

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Thursday, August 16, 2001 — 8:30 to 11:30 a.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 to the questions in Parts II, III, and IV directly in this booklet. Clearly indicate the necessary steps, 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 sheet, 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 sheet 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 The perimeter of an equilateral triangle varies directly as the length of a side. When the length of a side is doubled, the perimeter of the triangle is

- (1) halved
(2) doubled
(3) multiplied by 3
(4) divided by 3

Use this space for
computations.

- 2 Which expression is rational?

- (1) π
(2) $\sqrt{\frac{1}{2}}$
(3) $\sqrt{3}$
(4) $\sqrt{\frac{1}{4}}$

- 3 Written in simplest factored form, the binomial $2x^2 - 50$ can be expressed as

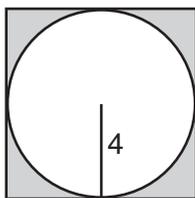
- (1) $2(x - 5)(x - 5)$
(2) $2(x - 5)(x + 5)$
(3) $(x - 5)(x + 5)$
(4) $2x(x - 50)$

- 4 Which statement is logically equivalent to “If I did not eat, then I am hungry”?

- (1) If I am not hungry, then I did not eat.
(2) If I did not eat, then I am not hungry.
(3) If I am not hungry, then I did eat.
(4) If I am hungry, then I did eat.

- 5 In the accompanying diagram, a circle with radius 4 is inscribed in a square.

Use this space for computations.



What is the area of the shaded region?

- (1) $64 - 16\pi$ (3) $64\pi - 8\pi$
(2) $16 - 16\pi$ (4) $16 - 8\pi$
- 6 Which letter below has point symmetry, but does *not* have line symmetry?
- (1) **H** (3) **A**
(2) **N** (4) **E**
- 7 The value of $5!$ is
- (1) $\frac{1}{5}$ (3) 20
(2) 5 (4) 120
- 8 What is the approximate circumference of a circle with radius 3?
- (1) 7.07
(2) 9.42
(3) 18.85
(4) 28.27
- 9 The sum of the measures of the interior angles of an octagon is
- (1) 180° (3) 540°
(2) 360° (4) $1,080^\circ$

Use this space for computations.

10 The exact average of a set of six test scores is 92. Five of these scores are 90, 98, 96, 94, and 85. What is the other test score?

- (1) 92 (3) 89
(2) 91 (4) 86

11 A certain car comes in three body styles with a choice of two engines, a choice of two transmissions, and a choice of six colors. What is the minimum number of cars a dealer must stock to have one car of every possible combination?

- (1) 13 (3) 42
(2) 36 (4) 72

12 The operation element @ is determined by the following table:

@	<u><i>a</i></u>	<u><i>b</i></u>	<u><i>c</i></u>
<i>a</i>	<i>a</i>	<i>b</i>	<i>c</i>
<i>b</i>	<i>b</i>	<i>c</i>	<i>a</i>
<i>c</i>	<i>c</i>	<i>a</i>	<i>b</i>

What is the identity element of this operation?

- (1) *a*, only (3) *c*
(2) *b*, only (4) *a* and *b*

13 If n represents an odd number, which computation results in an answer that is an even number?

- (1) $2 \times n + 1$ (3) $3 \times n - 2$
(2) $2 \times n - 1$ (4) $3 \times n + 1$

14 In his will, a man leaves one-half of his money to his wife, one-half of what is then left to his older child, and one-half of what is then left to his younger child. His two cousins divide the remainder equally, each receiving \$2,000. What was the total amount of money in the man's will?

- (1) \$40,000 (3) \$24,000
(2) \$32,000 (4) \$16,000

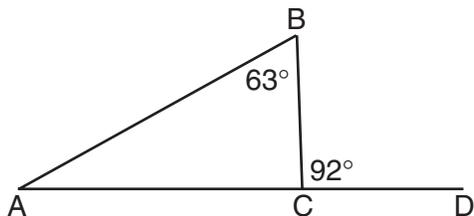
Use this space for
computations.

