The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 28, 1999 — 9:15 a.m. to 12:15 p.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 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.**

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 π or in radical form. [60]

1 A basketball player made 15 foul shots, which is 75% of the total number the player attempted. How many foul shots did this player attempt?

2 Solve for x: $4(3x - 5) = 5(2x + 4)$

3 The accompanying histogram shows the height distribution for students in a high school mathematics class. What is the total number of students in the class?

Height Distribution
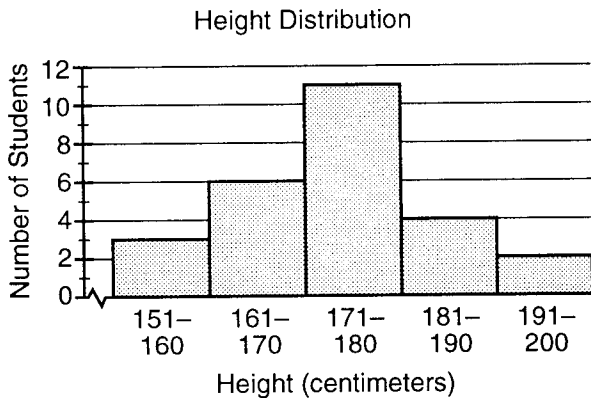
4 In the formula $z = xy^2$, find z if $x = 4$ and $y = -3$.

5 The scores 12, 14, 16, and x have a mean of 15. Find the value of x.

6 The circumference of a circle is 128π. What is the radius of the circle?

7 Solve for x in terms of p and a: $2x + a = p$

8 Solve the following system of equations for x:
$$3x + y = 17$$
$$2x - y = -12$$

9 Factor: $9x^2 - 25$

10 If two supplementary angles are in the ratio 8:1, how many degrees are in the measure of the smaller angle?

11 In the accompanying diagram, parallel lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are intersected by transversal $\overleftrightarrow{EF}$ at G and H, respectively. If m$\angle BGH = 3x - 5$ and m$\angle GHD = 6x + 14$, what is the value of x?
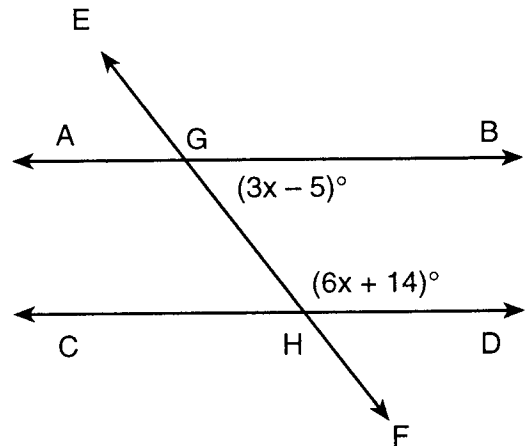
12 If the length of the hypotenuse of a right triangle is 17 and the length of one leg is 8, what is the length of the other leg?

13 From $9x^2 - 8x + 6$, subtract $7x^2 - 2x + 6$.

Directions (14–35): 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.

14 The length of each side of a regular hexagon is represented by $3x + 4$. Which expression represents the perimeter of the hexagon?

(1) $3x + 10$ (3) $18x + 4$

(2) $3x + 24$ (4) $18x + 24$

15 The product of $3x^4$ and $2x^4$ is
  (1) $5x^4$ (3) $6x^4$
  (2) $5x^8$ (4) $6x^8$

16 In the equation $0.03x - 0.1 = 2.6$, what is the value of x?
  (1) 9   (3) 120
  (2) 90   (4) 130

17 If x is a member of the set of integers, the solution set of $-4 < x \le 1$ is
  (1) $\{-4,-3,-2,0\}$ (3) $\{-3,-2,-1,0,1\}$
  (2) $\{-4,-3,-2,0,1\}$ (4) $\{-3,-2,0\}$

