New York State Education Department

Integrated Sequence for High School Mathematics

Course I

Final Examination

In Lieu of the Ninth Year Mathematics Regents Examination

Thursday, August 14, 1980 — 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 π or in radical form.


1 Solve for x: $4x = 2(x + 8)$

2 Find the value of $x^2 + 2y$ when $x = -3$ and $y = 1$.

3 It takes Bill x hours to paint his garage. Express in terms of x the part of the job Bill can finish in one hour.

4 Solve for x: $0.3x - 2 = 10$

5 Three angles of a triangle are in the ratio 1:3:5. Find the number of degrees in the smallest angle.

6 Express $(x + 2)(x - 4)$ as a trinomial.

7 If the sales tax rate is 5%, find the amount of tax that must be paid on a $35 watch.

8 Joann's five test scores in math were 87, 87, 89, 90, and 100. What is the mode?

9 Factor: $x^2 + 5x - 14$

10 In the accompanying diagram, $\triangle ABC$ is similar to $\triangle RST$, $\angle A \cong \angle R$, $\angle B \cong \angle S$, and $\angle C \cong \angle T$. If AB = 2, AC = 6, and RT = 15, find the length of side RS.
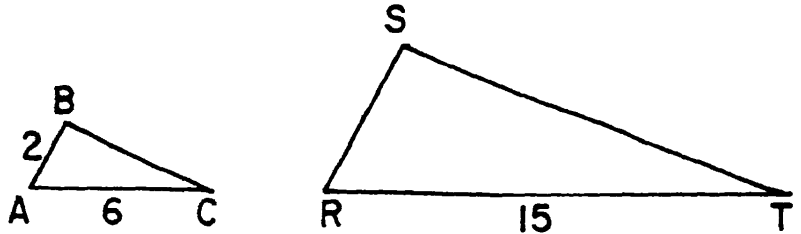

11 In a single toss of two coins, what is the probability of obtaining two heads?

12 A card is selected at random from a standard deck of 52 cards. What is the probability it is not an ace?

13 In the accompanying diagram of regular pentagon ABCDE, all sides are congruent. The perimeter is represented by 10x - 5. What is a binomial expression for the length of one side of the pentagon?
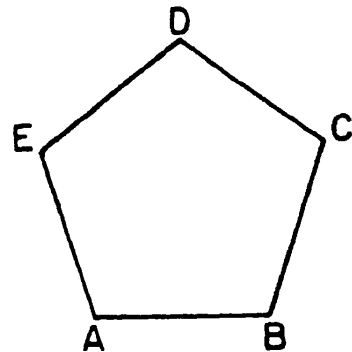
14 In the accompanying figure, $\angle ABC$ is a right angle, $m\angle ABD = 3x - 6$, and $m\angle DBC = x$. Find the value of x.
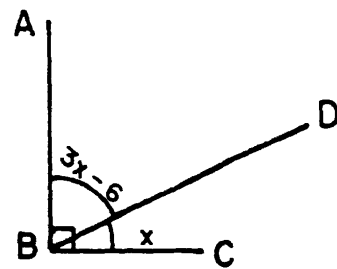

15 If 18 is subtracted from twice a certain number, the result is 36. Find the number.

16 Let p represent, "You open an account."
    Let q represent, "You receive a gift."

    Write in symbolic form using p and q: "If you open an account, then you receive a gift."

17 Solve for x in terms of a, b, and c: ax + b = c

18 The lengths of the two legs of a right triangle are 2 and 3. Find in radical form the length of the hypotenuse of the triangle.

19 As shown in the diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are cut by transversal $\overleftrightarrow{AEF}$ at points A and E, respectively, $m\angle EAB = 2x$, and the degree measure of $\angle DEF$ is 60. Find the value of x.
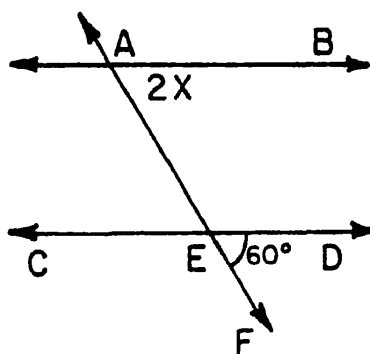
20 Solve the following system of equations for x: $3x + y = 9$
$x - y = 7$

Directions (21-35): 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.

