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REGHS

CPIML

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Friday, June 15, 1990 — 9:15 a.m. to 12:15 p.m., only

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 π or in radical form. [60]

1 A 50-foot tree casts a shadow of 40 feet. At the same time, a boy casts a shadow of 4 feet. Expressed in feet, how tall is the boy?

2 In the accompanying diagram of $\triangle ABC$, $\overline{AC} \cong \overline{BC}$ and $m\angle A = 70$. Find the measure of the vertex angle.
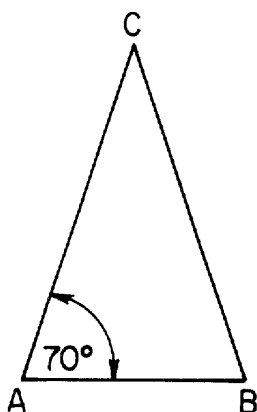

3 In the accompanying diagram, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at E. If $m\angle AED = 9x + 10$ and $m\angle BEC = 2x + 52$, find the value of x.
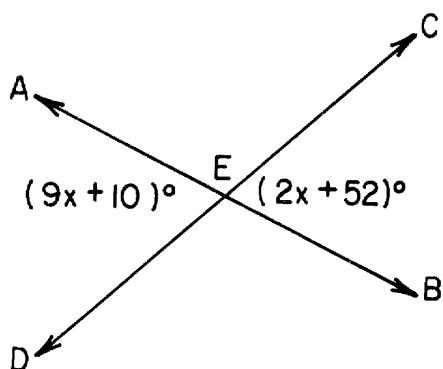
4 Let p represent the statement "I will win," and let q represent the statement "I practice." Write in symbolic form: "If I do not practice, then I will not win."

5 Solve for x: $\dfrac{3x}{4} - 1 = 2$

6 The histogram below shows the grade distribution for a mathematics test given to Ms. Keith's class. How many students are in the class?

DISTRIBUTION OF GRADES
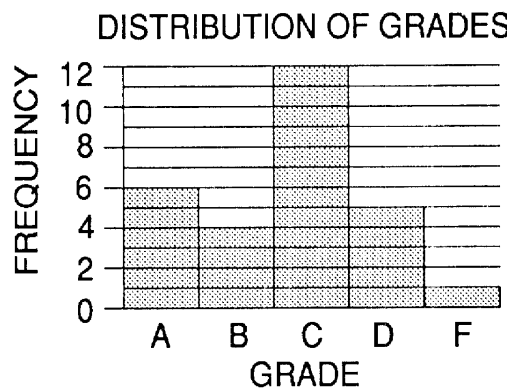
7 Solve for x: $0.03x - 2.1 = 0.3$

8 Solve for x: $\dfrac{3}{x + 2} = \dfrac{1}{x}, x \neq 0, x \neq -2$

9 The lengths of the sides of a trapezoid are represented by $2x + 3$, $4x - 5$, $3x + 2$, and $5x - 9$. Express the perimeter of the trapezoid as a binomial in terms of x.

10 If the replacement set for x is $\{2,3,4,5,6\}$, what is the probability that a number chosen at random from the replacement set will make the sentence $3x + 2 \leq 20$ true?

11 Solve for x: $4(2x - 1) = 2x + 35$

12 In rectangle $ABCD$, AB is represented by $2x + 1$ and BC is represented by $x + 3$. Express the area of rectangle $ABCD$ as a trinomial in terms of x.
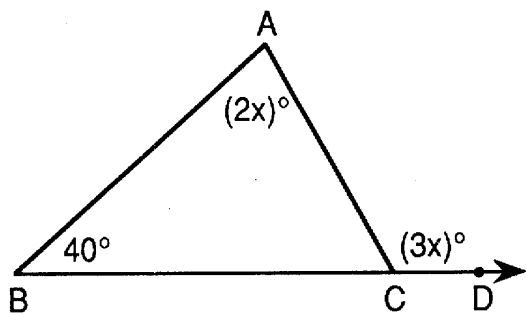
13 The measures of two supplementary angles are in the ratio 4:5. Find the number of degrees in the measure of the *smaller* angle.

14 From $7x^2 - 4x$ subtract $5x^2 + 2x$.

15 If x varies directly as y, find x when $y = 1$ if $x = 12$ when $y = 4$.

16 Express $\dfrac{3}{2x} + \dfrac{5}{3x}$, $x \neq 0$, as a single fraction.

17 In the accompanying diagram, $\angle ACD$ is an exterior angle of $\triangle ABC$. If $m\angle B = 40$, $m\angle A = 2x$, and $m\angle ACD = 3x$, what is the value of x?