18 Which expression is equivalent to the expression $(2x + 4)(x - 6)$?
  (1) $2x^2 - 24$ (3) $x^2 - 4x - 12$
  (2) $2x^2 - 8x - 24$ (4) $2x^2 + 4x - 24$

19 Expressed in simplest form, $\dfrac{30x^3 - 15x^2 + 5x}{5x}$, $x \ne 0$, is equivalent to
  (1) $6x^2 - 3x$ (3) $6x^2 - 3x + 1$
  (2) $25x^2 - 10x$ (4) $25x^2 - 10x + 1$

20 If the length of a rectangle is $5\sqrt{2}$ and the width is $2\sqrt{3}$, what is the area of the rectangle?
  (1) $10\sqrt{6}$ (3) $7\sqrt{5}$
  (2) $7\sqrt{6}$ (4) $10\sqrt{5}$

21 Which letter does *not* have a line of symmetry?
  (1) S   (3) X
  (2) O   (4) H

22 What is the value of x in the proportion $\dfrac{x-4}{x} = \dfrac{5}{7}$?
  (1) -2 (3) -14
  (2) 2   (4) 14

23 If 0.000063 is expressed in the form 6.3×10^n, what is the value of n?
  (1) 5   (3) -4
  (2) -5 (4) 4

24 Which statement is true when p is false and q is true?
  (1) $p \leftrightarrow q$ (3) $p \wedge q$
  (2) $q \rightarrow p$ (4) $\sim p \vee q$

25 What is the positive value of x in the equation $x^2 - x - 6 = 0$?
  (1) 1   (3) 3
  (2) 2   (4) 6

26 In the accompanying diagram of trapezoid $ABCD$, $AB = 26$, $BC = 10$, $CD = 18$, $\overline{CB} \perp \overline{AB}$, and altitude $\overline{DE}$ is drawn.
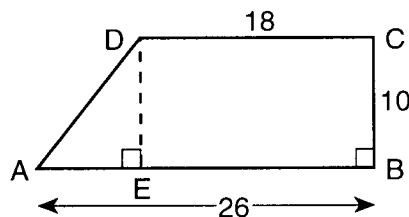

What is the area of the trapezoid?
  (1) 440   (3) 220
  (2) 228   (4) 180

27 If y varies directly as x and $y = 8$ when $x = 3$, what is the value of y when $x = 9$?
  (1) $\dfrac{8}{3}$ (3) 14
  (2) $\dfrac{27}{8}$ (4) 24

28 The area of a square is represented by $36x^2$. Which expression represents the length of each side of the square?
  (1) $6x$ (3) $6x^2$
  (2) $9x$ (4) $9x^2$

29 What is the converse of the statement "If you used too much milk, then your cereal is soggy"?

(1) If your cereal is soggy, then you did not use too much milk.
(2) If you did not use too much milk, then your cereal is not soggy.
(3) If your cereal is not soggy, then you did not use too much milk.
(4) If your cereal is soggy, then you used too much milk.

30 What is the sum of $\frac{4}{9y}$ and $\frac{7}{3y}$, $y \neq 0$?

(1) $\frac{11}{9y}$ (3) $\frac{25}{9y}$

(2) $\frac{11}{12y}$ (4) $\frac{25}{12y}$

31 The graph of which inequality is shown in the accompanying diagram?
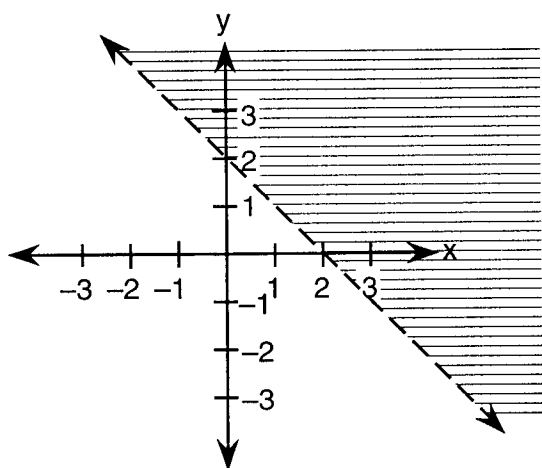
(1) $x - y > 2$ (3) $x - y < 2$
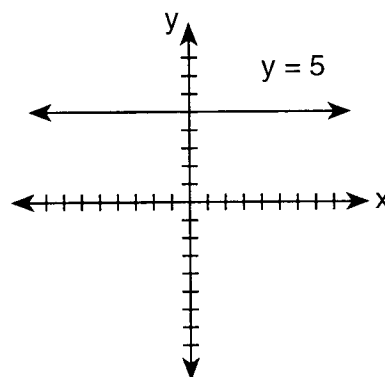(2) $x + y > 2$ (4) $x + y < 2$

