

INTEGRATED ALGEBRA

Thursday, January 28, 2010 — 1:15 to 4:15 p.m., only

Student Name: _____

School Name: _____

Print your name and the name of your school on the lines 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.

This examination has four parts, with a total of 39 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. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

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. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

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 graphing calculator and a straightedge (ruler) must be available for you to use while taking this examination.

The use of any communications device is strictly prohibited when taking this examination. If you use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

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

Use this space for
computations.

4 Given:

$$Q = \{0, 2, 4, 6\}$$

$$W = \{0, 1, 2, 3\}$$

$$Z = \{1, 2, 3, 4\}$$

What is the intersection of sets Q , W , and Z ?

(1) $\{2\}$

(3) $\{1, 2, 3\}$

(2) $\{0, 2\}$

(4) $\{0, 1, 2, 3, 4, 6\}$

5 Roger is having a picnic for 78 guests. He plans to serve each guest at least one hot dog. If each package, p , contains eight hot dogs, which inequality could be used to determine how many packages of hot dogs Roger will need to buy?

(1) $p \geq 78$

(3) $8 + p \geq 78$

(2) $8p \geq 78$

(4) $78 - p \geq 8$

6 In a science fiction novel, the main character found a mysterious rock that decreased in size each day. The table below shows the part of the rock that remained at noon on successive days.

| Day | Fractional Part of the Rock Remaining |
|-----|---------------------------------------|
| 1 | 1 |
| 2 | $\frac{1}{2}$ |
| 3 | $\frac{1}{4}$ |
| 4 | $\frac{1}{8}$ |

Which fractional part of the rock will remain at noon on day 7?

(1) $\frac{1}{128}$

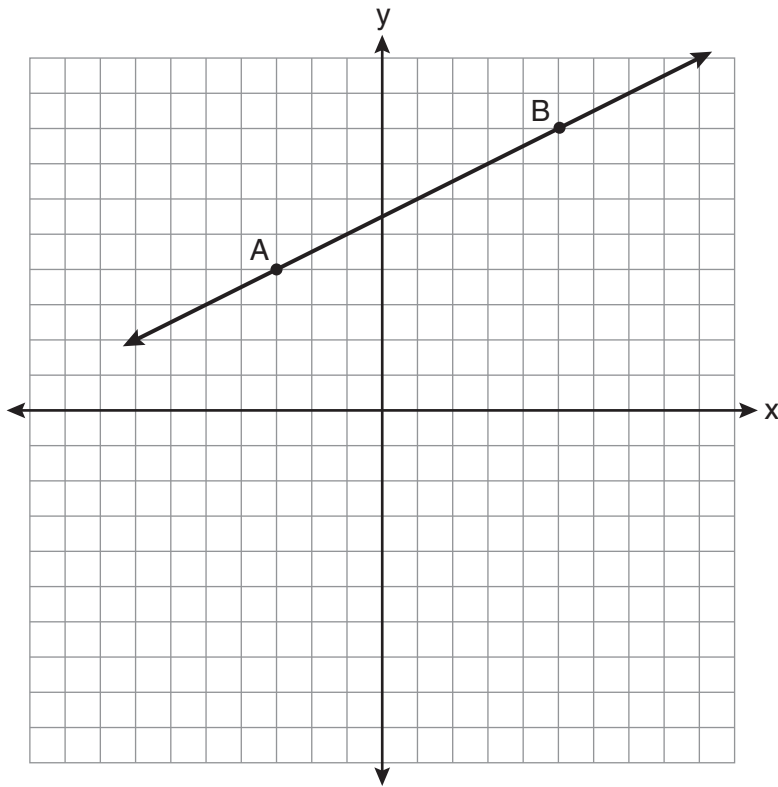
(3) $\frac{1}{14}$

(2) $\frac{1}{64}$

(4) $\frac{1}{12}$

Use this space for computations.

7 In the diagram below, what is the slope of the line passing through points A and B?



(1) -2

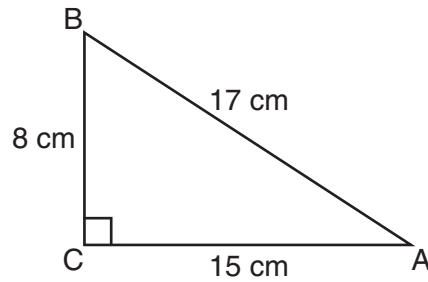
(3) $-\frac{1}{2}$

(2) 2

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

Use this space for computations.

