The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Tuesday, January 23, 2001 — 1:15 to 4:15 p.m., only

Print Your Name:

Print Your School's Name:

Print your name and the name of your school in the boxes above. Then turn to the last page of this booklet, which is the answer sheet for Part I. 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.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. Any work done on this sheet of scrap graph paper will *not* be scored. All work should be written in pen, except graphs and drawings, which should be done in pencil.

This examination has four parts, with a total of 35 questions. You must answer all questions in this examination. Write your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers for the questions in Parts II, III, and IV directly in this booklet. Clearly indicate the necessary steps you take, including appropriate formula substitutions, diagrams, graphs, charts, etc.

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.

Notice...

A minimum of a scientific calculator, a straightedge (ruler), and a compass must be available for your use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Record your answers in the spaces provided on the separate answer sheet. [40]

1 There are 461 students and 20 teachers taking buses on a trip to a museum. Each bus can seat a maximum of 52. What is the *least* number of buses needed for the trip?

  (1) 8   (3) 10
  (2) 9   (4) 11

2 In right triangle ABC, $m\angle C = 3y - 10$, $m\angle B = y + 40$, and $m\angle A = 90$. What type of right triangle is triangle ABC?

  (1) scalene   (3) equilateral
  (2) isosceles   (4) obtuse

3 If $x > 0$, the expression $(\sqrt{x})(\sqrt{2x})$ is equivalent to

  (1) $\sqrt{2x}$ (3) $x^2\sqrt{2}$
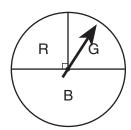
  (2) $2x$ (4) $x\sqrt{2}$

4 Three times as many robins as cardinals visited a bird feeder. If a total of 20 robins and cardinals visited the feeder, how many were robins?

  (1) 5   (3) 15
  (2) 10   (4) 20

5 One of the factors of $4x^2 - 9$ is

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

6 At a school fair, the spinner represented in the accompanying diagram is spun twice.

What is the probability that it will land in section G the first time and then in section B the second time?

  (1) $\frac{1}{2}$ (3) $\frac{1}{8}$

  (2) $\frac{1}{4}$ (4) $\frac{1}{16}$

7 If a and b are integers, which equation is always true?

(1) $\dfrac{a}{b} = \dfrac{b}{a}$

(3) $a - b = b - a$

(2) $a + 2b = b + 2a$

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

8 The sum of $3x^2 + 4x - 2$ and $x^2 - 5x + 3$ is

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

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

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

(4) $4x^2 - x - 1$

9 If $x \neq 0$, the expression $\dfrac{x^2 + 2x}{x}$ is equivalent to

(1) $x + 2$

(3) $3x$

(2) 2

(4) 4

10 Helen is using a capital **H** in an art design. The **H** has

(1) only one line of symmetry
(2) only two points of symmetry
(3) two lines of symmetry and only one point of symmetry
(4) two lines of symmetry and two points of symmetry

11 The distance from Earth to the Sun is approximately 93 million miles. A scientist would write that number as

(1) 9.3×10^6

(3) 93×10^7

(2) 9.3×10^7

(4) 93×10^{10}

12 Given the statement: "If two sides of a triangle are congruent, then the angles opposite these sides are congruent."

Given the converse of the statement: "If two angles of a triangle are congruent, then the sides opposite these angles are congruent."

What is true about this statement and its converse?

(1) Both the statement and its converse are true.
(2) Neither the statement nor its converse is true.
(3) The statement is true but its converse is false.
(4) The statement is false but its converse is true.

13 Which equation could represent the relationship between the x and y values shown in the accompanying table?

x	y
0	2
1	3
2	6
3	11
4	18

(1) $y = x + 2$

(3) $y = x^2$

(2) $y = x^2 + 2$

(4) $y = 2^x$

14 A locker combination system uses three digits from 0 to 9. How many different three-digit combinations with no digit repeated are possible?
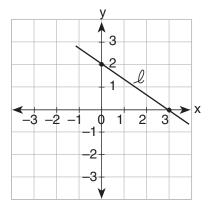
(1) 30   (3) 720

(2) 504   (4) 1,000

15 What is the slope of line ℓ in the accompanying diagram?

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

(2) $-\frac{2}{3}$ (4) $\frac{3}{2}$

16 If $bx - 2 = K$, then x equals

(1) $\frac{K}{b} + 2$ (3) $\frac{2 - K}{b}$

(2) $\frac{K - 2}{b}$ (4) $\frac{K + 2}{b}$

17 In a molecule of water, there are two atoms of hydrogen and one atom of oxygen. How many atoms of hydrogen are in 28 molecules of water?
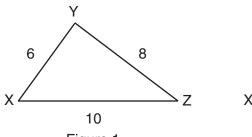
(1) 14   (3) 42

(2) 29   (4) 56

18 From January 3 to January 7, Buffalo recorded the following daily high temperatures: 5°, 7°, 6°, 5°, and 7°. Which statement about the temperatures is true?