32 What are the coordinates of the y-intercept in the graph of the equation $y + 3x = 6$?

(1) $(0,6)$ (3) $(0,-3)$
(2) $(0,3)$ (4) $(0,-6)$

33 The value of $_8P_3$ is

(1) 24   (3) 6,720
(2) 336   (4) 40,320

34 The diagram below shows the graph of the equation $y = 5$.

What is the slope of the line $y = 5$?

(1) 0   (3) -5
(2) 5   (4) undefined

35 The probability of drawing a red marble from a sack of marbles is $\frac{2}{5}$. Which set of marbles could the sack contain?

(1) 2 red marbles and 5 green marbles
(2) 4 red marbles and 6 green marbles
(3) 6 red marbles and 15 green marbles
(4) 2 red marbles, 1 blue marble, and 4 white marbles

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 axes, graph the following system of inequalities.

$$2y + 2 \geq 4x$$
$$y - 5 < 2x$$ [8]

b State the coordinates of a point that is in the solution set of the graphs drawn in part *a*. [2]

37 *a* In the diagram of $\triangle ABC$ below, $\overline{BC}$ is extended to D, $m\angle A = 3x - 17$, $m\angle B = 2x + 9$, and $m\angle ACD = 4x + 24$. Find $m\angle ACD$. [5]

A

(3x − 17)°

(2x + 9)°   (4x + 24)°

B   C   D
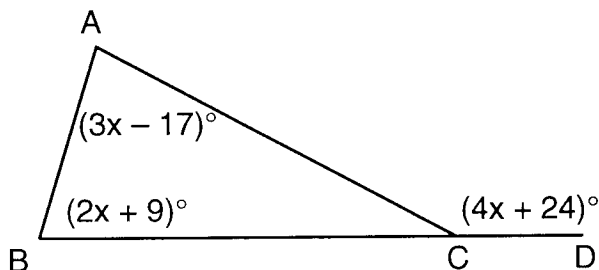
b In $\triangle DEF$, $m\angle D$ is 1 degree more than twice $m\angle E$, and $m\angle F$ is 7 degrees less than $m\angle D$. Find the number of degrees in the measure of *each* angle of the triangle. [5]