8 Which equation shows a correct trigonometric ratio for angle A in the right triangle below?



(1) $\sin A = \frac{15}{17}$

(3) $\cos A = \frac{15}{17}$

(2) $\tan A = \frac{8}{17}$

(4) $\tan A = \frac{15}{8}$

9 Debbie solved the linear equation $3(x + 4) - 2 = 16$ as follows:

[Line 1] $3(x + 4) - 2 = 16$

[Line 2] $3(x + 4) = 18$

[Line 3] $3x + 4 = 18$

[Line 4] $3x = 14$

[Line 5] $x = 4\frac{2}{3}$

She made an error between lines

(1) 1 and 2

(3) 3 and 4

(2) 2 and 3

(4) 4 and 5

**Use this space for
computations.**

13 Which equation represents the line that passes through the points $(-3,7)$ and $(3,3)$?

(1) $y = \frac{2}{3}x + 1$

(3) $y = -\frac{2}{3}x + 5$

(2) $y = \frac{2}{3}x + 9$

(4) $y = -\frac{2}{3}x + 9$

14 Which data table represents univariate data?

| Side Length of a Square | Area of Square |
|-------------------------|----------------|
| 2 | 4 |
| 3 | 9 |
| 4 | 16 |
| 5 | 25 |

(1)

| Age Group | Frequency |
|-----------|-----------|
| 20–29 | 9 |
| 30–39 | 7 |
| 40–49 | 10 |
| 50–59 | 4 |

(3)

| Hours Worked | Pay |
|--------------|-------|
| 20 | \$160 |
| 25 | \$200 |
| 30 | \$240 |
| 35 | \$280 |

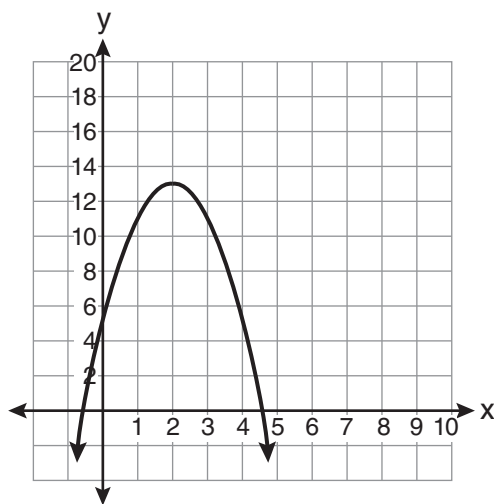
(2)

| People | Number of Fingers |
|--------|-------------------|
| 2 | 20 |
| 3 | 30 |
| 4 | 40 |
| 5 | 50 |

(4)

15 What is the equation of the axis of symmetry of the parabola shown in the diagram below?

Use this space for computations.



(1) $x = -0.5$

(3) $x = 4.5$

(2) $x = 2$

(4) $x = 13$

16 The members of the senior class are planning a dance. They use the equation $r = pn$ to determine the total receipts. What is n expressed in terms of r and p ?

(1) $n = r + p$

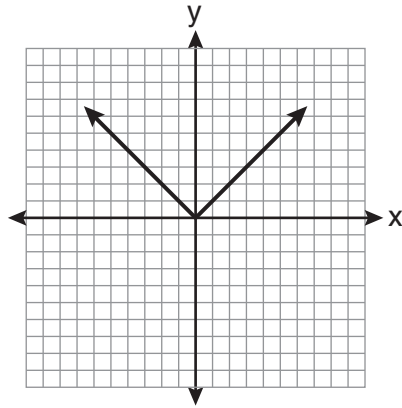
(3) $n = \frac{p}{r}$

(2) $n = r - p$

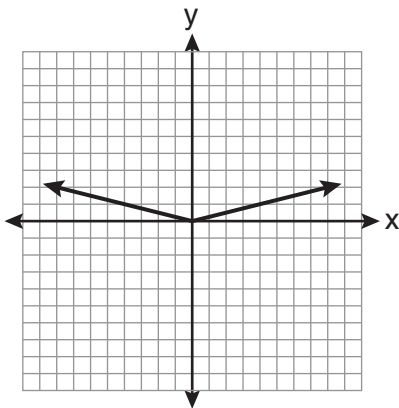
(4) $n = \frac{r}{p}$

17 The graph of the equation $y = |x|$ is shown in the diagram below.

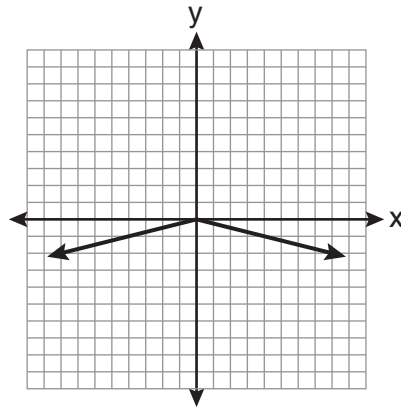
Use this space for
computations.



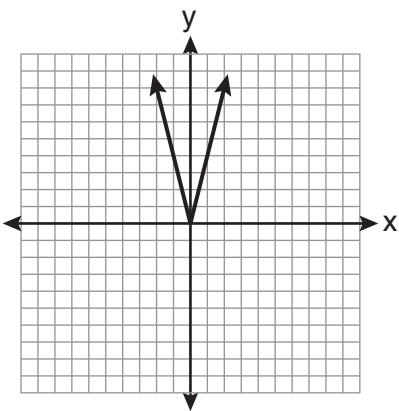
Which diagram could represent a graph of the equation $y = a|x|$ when $-1 < a < 0$?