18 The volume of a rectangular solid is 180 cubic centimeters. The length is 10 centimeters and the width is 4 centimeters. Using the formula $V = lwh$, find the number of centimeters in the height.

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 The expression $(x - 4)^2$ is equivalent to
(1) $x^2 - 16$ (3) $x^2 - 8x + 16$
(2) $x^2 + 16$ (4) $x^2 + 8x + 16$

20 What is the product of $3x^4y^2$ and $2xy^3$?
(1) $6x^5y^5$ (3) $6x^4y^6$
(2) $6x^4y^5$ (4) $6x^5y^6$

21 Which property is *not* true for *all* parallelograms?
(1) Opposite angles are congruent.
(2) Consecutive angles are supplementary.
(3) Opposite sides are congruent.
(4) Diagonals are congruent.

22 In which figure is $\triangle A'B'C'$ a reflection of $\triangle ABC$ in line ℓ?
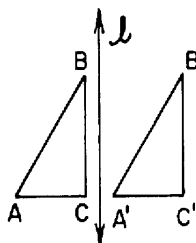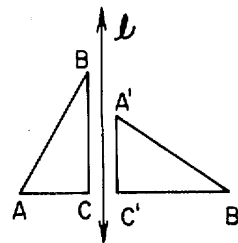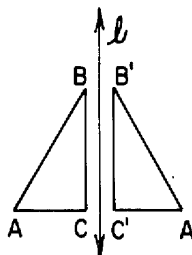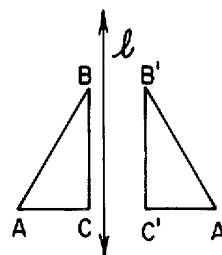
23 If the length of a rectangle is 3 and the width is 2, the length of the diagonal is
(1) $\sqrt{5}$ (3) 5
(2) $\sqrt{13}$ (4) 13

24 Which phrase describes the graph of $y = -1$ on the coordinate plane?
(1) a line parallel to the y-axis and 1 unit to the right of it
(2) a line parallel to the y-axis and 1 unit to the left of it
(3) a line parallel to the x-axis and 1 unit below it
(4) a line parallel to the x-axis and 1 unit above it

25 What is the value of $\dfrac{6!}{3!}$?
(1) 6   (3) 120
(2) 2   (4) 720

26 The set of scores on a mathematics test is 72, 80, 80, 82, 87, 89, and 91. The mean score is
(1) 84   (3) 82
(2) 83   (4) 80

27 If x is an integer, which is the solution set of $-1 \le x < 2$?
(1) $\{0,1\}$ (3) $\{0,1,2\}$
(2) $\{-1,0,1,2\}$ (4) $\{-1,0,1\}$

28 Which equation is equivalent to $x + 2y = 6$?
(1) $y = -x + 6$ (3) $y = -x + 3$
(2) $y = -\frac{1}{2}x + 6$ (4) $y = -\frac{1}{2}x + 3$

29 Let p represent "$x > 5$" and let q represent "x is a multiple of 3." If $x = 12$, which statement is false?
(1) $p \lor q$ (3) $p \rightarrow q$
(2) $\sim q \land p$ (4) $p \leftrightarrow q$

30 What is the solution set of $x^2 - x - 20 = 0$?
(1) $\{5,-4\}$ (3) $\{-10,2\}$
(2) $\{-5,4\}$ (4) $\{10,-2\}$

31 Which number is equal to 3.6×10^5?
(1) 360,000 (3) 0.000036
(2) 3,600,000 (4) 0.0000036

32 Which value of x will make the fraction $\frac{x - 3}{x + 6}$ undefined?
(1) 6 (3) 3
(2) -6 (4) -3

33 If the coordinates of the vertices of $\triangle ABC$ are $A(3,-2)$, $B(7,-2)$, and $C(5,5)$, what is the area of the triangle?
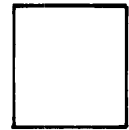(1) 10 (3) 20
(2) 14 (4) 28

34 The expression $2\sqrt{3} - \sqrt{27}$ is equivalent to
(1) $2\sqrt{24}$ (3) $-5\sqrt{3}$
(2) $5\sqrt{3}$ (4) $-\sqrt{3}$

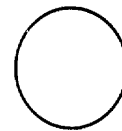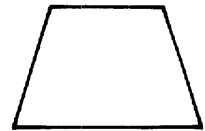35 Which figure does *not* have line symmetry?