- 15** If $a + b$ is less than $c + d$, and $d + e$ is less than $a + b$, then e is
- (1) less than c (3) less than d
(2) equal to c (4) greater than d
- 16** Which statement is the converse of “If it is a 300 ZX, then it is a car”?
- (1) If it is not a 300 ZX, then it is not a car.
(2) If it is not a car, then it is not a 300 ZX.
(3) If it is a car, then it is a 300 ZX.
(4) If it is a car, then it is not a 300 ZX.
- 17** In a class of 450 students, 300 are taking a mathematics course and 260 are taking a science course. If 140 of these students are taking both courses, how many students are *not* taking either of these courses?
- (1) 30 (3) 110
(2) 40 (4) 140
- 18** What is the solution set of $m^2 - 3m - 10 = 0$?
- (1) $\{5, -2\}$ (3) $\{3, -10\}$
(2) $\{2, -5\}$ (4) $\{3, 10\}$
- 19** Which expression is equivalent to $x^{-1} \cdot y^2$?
- (1) xy^2 (3) $\frac{x}{y^2}$
(2) $\frac{y^2}{x}$ (4) xy^{-2}
- 20** What is the smallest integer greater than 1 that is both the square of an integer and the cube of an integer?
- (1) 8 (3) 36
(2) 9 (4) 64

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 Triangle ABC , with side \overline{AC} extended to D , is shown in the accompanying diagram. If $m\angle ABC = 63$ and $m\angle BCD = 92$, what is $m\angle BAC$?



- 22 How many feet from the base of a house must a 39-foot ladder be placed so that the top of the ladder will reach a point on the house 36 feet from the ground?

23 Subtract $5x^2 - 7x - 6$ from $9x^2 + 3x - 4$.

24 An engineer measured the dimensions for a rectangular site by using a wooden pole of unknown length x . The length of the rectangular site is 2 pole measures increased by 3 feet, while the width is 1 pole measure decreased by 4 feet. Write an algebraic representation, in terms of x , for the perimeter of the site.

