The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, June 17, 1993 — 9:15 a.m. to 12:15 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

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 Solve for x: $1.2x - 0.8 = 1.6$

2 If p represents "It is raining" and q represents "I will go swimming," write in symbolic form, using p and q: "If it is raining, then I will not go swimming."

3 Solve for x: $3(x - 2) = -9$

4 If the probability that it will rain is 0.7, what is the probability that it will *not* rain?

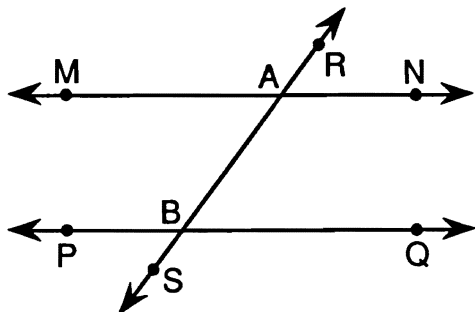5 Factor: $x^2 + 6x + 5$

6 Evaluate: $5!$

7 Solve the following system of equations for x:

$$2x + y = 6$$
$$3x - y = 4$$

8 Solve for x in terms of a. b. and c:

$$ax - b = c. \, a \neq 0$$

9 In the accompanying diagram, transversal $\overleftrightarrow{RS}$ intersects parallel lines $\overleftrightarrow{MN}$ and $\overleftrightarrow{PQ}$ at A and B, respectively. If $m\angle RAN = 3x + 24$ and $m\angle RBQ = 7x - 16$. find the value of x.


10 A jar contains only blue marbles and green marbles. If the ratio of blue marbles to green marbles is 3:2, what is the probability that one marble. selected at random. will be blue?

11 Solve for x: $2x + 4 \leq 12$

12 Two angles are supplementary. If one angle measures twice the other, find the number of degrees in the *smaller* angle.

13 In the accompanying diagram of $\triangle ABC$. the measure of an exterior angle at C is 105 and $m\angle A = 35$. Find $m\angle B$.
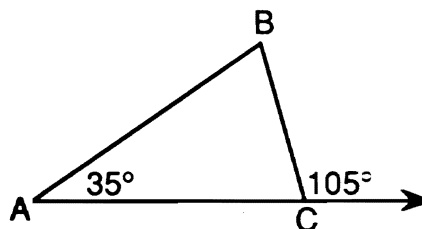
14 Solve for x: $\frac{3}{2}x - 12 = 18$

15 Solve for the positive value of x:

$$6x^2 - 54 = 0$$

16 The scores 12, 17, 15, and x have a mean of 13. What is the value of x?

17 The diameter of a circle is 8. What is the area of the circle in terms of π?
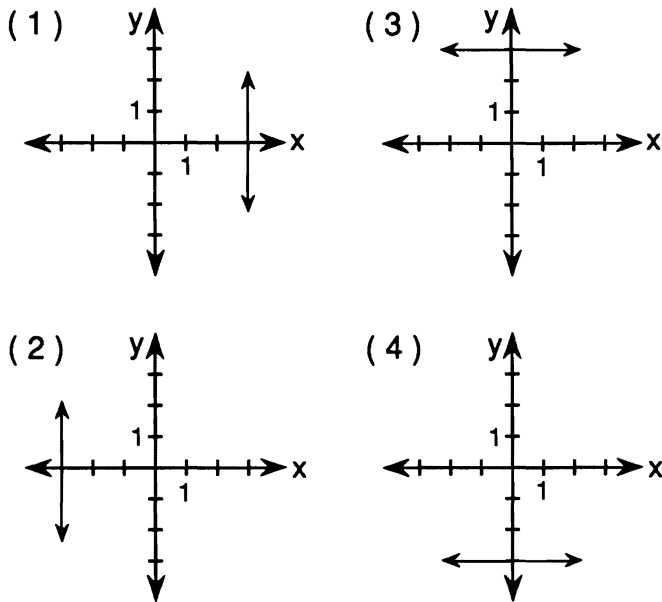
18 Express $(2x - 3)(x + 5)$ as a trinomial.

19 If 10 cubic centimeters of blood contains 1.2 grams of hemoglobin, how many grams of hemoglobin would 35 cubic centimeters of the same blood contain?

20 What is the product of $3y^2$ and $4y^5$?

(1) $7y^{10}$ (3) $12y^{10}$

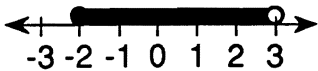(2) $7y^7$ (4) $12y^7$

21 Which graph represents the equation $x = -3$?

22 If $n + 4$ represents a positive odd integer, the next larger consecutive positive odd integer is represented by

(1) $2(n + 4)$ (3) $n + 5$

(2) $n + 2$ (4) $n + 6$

23 Which inequality is represented by the graph below?

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

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

24 Which statement is the inverse of the statement "If Abbey is not injured, she will win the race"?

(1) If Abbey wins the race, she is not injured.

(2) If Abbey is injured, she will win the race.

(3) If Abbey is injured, she will not win the race.

(4) If Abbey does not win the race, she is injured.