(1) mean = median   (3) median = mode

(2) mean = mode   (4) mean < median

19 In which of the accompanying figures are segments XY and YZ perpendicular?

Figure 1

Figure 2

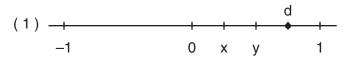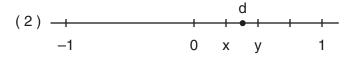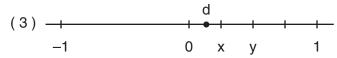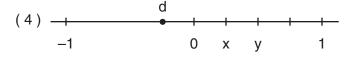(1) figure 1, only
(2) figure 2, only
(3) both figure 1 and figure 2
(4) neither figure 1 nor figure 2

20 Let x and y be numbers such that $0 < x < y < 1$, and let $d = x - y$. Which graph could represent the location of d on the number line?
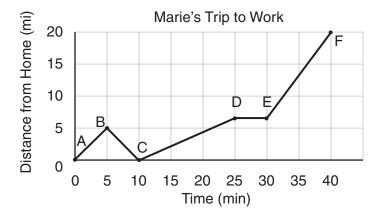
Part II

Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [10]

21 The accompanying graph shows Marie's distance from home (A) to work (F) at various times during her drive.
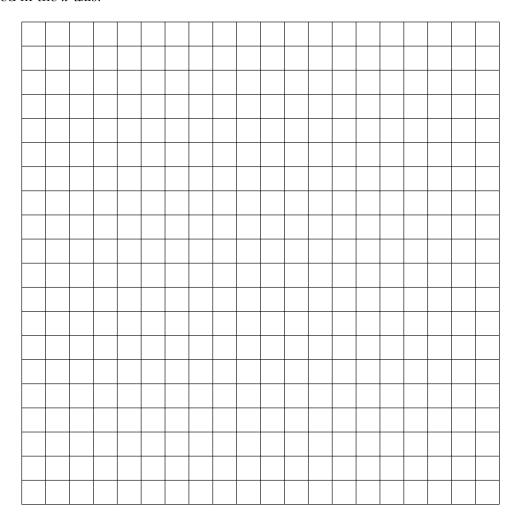

Marie's Trip to Work

a Marie left her briefcase at home and had to return to get it. State which point represents when she turned back around to go home and explain how you arrived at that conclusion.

b Marie also had to wait at the railroad tracks for a train to pass. How long did she wait?

22 Sue bought a picnic table on sale for 50% off the original price. The store charged her 10% tax and her final cost was $22.00. What was the original price of the picnic table?

23 A cardboard box has length $x - 2$, width $x + 1$, and height $2x$.

a Write an expression, in terms of x, to represent the volume of the box.

b If $x = 8$ centimeters, what is the number of cubic centimeters in the volume of the box?

24 The coordinates of the endpoints of $\overline{AB}$ are $A(0,2)$ and $B(4,6)$. Graph and state the coordinates of A' and B', the images of A and B after $\overline{AB}$ is reflected in the x-axis.

25 Two trains leave the same station at the same time and travel in opposite directions. One train travels at 80 kilometers per hour and the other at 100 kilometers per hour. In how many hours will they be 900 kilometers apart?
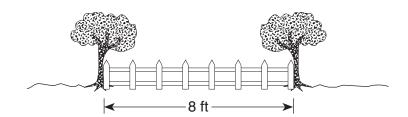
Part III

Answer all questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [15]

26 Sal has a small bag of candy containing three green candies and two red candies. While waiting for the bus, he ate two candies out of the bag, one after another, without looking. What is the probability that both candies were the same color?
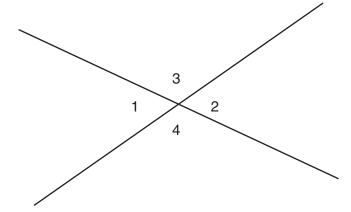
27 Steve has a treasure map, represented in the accompanying diagram, that shows two trees 8 feet apart and a straight fence connecting them. The map states that treasure is buried 3 feet from the fence and equidistant from the two trees.