25 Simplify: $\sqrt{50r^2s^4}$

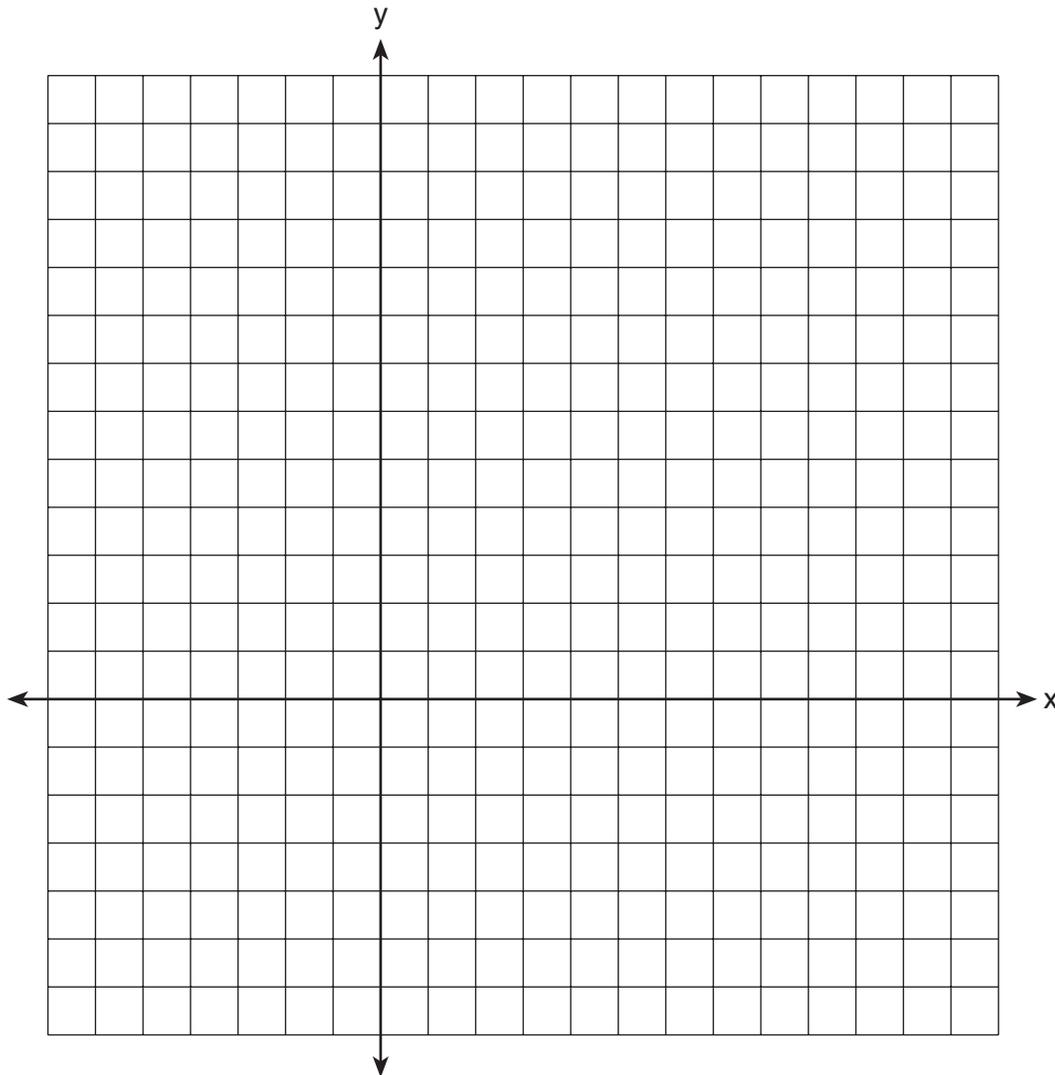
Part III

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 Megan decides to go out to eat. The menu at the restaurant has four appetizers, three soups, seven entrees, and five desserts. If Megan decides to order an appetizer *or* a soup, and one entree, and two different desserts, how many different choices can she make?

27 There are four students, all of different heights, who are to be randomly arranged in a line. What is the probability that the tallest student will be first in line and the shortest student will be last in line?

28 On the accompanying set of axes, graph $\triangle ABC$ with coordinates $A(-1,2)$, $B(0,6)$, and $C(5,4)$. Then graph $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation of 2.



29 Ramón said that the set of integers is *not* closed for one of the basic operations (addition, subtraction, multiplication, or division). You want to show Ramón that his statement is correct.

For the operation for which the set of integers is *not* closed, write an example using:

- a positive even integer and a zero
- a positive and a negative even integer
- two negative even integers

Be sure to explain why *each* of your examples illustrates that the set of integers is *not* closed for that operation.

30 Shanaya graphed the line represented by the equation $y = x - 6$.

Write an equation for a line that is parallel to the given line.

Write an equation for a line that is perpendicular to the given line.

Write an equation for a line that is identical to the given line but has different coefficients.

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 Point P is located on \overleftrightarrow{AB} .

a Describe the locus of points that are

(1) 3 units from \overleftrightarrow{AB}

(2) 5 units from point P

b How many points satisfy both conditions in part *a*?

32 The ninth graders at a high school are raising money by selling T-shirts and baseball caps. The number of T-shirts sold was three times the number of caps. The profit they received for each T-shirt sold was \$5.00, and the profit on each cap was \$2.50. If the students made a total profit of \$210, how many T-shirts *and* how many caps were sold?