21 Which graph shows the solution of $-2 \leq x < 5$?

(1)
(3)
(2)
(4)
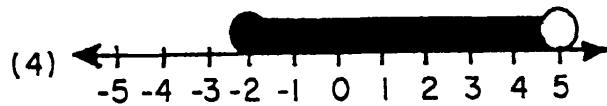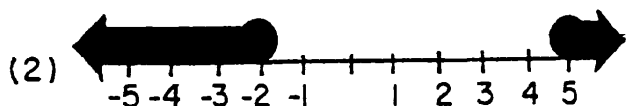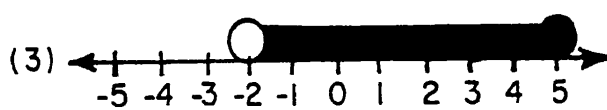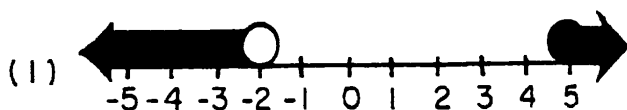
22 When $3x^3 + 3x$ is divided by $3x$, the quotient is

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

23 What is the solution set for the equation $x^2 + 2x - 15 = 0$?

(1) $\{3,-5\}$ (3) $\{-3,-5\}$
(2) $\{3,5\}$ (4) $\{-3,5\}$

24 The area of a circle with radius 7 is

(1) 49   (3) 14π
(2) 49π (4) 7π

33

25 The product $(-2xy^2)(3x^2y^3)$ is

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

26 Which is an irrational number?

(1) 0   (3) $\sqrt{5}$
(2) $\frac{1}{3}$ (4) $\sqrt{9}$

27 If p ∧ q is true, which must be true?

(1) ~p   (3) p → ~q
(2) ~q   (4) p ∨ q

28 The length of a rectangle is 5 centimeters longer than its width, w. The length of the rectangle can be represented by

(1) w + 5   (3) 5 - w
(2) w - 5   (4) 5w

29 In the accompanying figure, triangle ABC is inscribed in a circle and arc AC measures 150°. What is the number of degrees in ∠ABC?
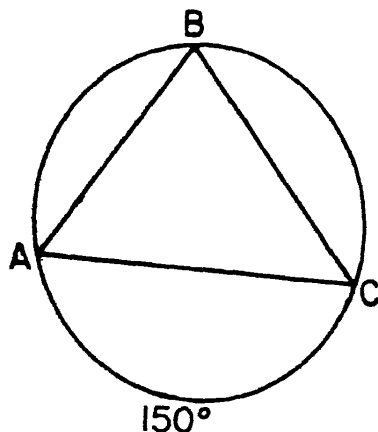
(1) 50°   (3) 75°
(2) 55°   (4) 150°

30 The equation of a line whose slope is 2 and whose y-intercept is -2 is

(1) 2y = x - 2   (3) y = -2x + 2
(2) y = -2   (4) y = 2x - 2

31 A bag contains 5 black marbles and 10 red marbles. If one marble is drawn at random, what is the probability that it is black?

(1) $\frac{5}{10}$ (3) $\frac{5}{15}$

(2) $\frac{1}{15}$ (4) $\frac{10}{15}$

32 Given the true statement: "If I own a Buick, then I own a car." Which statement must be true?

(1) If I do not own a Buick, then I do not own a car.
(2) If I own a car, then I own a Buick.
(3) If I own a car, then I do not own a Buick.
(4) If I do not own a car, then I do not own a Buick.

