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 Solve for x: $\quad 3x - 5 = x + 7$

2 Let p represent the statement "It snows" and let q represent the statement "I ski." Using p and q, write in symbolic form: "If it does not snow, then I do not ski."

3 Solve for x: $\quad 3(2 - x) = 8(x - 2)$

4 Multiply: $\quad (x - 3)(x + 2)$

5 If $p = 2ak^2$, find p when $a = -1$ and $k = 3$.

6 A traffic light is red for 32 seconds, green for 25 seconds, and yellow for 3 seconds. Find the probability that the light will be red at any given time.

7 A point whose y-coordinate is 6 lies on the line whose equation is $y = 5x - 4$. What is the x-coordinate of the point?

8 Write in symbolic form, using p and q, the converse of $p \rightarrow q$.

9 In the accompanying diagram of isosceles triangle ABC, $\overline{AB} \cong \overline{CB}$, point D is on $\overrightarrow{AB}$, and $m\angle CBD = 140$. Find $m\angle A$.
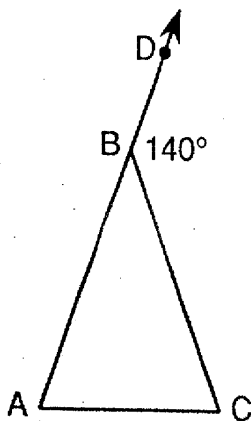
10 Solve the following system of equations for x:

$$5x + y = 19$$
$$2x + y = 1$$

11 From $5x^2 - 6x + 8$, subtract $3x^2 - 2x - 4$.

12 Express as a single fraction in simplest form:

$$\frac{4x}{5} - \frac{x}{2}$$

13 Evaluate: $\quad 6!$

14 The length of the hypotenuse of a right triangle is 15 and the length of one leg is 12. Find the length of the other leg.

15 If the lengths of the sides of a triangle are represented by $3x$, $2x - 1$, and $3x + 2$, express the perimeter of the triangle as a binomial in terms of x.

16 The radius of a circle is 7. What is the area of the circle in terms of π?

17 Solve for n: $\quad \dfrac{4n}{5n + 7} = \dfrac{2}{3}$

18 In the accompanying figure, $ABCD$ is a parallelogram, $m\angle A = 2x + 35$, and $m\angle C = 5x - 22$. Find the value of x.
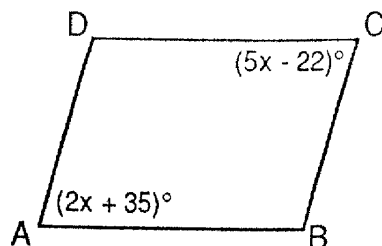
19 Find the area of a right triangle whose legs have lengths 6 and 8.

20 Factor: $x^2 + 5x$

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 What is the product of $-6x^3$ and $2x^5$?

(1) $-4x^8$

(2) $-12x^8$

(3) $-12x^{15}$

(4) $-4x^{15}$

22 Under which transformation can the image be a different size than the original figure?

(1) translation

(2) rotation

(3) dilation

(4) reflection

23 Written in standard notation, 7.2×10^3 is equivalent to

(1) 0.0072

(2) 0.00072

(3) 7,200

(4) 72,000

24 Two complementary angles are in the ratio 3:2. The number of degrees in the *smaller* angle is

(1) 18

(2) 36

(3) 54

(4) 72

25 Which letter has vertical line symmetry?

(1) T

(2) P

(3) E

(4) S

26 An equation whose graph has a slope of –2 and a y-intercept of 3 is

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

(2) $y = -2x + 3$

(3) $x = 3y - 2$

(4) $y = 3x - 2$

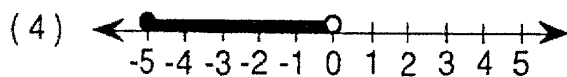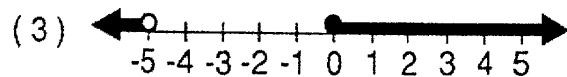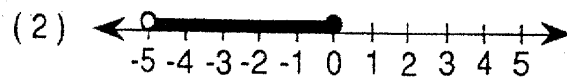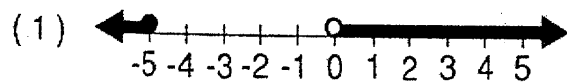27 Which statement is *always* false?

(1) $p \wedge \sim p$

(2) $p \rightarrow q$

(3) $q \rightarrow p$

(4) $\sim p \rightarrow \sim q$

28 The expression $5 \leq x - 2$ is equivalent to

(1) $x \leq 7$

(2) $x \geq 7$

(3) $x \geq 3$

(4) $x \geq \frac{5}{2}$

29 Which graph represents the open sentence $-5 \leq x < 0$?

(1)

(2)

(3)

(4)

30 The sides of a triangle measure 2, 3, and 4. If the smallest side of a similar triangle measures 8, then the measure of the largest side is

(1) 10

(2) 12

(3) 14

(4) 16

31 The accompanying frequency table shows data collected by the police in an automobile speed check.

Speed Interval	Frequency
66–75	45
56–65	110
46–55	120
36–45	25

Which interval contains the median speed?