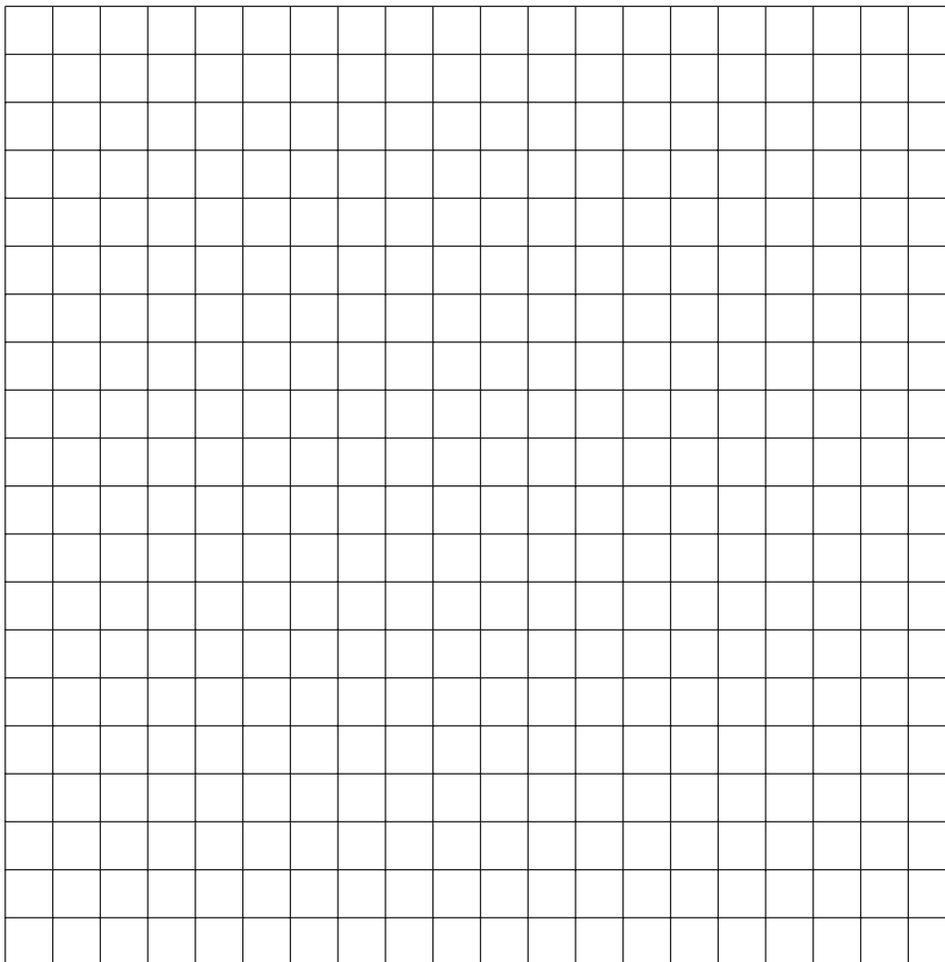
33 A ship on the ocean surface detects a sunken ship on the ocean floor at an angle of depression of 50° . The distance between the ship on the surface and the sunken ship on the ocean floor is 200 meters. If the ocean floor is level in this area, how far above the ocean floor, to the *nearest meter*, is the ship on the surface?

34 The following data consists of the weights, in pounds, of 30 adults:

195, 206, 100, 98, 150, 210, 195, 106, 195, 168, 180, 212, 104, 195, 100,
 216, 195, 209, 112, 99, 206, 116, 195, 100, 142, 100, 135, 98, 160, 155

Using the data, complete the accompanying cumulative frequency table and construct a cumulative frequency histogram on the grid below.