33 The sum of $\sqrt{20}$ and $\sqrt{45}$ is

(1) $5\sqrt{5}$ (3) $13\sqrt{5}$
(2) $6\sqrt{5}$ (4) $\sqrt{65}$

34 What should be the last column of the truth table below?

p	q	~p	~p $\wedge$ q
T	T	F	
T	F	F	
F	T	T	
F	F	T	

(1) T   (3) F
    F   F
    F   T
    F   F

(2) T   (4) F
    F   F
    T   F
    T   F

35 The symbol for "factorial 4" is 4! What is the value of 4!?

(1) 24   (3) 8
(2) 16   (4) 4

35

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

Part II

Answer <u>four</u> questions from this part. Show work unless otherwise directed.

36 Solve graphically and check:

$$2x + y = 7$$
$$x - y = 2 \quad [8,2]$$

37 The length of a rectangle is 5 more than 3 times its width. The perimeter of the rectangle is 34. Find the length and width of the rectangle. [<u>Only an algebraic solution will be accepted.</u>] [5,

38 A high school athletic department sold 450 tickets to a varsity football game. Some of the tickets were sold in advance for $1.00 each; the remainder were sold at the gate for $1.50 each. If the total receipts from both sales was $565.00, find the number of tickets that were sold at the gate. [<u>Only an algebraic solution will be accepted.</u>] [5,5]

39 The accompanying table shows the distribution of scores on a quiz.

Score	Frequency
100	5
90	4
80	3
70	7
60	0
50	1

a Find the total frequency.   [2]

b Find the mode.   [2]

c Find the median.   [2]

d Find the mean.   [4]

36

40 A sack contains 1 red, 1 white, and 2 blue disks. One disk is drawn at random and is not replaced. Then a second disk is drawn at random.

    a Draw a tree diagram or list the pairs of the sample space showing all possible outcomes. [4]

    b Determine the probability that:

        (1) both disks are blue [2]
        (2) the first disk is red and the second disk is white [2]
        (3) both disks are white [2]

41 Find two consecutive positive integers such that the square of the smaller added to twice the larger is 50. [Only an algebraic solution will be accepted.] [4,6]

42 a On your answer paper, copy and complete the truth table for the tautology $(p \rightarrow \sim q) \longleftrightarrow (\sim p \lor \sim q)$. [8]

p	q	~p	~q	p → ~q	~p ∨ ~q	(p → ~q) ←→ (~p ∨ ~q)

    b Let p represent, "I save money," and let q represent, "I spend money." Which sentence is equivalent to $(p \rightarrow \sim q)$?

        (1) I save money and I spend money.
        (2) I save money or I spend money.
        (3) I do not save money and I do not spend money.
        (4) I do not save money or I do not spend money. [2]

37

Part I

Score_____

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

Thursday, August 14, 1980 — a.m.

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]

31

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, August 14, 1980 — a.m.

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 21-35, allow credit if the pupil has written the correct answer instead of the numeral 1,2,3, or 4.

(1)	8	(13)	$2x - 1$	(25)	3
(2)	11	(14)	24	(26)	3
(3)	$\dfrac{1}{x}$	(15)	27	(27)	4
(4)	40	(16)	$p \rightarrow q$	(28)	1
(5)	20	(17)	$\dfrac{c - b}{a}$	(29)	3
(6)	$x^2 - 2x - 8$	(18)	$\sqrt{13}$	(30)	4
(7)	$1.75	(19)	30	(31)	3
(8)	87	(20)	4	(32)	4
(9)	$(x + 7)(x - 2)$	(21)	4	(33)	1
(10)	5	(22)	2	(34)	3
(11)	$\dfrac{1}{4}$	(23)	1	(35)	1
(12)	$\dfrac{48}{52}$	(24)	2		

[OVER]

41

Part II

Please refer to the Department's pamphlet <u>Suggestions on the 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]

     l = 14

     w = 3   [5]

(38) Analysis   [5]

     230   [5]

(39)   a   20   [2]

     b   70   [2]

     c   80   [2]

     d   82   [4]

(40)   b   (1) $\frac{2}{12}$ [2]

          (2) $\frac{1}{12}$ [2]

          (3)   0   [2]

(41)   Analysis   [4]

     6 and 7   [6]

(42)   b   4   [2]

42