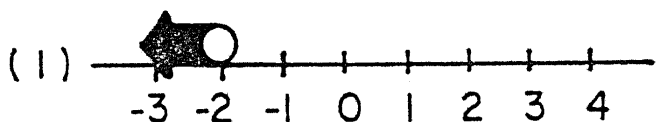
Directions. (21-35): For each of those chosen, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.

- 21 Which is equivalent to  $5\sqrt{3}$ ?
- |                 |                 |
|-----------------|-----------------|
| (1) $\sqrt{15}$ | (3) $\sqrt{75}$ |
| (2) $\sqrt{53}$ | (4) 225         |
- 22 The solution set for  $x^2 - 7x + 12 = 0$  is
- |                 |                  |
|-----------------|------------------|
| (1) $\{3, -4\}$ | (3) $\{3, 4\}$   |
| (2) $\{-3, 4\}$ | (4) $\{-3, -4\}$ |

23 A side of an equilateral triangle is represented by  $x + 3$ . The perimeter of the triangle is represented by

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

24 Which graph represents the solution set of the inequality  $3x > 6$ ?



25 From an ordinary deck of 52 cards, one card is drawn. What is the probability that it will be either an ace or a red king?

- (1)  $8/52$                       (3)  $6/26$   
 (2)  $6/52$                       (4)  $3/14$

26 If a group of data consists of the numbers 2, 2, 5, 6, 15, which is true?

- (1) median  $>$  mean                      (3) mode  $<$  median  
 (2) mean  $=$  mode                      (4) median  $=$  mode

27 What is the product of  $(-3x^3)(4x^3)$ ?

- (1)  $-12x^5$                       (3)  $7x^5$   
 (2)  $-12x^6$                       (4)  $12x^5$

- 28 The menu for dinner lists 2 soups, 3 meats, and 2 desserts. How many different meals which have one soup, one meat, and one dessert are possible?
- (1) 7                                  (3) 12  
 (2) 8                                  (4) 24
- 29 Given the true statement, "If a triangle is equilateral, then it is isosceles." Which statement must also be true?
- (1) If a triangle is not equilateral, then it is not isosceles.  
 (2) If a triangle is not equilateral, then it is isosceles.  
 (3) If a triangle is not isosceles, then it is not equilateral.  
 (4) If a triangle is isosceles, then it is equilateral.
- 30 What is the slope of the line whose equation is  $y = 3x + 6$ ?
- (1)  $\frac{1}{2}$                                   (3) 3  
 (2) 2                                      (4) 6
- 31 If each side of a square is doubled, then its perimeter
- (1) is doubled                          (3) is halved  
 (2) is multiplied by 4              (4) stays the same
- 32 Alice bought supplies for \$40.00. If the sales tax is 7%, what was the total cost?
- (1) \$2.80                                  (3) \$42.80  
 (2) \$37.20                                  (4) \$47.00
- 33 If  $(r, 3)$  is in the solution set of  $2x + y = 7$ , then the value of  $r$  must be
- (1) 1    (3) 3  
 (2) 2    (4) 4
- 34 If the probability of an event happening is  $\frac{1}{3}$ , what is the probability of that event not happening?
- (1)  $\frac{1}{9}$                                       (3)  $\frac{1}{3}$   
 (2)  $\frac{1}{6}$                                       (4)  $\frac{2}{3}$

35 If  $p$  represents "x is divisible by 2" and  $q$  represents "x is divisible by 3," then which is true when  $x = 14$ ?

(1)  $p \wedge q$

(3)  $\sim p$

(2)  $p \vee q$

(4)  $q$ , only

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:

$$\begin{aligned} 2x &= y + 5 \\ x + y &= -2 \end{aligned} \quad [8,2]$$

OR

b Graph the following system of inequalities and label the solution set A.

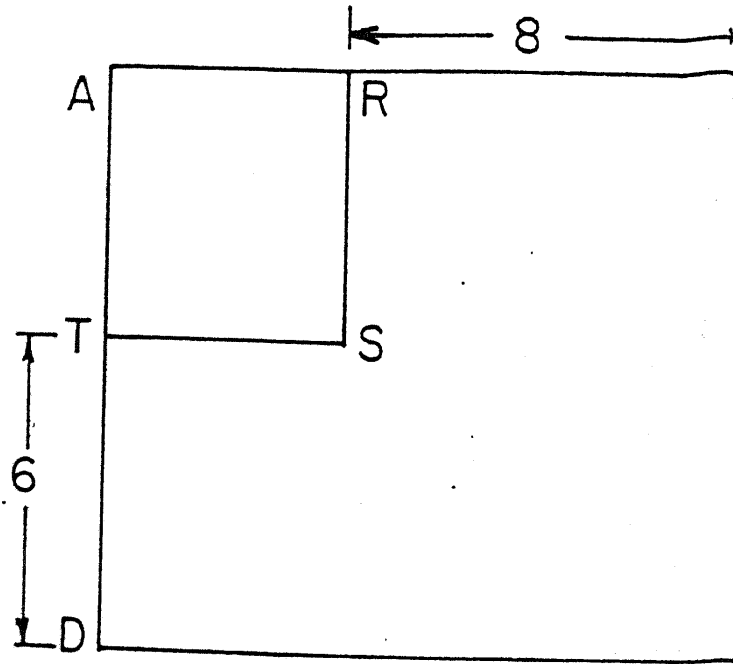
$$\begin{aligned} y &< 5 \\ y &\leq x + 3 \end{aligned} \quad [8,2]$$

37 a Copy and complete the truth table for the statement  $[\sim p \wedge (p \rightarrow q)] \rightarrow \sim q$ . [8]