(1) 36–45

(2) 46–55

(3) 56–65

(4) 66–75

32 Which sentence illustrates the commutative property for addition?

(1) $(a + b) + c = a + (b + c)$

(2) $a(b + c) = ab + ac$

(3) $a + 0 = a$

(4) $a + b = b + a$

33 What is the solution set of the equation $x^2 - 3x - 4 = 0$?

(1) $\{-3,1\}$

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

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

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

34 Expressed in terms of d, the number of weeks in d days is

(1) $\dfrac{d}{7}$

(2) $\dfrac{7}{d}$

(3) $7d$

(4) $7 + d$

35 The expression $\sqrt{500}$ is equivalent to

(1) $50\sqrt{10}$

(2) $5\sqrt{10}$

(3) $10\sqrt{5}$

(4) $10\sqrt{50}$

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

p	q	$\sim p$	$\sim q$	$q \rightarrow \sim p$	$\sim q \lor p$	$(q \rightarrow \sim p) \rightarrow (\sim q \lor p)$
T	T					
T	F					
F	T					
F	F					

b Based on the table completed in part a, is $(q \rightarrow \sim p) \rightarrow (\sim q \lor p)$ a tautology?   [1]

c Justify the answer given in part b.   [1]

---

37 The length of a rectangle is four more than one-half the width of the rectangle. If the perimeter of the rectangle is 50, find the

a area of the rectangle   [7]

b length of the diagonal of the rectangle to the nearest tenth   [3]

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

$$y < 3$$
$$2y - x \geq 4$$ [8]

b Write the coordinates of a point in the solution set of the system of inequalities graphed in part a.   [2]

39 Solve the following system of equations algebraically or graphically and check:

$$x + 2y = 4$$
$$y = 2x + 7$$ [8,2]

40 a On your answer paper, copy and complete the frequency table for the following scores on a math test: 68, 77, 93, 61, 84, 88, 76, 91, 80, 100, 89, 82, 93, 88, 70, 97, 87, 88, 90, 85, 79, 99, 97, 88, 82, 100, 96, 95, 96, 100.   [4]

Score	Tally	Frequency
61–65		
66–70		
71–75		
76–80		
81–85		
86–90		
91–95		
96–100		

b Construct a frequency histogram for these scores.   [4]

c What percentage of the students who took the test scored above 75?   [2]

☞ GO RIGHT ON TO THE NEXT PAGE.

41 A jar contains a total of 20 marbles that are blue, green, or white. The number of white marbles is three more than the number of green marbles, and the number of blue marbles is one more than twice the number of green marbles.

a How many marbles of each color are in the jar? [5]

b One marble is randomly selected, its color is noted, and it is returned to the jar. A second marble is randomly selected and its color is noted. Find the probability that

(1) both marbles selected are blue [2]
(2) the first marble selected is green and the second marble selected is white [2]
(3) one of the marbles selected is red [1]

42 Frank is going to buy some ties at $7.50 per tie and some shirts at $18.50 per shirt. If he buys twice as many ties as shirts and spends no more than $205, what is the greatest number of shirts he can buy? [All prices include tax.] [*Show or explain the procedure used to obtain your answer.*] [10]

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 p the examination, and that I have neither given nor received assistance in answering any of the questions during the exam

_____

Signature

ties at $7.50 per tie
er shirt. If he buys
and spends no more
est number of shirt
nclude tax.] [Show
d to obtain your an

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Friday, January 28, 1994 — 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 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 21–35, allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) 6	(11) $2x^2 - 4x + 12$	(21) 2	(31) 3
(2) $\sim p \rightarrow \sim q$	(12) $\dfrac{3x}{10}$	(22) 3	(32) 4
(3) 2	(13) 720	(23) 3	(33) 2
(4) $x^2 - x - 6$	(14) 9	(24) 2	(34) 1
(5) –18	(15) $8x + 1$	(25) 1	(35) 3
(6) $\dfrac{32}{60}$	(16) 49π	(26) 2	
(7) 2	(17) 7	(27) 1	
(8) $q \rightarrow p$	(18) 19	(28) 2	
(9) 70	(19) 24	(29) 4	
(10) 6	(20) $x(x + 5)$	(30) 4	

[OVER]

Part II

Please refer to the Department's publication *Guide for Rating Regents Examinations in Mathematics* and its supplement. 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.