8 ft

a Sketch a diagram to show all the places where the treasure could be buried. Clearly indicate in your diagram where the treasure could be buried.

b What is the distance between the treasure and one of the trees?

28 In the accompanying figure, two lines intersect, m∠3 = 6t + 30, and
m∠2 = 8t − 60. Find the number of degrees in m∠4.

29 Mark says, "The number I see is odd." Jan says, "That same number is prime." The teacher says, "Mark is correct or Jan is correct." Some integers would make the teacher's statement true while other integers would make it false. Give and explain *one* example of when the teacher's statement is true. Give and explain *one* example of when the teacher's statement is false.

30 Juan has a cellular phone that costs $12.95 per month plus 25¢ per minute for each call. Tiffany has a cellular phone that costs $14.95 per month plus 15¢ per minute for each call. For what number of minutes do the two plans cost the same?

Part IV
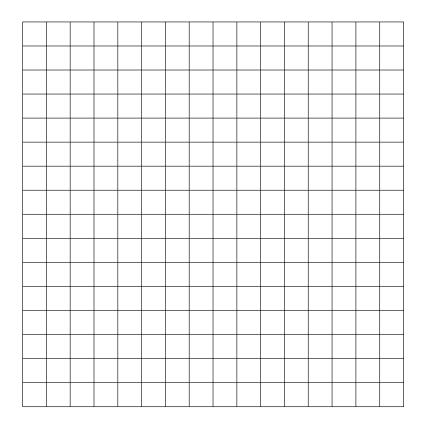
Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [20]

31 Solve algebraically for x: $\quad \dfrac{1}{x} = \dfrac{x+1}{6}$

32 On a science quiz, 20 students received the following scores: 100, 95, 95, 90, 85, 85, 85, 80, 80, 80, 80, 75, 75, 75, 70, 70, 65, 65, 60, 55.

Construct a statistical graph, such as a histogram or a stem-and-leaf plot, to display this data. [*Be sure to title the graph and label all axes or parts used.*]

If your type of plot requires a grid, show your work here.

If no grid is necessary, show your work here.

33 John uses the equation $x^2 + y^2 = 9$ to represent the shape of a garden on graph paper.

a Graph $x^2 + y^2 = 9$ on the accompanying grid.

b What is the area of the garden to the *nearest square unit*?

34 There were 100 more balcony tickets than main-floor tickets sold for a concert. The balcony tickets sold for $4 and the main-floor tickets sold for $12. The total amount of sales for both types of tickets was $3,056.

a Write an equation or a system of equations that describes the given situation. Define the variables.

b Find the number of balcony tickets that were sold.

35 Find, to the *nearest tenth of a foot*, the height of the tree represented in the accompanying diagram.

62°

x

15 ft

(Not drawn to scale)

MATHEMATICS A

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ANSWER SHEET

Pupil .... Sex: ☐ Male ☐ Female   Grade ....