$p$	$q$	$\sim p$	$p \rightarrow q$	$\sim p \wedge (p \rightarrow q)$	$\sim q$	$[\sim p \wedge (p \rightarrow q)] \rightarrow \sim q$

b Is  $[\sim p \wedge (p \rightarrow q)] \rightarrow \sim q$  a tautology? Justify your answer. [1,1]

- 38 Given: rectangle ABCD with square ARST as shown. The area of the rectangle is 143. If  $RB = 8$  and  $TD = 6$ , find the length of  $AT$ , a side of square ARST. [Only an algebraic solution will be accepted.] [5,5]

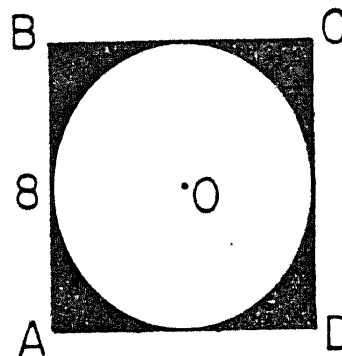


- 39 Solve algebraically for  $x$  and  $y$  and check:

$$\begin{aligned} 4x + 3y &= 27 \\ y &= 2x - 1 \end{aligned} \quad [8,2]$$

- 40 An urn contains 3 orange marbles numbered 1, 2, and 3 respectively and 2 blue marbles numbered 1 and 2, respectively. One marble is removed, its color noted, and the marble is not replaced. A second marble is removed and its color noted.
- a Draw a tree diagram or list the sample space of all possible pairs of outcomes. [4]
- b What is the probability that
- |                                       |     |
|---------------------------------------|-----|
| (1) both marbles drawn are orange     | [2] |
| (2) neither marble drawn is orange    | [2] |
| (3) one of the marbles drawn is green | [2] |

- 41 In the accompanying figure, square ABCD is circumscribed about circle O. The sides of the square have the same length as the diameter of the circle and  $AB = 8$ . [Answers may be left in radical form or in terms of  $\pi$ .]



- a Find the circumference of the circle. [2]  
 b Find the area of the circle. [2]  
 c Find the area of the square. [2]  
 d Find the area of the shaded portion of the figure. [2]  
 e Find the length of AC. [2]
- 42 Given the following data:

Test Scores for a Class of 20 Students

<u>Interval</u>	<u>Number (frequency)</u>
51-60	1
61-70	3
71-80	3
81-90	7
91-100	6

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





New York State Education Department

Integrated Sequence for High School Mathematics

Course I

Final Examination

Monday, June 20, 1977

Pupil.....Teacher.....

School.....

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer 30 questions in this part.

- 1 \_\_\_\_\_ 13 \_\_\_\_\_ 25 \_\_\_\_\_
- 2 \_\_\_\_\_ 14 \_\_\_\_\_ 26 \_\_\_\_\_
- 3 \_\_\_\_\_ 15 \_\_\_\_\_ 27 \_\_\_\_\_
- 4 \_\_\_\_\_ 16 \_\_\_\_\_ 28 \_\_\_\_\_
- 5 \_\_\_\_\_ 17 \_\_\_\_\_ 29 \_\_\_\_\_
- 6 \_\_\_\_\_ 18 \_\_\_\_\_ 30 \_\_\_\_\_
- 7 \_\_\_\_\_ 19 \_\_\_\_\_ 31 \_\_\_\_\_
- 8 \_\_\_\_\_ 20 \_\_\_\_\_ 32 \_\_\_\_\_
- 9 \_\_\_\_\_ 21 \_\_\_\_\_ 33 \_\_\_\_\_
- 10 \_\_\_\_\_ 22 \_\_\_\_\_ 34 \_\_\_\_\_
- 11 \_\_\_\_\_ 23 \_\_\_\_\_ 35 \_\_\_\_\_
- 12 \_\_\_\_\_ 24 \_\_\_\_\_

[OVER]

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.

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Signature

For Teachers Only  
 Scoring Key  
 Integrated Sequence for High School Mathematics  
 Course I  
 June 20, 1977

Part I

- |                        |                            |        |
|------------------------|----------------------------|--------|
| (1) 5                  | (13) $\frac{1}{36}$        | (25) 2 |
| (2) 50                 | (14) 18                    | (26) 3 |
| (3) 12                 | (15) $49\pi$               | (27) 1 |
| (4) $\frac{V}{LW}$     | (16) 24                    | (28) 3 |
| (5) $x(x + 10)$        | (17) $10x$                 | (29) 3 |
| (6) 15                 | (18) 7                     | (30) 3 |
| (7) 6                  | (19) 40                    | (31) 1 |
| (8) 4                  | (20) $p \leftrightarrow q$ | (32) 3 |
| (9) 28                 | (21) 3                     | (33) 2 |
| (10) $p \wedge \sim q$ | (22) 3                     | (34) 4 |
| (11) $8x^2 - 7x + 1$   | (23) 1                     | (35) 2 |
| (12) $\frac{1}{2}$     | (24) 4                     |        |

Part II

- |   |   |                                 |
|---|---|---------------------------------|
| (37) b No, not all T's in<br>final column (or some-<br>thing similar) [2]   | (40) b (1) $\frac{6}{20}$ [2]<br>(2) $\frac{2}{20}$ [2]<br>(3) 0 [2]                                      | (42) b 81-90 [2]<br>c 71-80 [2] |
| (38) Analysis [5]<br>5 [5]  | (41) a $8\pi$ [2]<br>b $16\pi$ [2]<br>c 64 [2]<br>d $64 - 16\pi$ [2]<br>e $8\sqrt{2}$ or $\sqrt{128}$ [2] |                                 |
| (39) (3,5) or $\begin{matrix} x = 3 \\ y = 5 \end{matrix}$ [8]<br>Check [2] |   |                                 |