(36) *b* No   [1]

(37) *a* 154   [7]

     b 17.8   [3]

(39) (−2,3)   [8]

(40) *c* 90   [2]

(41) *a* 4 green, 7 white, 9 blue   [5]

    b (1) $\frac{81}{400}$ [2]

       (2) $\frac{28}{400}$ [2]

       (3) 0   [1]

(42) 6   [10]

Las respuestas a los siguientes preguntas deben ser escritas en el papel provisto por la escuela.

Parte II

Conteste cuatro preguntas de esta parte. Claramente indique los pasos necesarios, incluyendo las fórmulas de sustitución apropiadas, diagramas, gráficas, tablas, etc. Los cálculos que pueden obtenerse mentalmente o con la calculadora no necesitan mostrarse. [40]

36 *a* *En su hoja de respuestas*, copie y complete la tabla de valores lógicos para la declaración $(q \rightarrow \sim p) \rightarrow (\sim q \vee p)$. [8]

p	q	$\sim p$	$\sim q$	$q \rightarrow \sim p$	$\sim q \vee p$	$(q \rightarrow \sim p) \rightarrow (\sim q \vee p)$
V	V					
V	F					
F	V					
F	F					

b Basada en la tabla completada en la parte *a*, ¿es $(q \rightarrow \sim p) \rightarrow (\sim q \vee p)$ una tautología? [1]

c Justifique la contestación dada en la parte *b*. [1]

---

37 La longitud de un rectángulo es cuatro más que una mitad la anchura del rectángulo. Si el perímetro del rectángulo es 50, halle

 a el área del rectángulo [7]

 b la longitud de la diagonal del rectángulo a la *décima más cercana* [3]

38 *a* Sobre el mismo conjunto de ejes de coordenadas, haga un gráfico con el siguiente sistema de desigualdades:

$$\begin{array}{c} y < 3 \\ 2y - x \geq 4 \end{array} \quad [8]$$

 b Escriba las coordenadas de un punto en el conjunto de solución del sistema de desigualdades que se trazaron en el gráfico de la parte *a*. [2]

39 Resuelva el siguiente sistema de ecuaciones algebráicamente *o* gráficamente y verifique:

$$\begin{array}{c} x + 2y = 4 \\ y = 2x + 7 \end{array} \quad [8,2]$$

40 *a* *En su hoja de respuestas*, copie y complete la tabla de frecuencia para las siguientes puntuaciones en un examen de matemáticas: 68, 77, 93, 61, 84, 88, 76, 91, 80, 100, 89, 82, 93, 88, 70, 97, 87, 88, 90, 85, 79, 99, 97, 88, 82, 100, 96, 95, 96, 100. [4]

Puntuación	Cuenta	Frecuencia
61–65		
66–70		
71–75		
76–80		
81–85		
86–90		
91–95		
96–100		

 b Construya un histograma de frecuencia para estas puntuaciones. [4]

 c ¿Qué porcentaje de los estudiantes que tomaron el examen obtuvieron una puntuación sobre 75? [2]

VAYA DIRECTAMENTE A LA PROXIMA PAGINA.

41 Una bolsita contiene un total de 20 canicas azules, verdes, o blancas. El número de canicas blancas es tres más que el número de canicas verdes, y el número de canicas azules es uno más que dos veces el número de canicas verdes.

a ¿Cuántas canicas de cada color están en la bolsita? [5]

b Una canica se selecciona al azar, su color se anota, y la canica se devuelve a la bolsita. Una segunda canica se selecciona al azar y su color se anota. Halle la probabilidad de que

(1) ambas canicas seleccionadas son azules [2]

(2) la primera canica seleccionada es verde y la segunda canica seleccionada es blanca [2]

(3) una de las canicas seleccionadas es roja [1]

42 Francisco va a comprar unas corbatas a por cada corbata y unas camisas a $18.. camisa. Si él compra dos veces la canti corbatas que la cantidad de camisas y g más de $205, ¿cuál es la cantidad mayc camisas que puede comprar? [Todos lo: incluyen el impuesto.] [Muestre o expliq procedimiento usado para obtener su re. [10]

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATEMATICAS CONSECUTIVAS—CURSO I

Viernes, 28 de enero de 1994 — de 9:15 a.m. a 12:15 p.m., solamente

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

HOJA DE RESPUESTAS

Estudiante .... Sexo: ☐ Masculino ☐ Femenino   Grado ....

Profesor. .... Escuela ....

Sus respuestas a la Parte I deben ser escritas en esta hoja.

Parte I

Conteste 30 preguntas en esta parte.

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.............

Sus respuestas para la Parte II se deben escribir en el papel provisto por la escuela.

La siguiente declaración debe ser firmada cuando usted haya terminado el examen.

Por la presente afirmo, al terminar este examen, que no tenía conocimiento ilegal alguno sobre las preguntas o respuestas antes del examen, y que ni he dado, ni he recibido ayuda en la contestación de cualquiera de las preguntas durante el examen.

_____
Firma