Interval	Frequency	Cumulative Frequency
51–100		
101–150		
151–200		
201–250		



35 Solve the following system of equations algebraically.

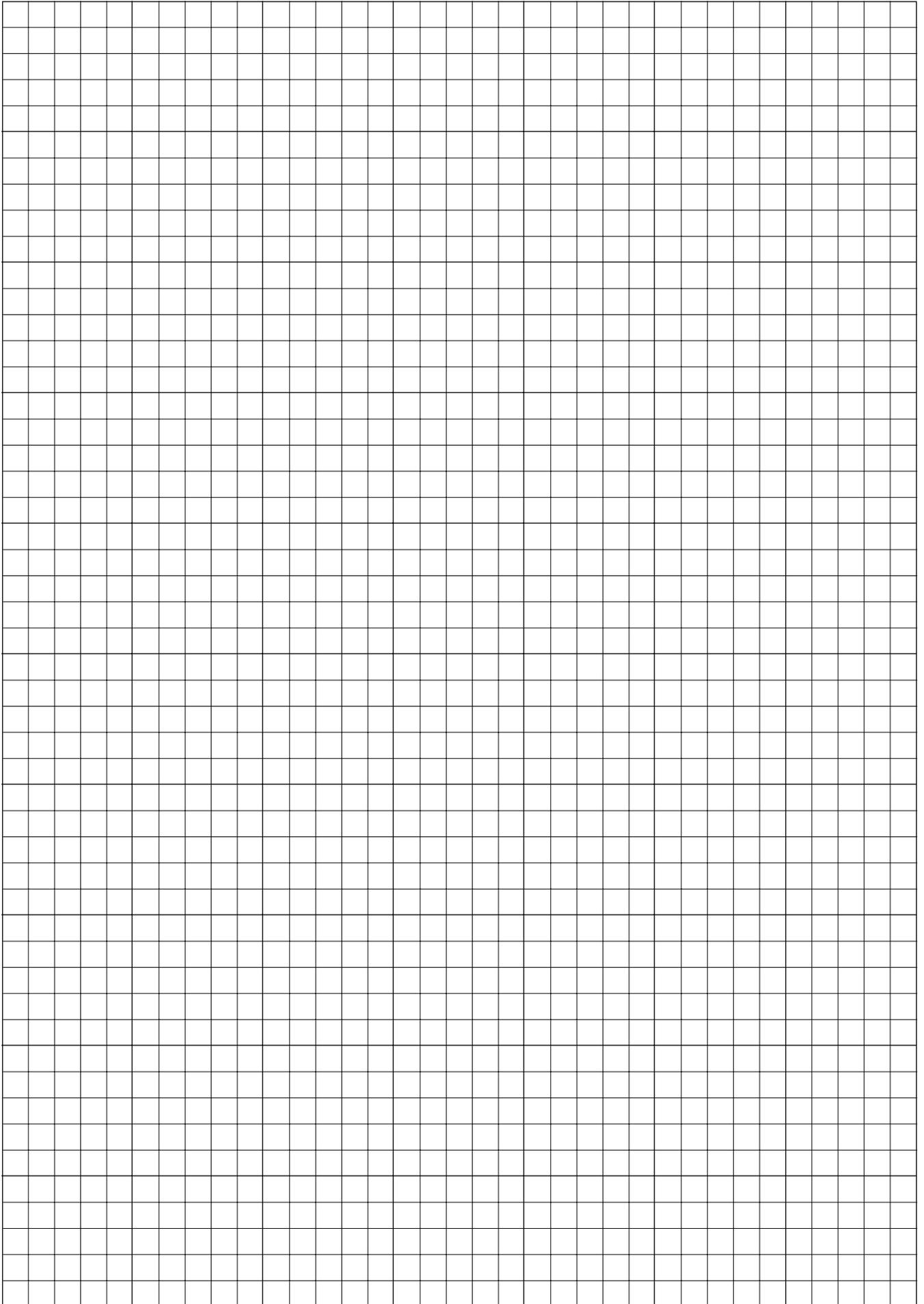
$$y = x^2 + 4x - 2$$

$$y = 2x + 1$$

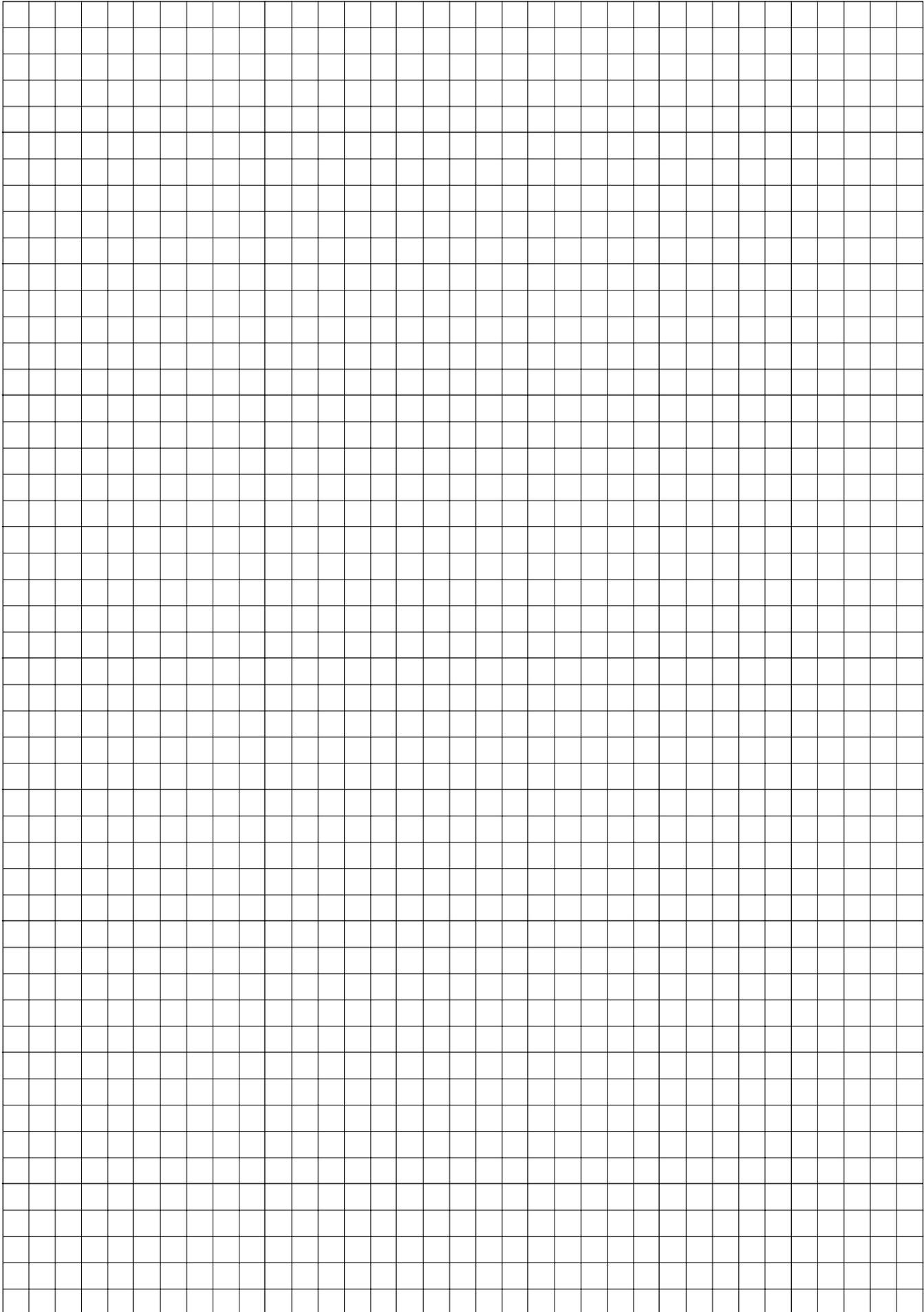
Scrap Graph Paper — This sheet will *not* be scored.

Tear Here

Tear Here



Scrap Graph Paper — This sheet will *not* be scored.



Tear Here

Tear Here

Tear Here

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Thursday, August 16, 2001 — 8:30 to 11:30 a.m., only

ANSWER SHEET

Student 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