(1)

(3)

(2)

(4)

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. [40]

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

$$y \le -3x + 2$$
$$y - x > 0 \qquad [8]$$

b Write the coordinates of a point *not* in the solution set of the inequalities graphed in part *a*. [2]

37 Twice the square of an integer is five less than eleven times the integer. Find the integer. [*Only an algebraic solution will be accepted.*] [4,6]

38 Solve the following system of equations algebraically and check:

$$2x + 3y = 11$$
$$5x - 2y = -20 \qquad [8,2]$$

39 In rectangle *ABCD*, the ratio of *AB:BC* is 4:3. The perimeter of the rectangle is 56 centimeters.
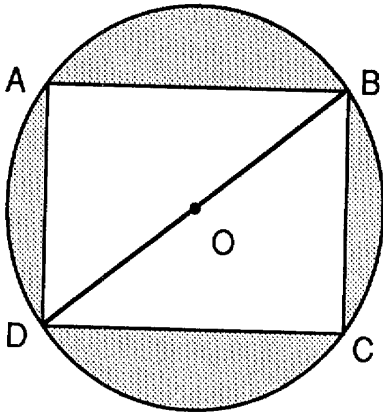
a Find *AB*. [2]
b Find *BD*. [3]
c Express, in terms of π, the area of circle *O*. [2]
d Express, in terms of π, the area of the shaded region. [3]

40 The table below shows the cumulative frequency of the ages of 35 people standing in a cafeteria line.

Interval	Cumulative Frequency
10–19	2
10–29	17
10–39	27
10–49	32
10–59	32
10–69	35

a *On your answer paper*, copy and complete the frequency table below, based on the data given in the cumulative frequency table above. [1]

Interval	Frequency
10–19	2
20–29	
30–39	
40–49	
50–59	
60–69	

b Construct a frequency histogram using the table completed in part *a*. [4]
c Using the frequency table in part *a*, in which interval does the median occur? [2]
d What is the probability that a person chosen at random from the line is at least 40 years old? [2]
e What is the probability that a person chosen at random from the line is between 50 and 59 years old? [1]

☞ GO RIGHT ON TO THE NEXT PAGE.

41 Adam has a bag containing four yellow gumdrops and one red gumdrop. He will eat one of the gumdrops, and a few minutes later, he will eat a second gumdrop.

   a What is the probability Adam will eat a yellow gumdrop first and a red gumdrop second? [3]

   b What is the probability Adam will eat two yellow gumdrops? [3]

   c What is the probability Adam will eat two gumdrops having different colors? [2]

   d What is the probability Adam will eat two red gumdrops? [2]

42 Let p represent: "The flowers are not in bloom."
Let q represent: "It is raining."
Let r represent: "The grass is green."

   a Write, in symbolic form, the converse of "If the flowers are in bloom, then the grass is green." [2]

   b Write, in symbolic form, the inverse of "If it is raining, the grass is green." [2]

   c Write in sentence form: $p \wedge \sim q$ [2]

   d Write in sentence form: $\sim r \vee \sim p$ [2]

   e Which of these four statements must have the same truth value as $\sim q \rightarrow r$? [2]

     (1) $q \rightarrow \sim r$ (3) $\sim q \rightarrow \sim r$

     (2) $\sim r \rightarrow q$ (4) $r \rightarrow q$

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Friday, June 15, 1990 — 9:15 a.m. to 12:15 p.m., only

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

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

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Friday, June 15, 1990 — 9:15 a.m. to 12:15 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) 5	(11) 6.5	(21) 4	(31) 1
(2) 40	(12) $2x^2 + 7x + 3$	(22) 2	(32) 2
(3) 6	(13) 80	(23) 2	(33) 2
(4) $\sim q \rightarrow \sim p$	(14) $2x^2 - 6x$	(24) 3	(34) 4
(5) 4	(15) 3	(25) 3	(35) 1
(6) 28	(16) $\dfrac{19}{6x}$	(26) 2	
(7) 80	(17) 40	(27) 4	
(8) 1	(18) 4.5	(28) 4	
(9) $14x - 9$	(19) 3	(29) 2	
(10) 1	(20) 1	(30) 1	

[OVER]

Part II

Please refer to the Department publication *Guide for Rating Regents Examinations 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) 5   [4,6]

(38) (–2,5)   [8]

(39) *a* 16   [2]
    b 20   [3]
    c 100π [2]
    d $100\pi - 192$ [3]

(40) *c* 30–39   [2]
    d $\frac{8}{35}$ [2]
    e 0   [1]

(41) *a* $\frac{4}{20}$ [3]
    b $\frac{12}{20}$ [3]
    c $\frac{8}{20}$ [2]
    d 0   [2]

(42) *a* $r \rightarrow \sim p$ [2]
    b $\sim q \rightarrow \sim r$ [2]
    c The flowers are not in bloom and it is not raining.   [2]
    d The grass is not green or the flowers are in bloom.   [2]
    e (2)   [2]