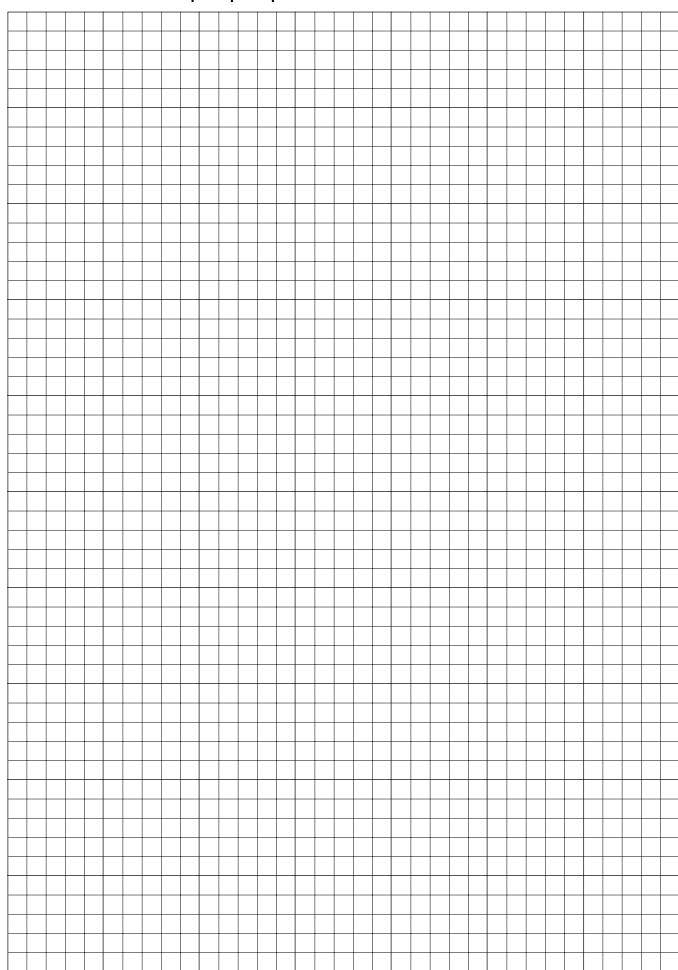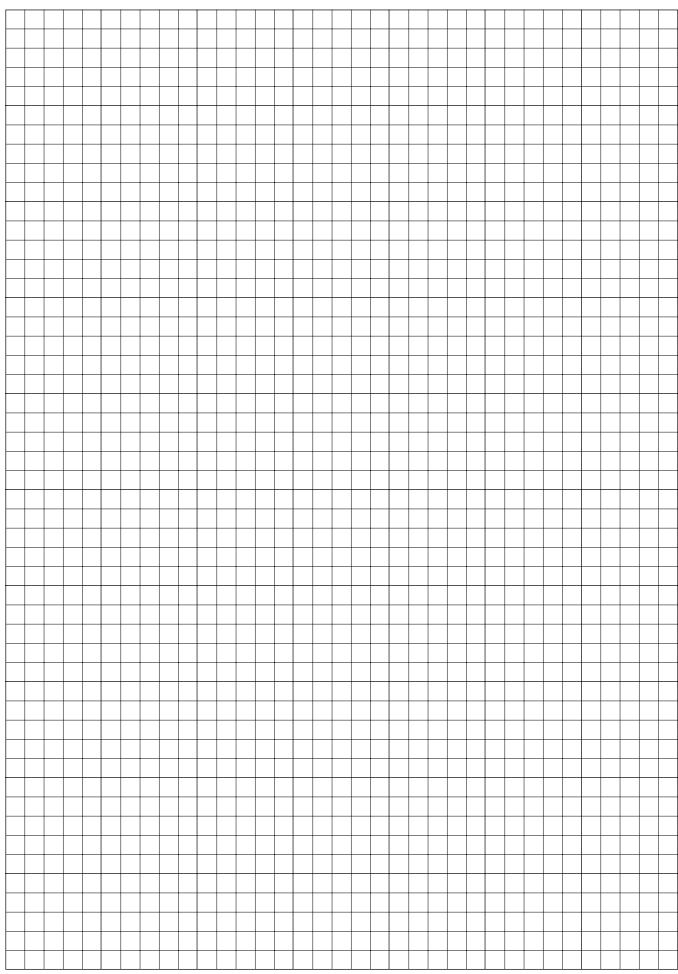Teacher .... School ....

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer all 20 questions in this part.

1	6	11	16 ....
2	7	12	17 ....
3	8	13	18 ....
4	9	14	19 ....
5	10	15	20 ....

Your answers for Parts II, III, and IV should be written in the test booklet.

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

Tear Here

Tear Here

MATHEMATICS A			
Question	Maximum Credit	Credits Earned	Rater's/Scorer's Initials
Part I 1–20	40		
Part II 21	2		
22	2		
23	2		
24	2		
25	2		
Part III 26	3		
27	3		
28	3		
29	3		
30	3		
Part IV 31	4		
32	4		
33	4		
34	4		
35	4		
Maximum Total	85		

Total Raw Score	Checked by	Scaled Score

Rater's/Scorer's Name (minimum of three)

Notes to raters. . .

- **Each paper should be scored by a minimum of three raters.**
- **The table for converting the total raw score to the scaled score is provided in the scoring key for this examination.**
- **The scaled score is the student's final examination score.**