25 If p is false and q is false, which expression is true?

(1) $p \vee q$ (3) $\sim p \rightarrow q$

(2) $p \wedge q$ (4) $p \leftrightarrow q$

26 The expression $\dfrac{25m^3 + 10m^2 - 5m}{5m}$, $m \neq 0$, is equivalent to

(1) $5m^2 + 2m - 1$ (3) $6m$

(2) $5m^2 + 2m$ (4) $5m^2 + 5m - 1$

27 If each side of a square is doubled, the area of the square

(1) remains the same   (3) is doubled

(2) is divided by 2   (4) is multiplied by 4

28 The y-intercept of the graph of the equation $y = -\frac{2}{3}x + 4$ is

(1) $-\frac{2}{3}$ (3) 3

(2) -2 (4) 4

29 The expression $\dfrac{x - 2}{x + 3}$ is undefined when x is equal to

(1) -3 (3) 3

(2) 2   (4) -2

30 If a rectangle is *not* a square, what is the greatest number of lines of symmetry that can be drawn?

(1) 1   (3) 3

(2) 2   (4) 4

31 In a right triangle, the length of the hypotenuse is 12 and the length of one leg is 8. What is the length of the other leg?

(1) $\sqrt{208}$ (3) $\sqrt{20}$

(2) $\sqrt{80}$ (4) 4

32 The expression $\sqrt{18} + \sqrt{32}$ is equivalent to

(1) $2\sqrt{7}$ (3) $7\sqrt{2}$
(2) $5\sqrt{2}$ (4) $13\sqrt{2}$

33 What is the measure of the largest angle of a triangle whose angle measures are in the ratio of 2:3:4?

(1) 20° (3) 60°
(2) 40° (4) 80°

34 In which quadrilateral are the diagonals *always* congruent?

(1) rectangle (3) rhombus
(2) trapezoid (4) parallelogram

35 Which table represents direct variation?

(1)

x	y
3	4
4	5
5	6
6	7

(2)

x	y
3	6
4	8
5	10
6	12

(3)

x	y
3	2
4	3
5	4
6	5

(4)

x	y
3	9
4	16
5	25
6	36

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 Solve the following system of equations graphically and check:

$$y - x = 1$$
$$y = -\frac{1}{2}x + 4$$

[8,2]

37 Solve the following system of equations algebraically and check:

$$4x - 5y = 18$$
$$3x - 2y = 10$$

[8,2]

38 A candy jar has four red gumdrops, five green gumdrops, and one black gumdrop. Without looking, Kim reaches into the jar and chooses one gumdrop. Without replacing this gumdrop, Kim chooses a second gumdrop. The tree diagram below represents all possible outcomes with the probability value on each branch.
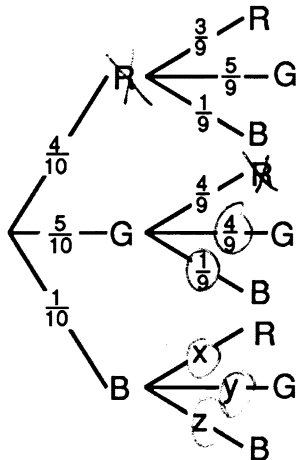

a Find the values of x, y, and z.   [3]

b Find the probability that

(1) both gumdrops chosen are green   [2]
(2) one of the gumdrops chosen is red and the other is green   [2]
(3) neither of the gumdrops chosen is red   [3]

39 a In the accompanying diagram, rectangles DGFE, EFHA, and GHBC are congruent and AH = 4. Find the ratio AB:BC. [Show or explain the procedure used to obtain your answer.]   [4]
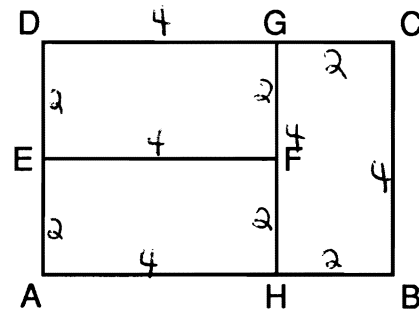
b In the accompanying diagram, ABCD is a rectangle with E a point on $\overline{DC}$, EC = 5, BE = 13, and AB = 20. Find the area of trapezoid ABED. [Show or explain the procedure used to obtain your answer.]   [6]
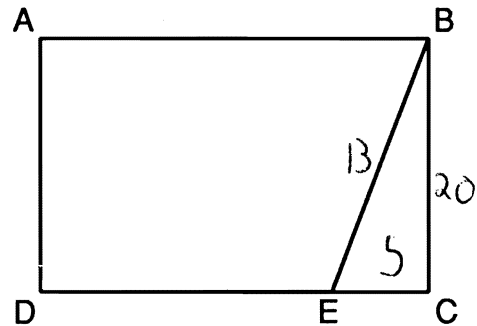
40 a On your answer paper, construct and complete the truth table for the statement $(p \wedge q) \rightarrow (\sim p \vee \sim q)$.   [8]

b Based on the truth table constructed in part a, which truth values of p and q make $(p \wedge q) \rightarrow (\sim p \vee \sim q)$ false?   [2]

41 If 18 is subtracted from twice the square of an integer, the result is equal to nine times the integer. Find the integer. [Only an algebraic solution will be accepted.]   [4,6]

42 Tracy recorded the number of calories she consumed for 20 consecutive days: 1200, 1153, 1106, 976, 980, 972, 1405, 1100, 1325, 1149, 1252, 972, 1341, 962, 1243, 1070, 1438, 1305, 1367, 1163.

a *On your answer paper,* copy and complete the tables below to find the frequency and cumulative frequency in each interval.   [2.2]

FREQUENCY TABLE

Interval	Tally	Frequency
900–999		
1000–1099		
1100–1199		
1200–1299		
1300–1399		
1400–1499		

CUMULATIVE FREQUENCY TABLE

Interval	Cumulative Frequency
900–999	
900–1099	
900–1199	
900–1299	
900–1399	
900–1499	

b Using the cumulative frequency table completed in part *a,* construct a cumulative frequency histogram.   [4]

c Which interval in the frequency table completed in part *a* contains the median?   [2]