38 Construct a truth table for the statement $(p \vee \sim q) \leftrightarrow (\sim p \rightarrow \sim q)$. [10]

39 A hatchery has 9 eggs that are expected to hatch tomorrow. There are 5 duck eggs, 3 chicken eggs, and 1 swan egg.

a On your answer sheet, copy the tree diagram below. Then complete each branch by filling in the probability value for all possible outcomes for the first two eggs that hatch. [4]
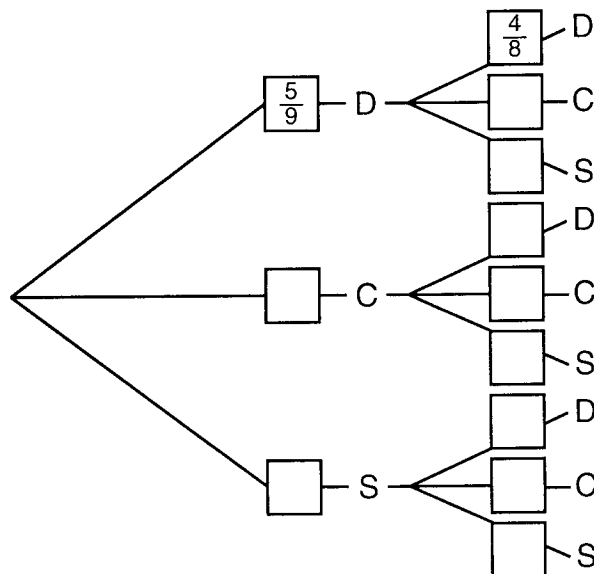
b Find the probability that of the first two eggs hatched
  (1) both will be ducks [2]
  (2) both will be the same kind of bird [2]
  (3) one will be a swan [2]

GO RIGHT ON TO THE NEXT PAGE.

40 In the accompanying diagram, two congruent circles, O and P, with radii $\overline{OT}$ and $\overline{PT}$, respectively, are inscribed in rectangle $ABCD$. The length of $\overline{OP}$ is 12.
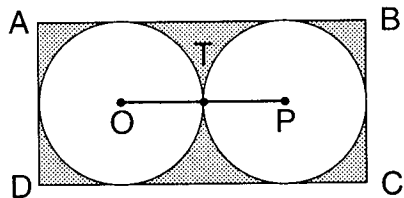
a Find, in terms of π, the area of circle O.   [3]

b Find the area of rectangle $ABCD$.   [4]

c Find, in terms of π, the area of the shaded region.   [3]

41 Solve the following system of equations algebraically *or* graphically and check your solution.

$$y = 4x - 1$$
$$3x + 2y = 20$$ [8,2]

42 Find three positive consecutive odd integers such that the product of the first and second is 25 more than 10 times the third. [*Only an algebraic solution will be accepted.*]   [4,6]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Thursday, January 28, 1999 — 9:15 a.m. to 12:15 p.m., only

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

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FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Thursday, January 28, 1999 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind. Use checkmarks to indicate student 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 14–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

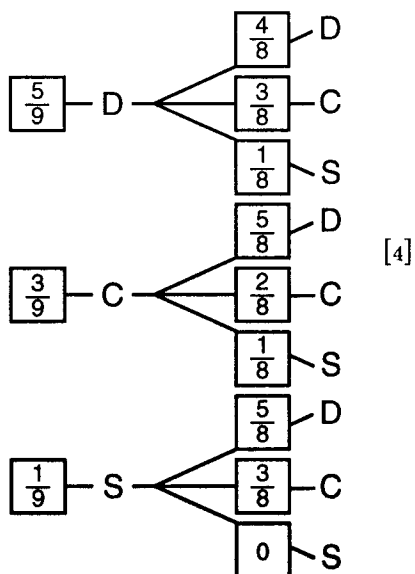|			
(1) 20	(11) 19	(21) 1	(31) 2
(2) 20	(12) 15	(22) 4	(32) 1
(3) 26	(13) $2x^2 - 6x$	(23) 2	(33) 2
(4) 36	(14) 4	(24) 4	(34) 1
(5) 18	(15) 4	(25) 3	(35) 2
(6) 64	(16) 2	(26) 3	
(7) $\frac{p-a}{2}$	(17) 3	(27) 4	
(8) 1	(18) 2	(28) 1	
(9) $(3x + 5)(3x - 5)$	(19) 3	(29) 4	
(10) 20	(20) 1	(30) 3	

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics,* 1996 Edition. 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) *a* 152   [5]

   b m∠D = 75

      m∠E = 37   [5]

      m∠F = 68

(39) *a*

   b (1) $\frac{20}{72}$ [2]

      (2) $\frac{26}{72}$ [2]

      (3) $\frac{16}{72}$ [2]

(40) *a* 36π   [3]

   b 288   [4]

   c 288 – 72π [3]

(41) (2,7)   [8]

   Check   [2]

(42) Analysis   [4]

   13, 15, 17   [6]