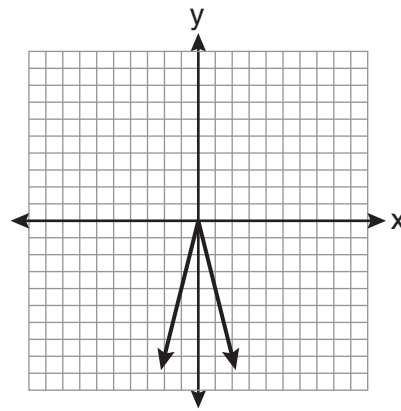
(1)



(3)



(2)



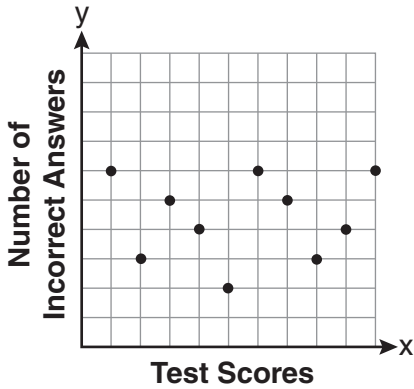
(4)

Use this space for computations.

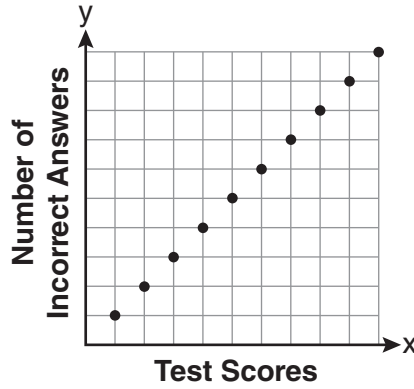
18 Which relation represents a function?

- (1) $\{(0,3), (2,4), (0,6)\}$
- (2) $\{(-7,5), (-7,1), (-10,3), (-4,3)\}$
- (3) $\{(2,0), (6,2), (6,-2)\}$
- (4) $\{(-6,5), (-3,2), (1,2), (6,5)\}$

19 Which scatter plot shows the relationship between x and y if x represents a student score on a test and y represents the number of incorrect answers a student received on the same test?



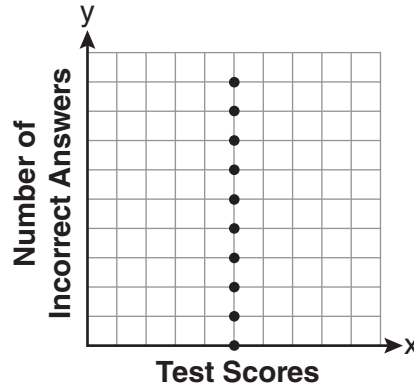
(1)



(3)



(2)



(4)

**Use this space for
computations.**

20 Which expression is equivalent to $3^3 \cdot 3^4$?

(1) 9^{12}

(3) 3^{12}

(2) 9^7

(4) 3^7

21 Which point is on the line $4y - 2x = 0$?

(1) $(-2, -1)$

(3) $(-1, -2)$

(2) $(-2, 1)$

(4) $(1, 2)$

22 If Ann correctly factors an expression that is the difference of two perfect squares, her factors could be

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

(3) $(x - 4)(x - 4)$

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

(4) $(2y - 5)(y - 5)$

23 Which ordered pair is in the solution set of the following system of linear inequalities?

$$y < 2x + 2$$

$$y \geq -x - 1$$

(1) $(0, 3)$

(3) $(-1, 0)$

(2) $(2, 0)$

(4) $(-1, -4)$

Use this space for
computations.

24 The expression $6\sqrt{50} + 6\sqrt{2}$ written in simplest radical form is

(1) $6\sqrt{52}$

(3) $17\sqrt{2}$

(2) $12\sqrt{52}$

(4) $36\sqrt{2}$

25 What is the sum of $\frac{3x^2}{x-2}$ and $\frac{x^2}{x-2}$?

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

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

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

(4) $\frac{4x^2}{x-2}$

26 Which equation represents a line parallel to the graph of $2x - 4y = 16$?

(1) $y = \frac{1}{2}x - 5$

(3) $y = -2x + 6$

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

(4) $y = 2x + 8$

27 An example of an algebraic expression is

(1) $\frac{2x+3}{7} = \frac{13}{x}$

(3) $4x - 1 = 4$

(2) $(2x+1)(x-7)$

(4) $x = 2$

Part II

Answer all 3 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. [6]

- 31 Angela wants to purchase carpeting for her living room. The dimensions of her living room are 12 feet by 12 feet. If carpeting is sold by the square yard, determine how many square yards of carpeting she must purchase.

$$3 \text{ feet} = 1 \text{ yard}$$

$$9 \text{ square feet} = 1 \text{ square yard}$$

32 In right triangle ABC , $AB = 20$, $AC = 12$, $BC = 16$, and $m\angle C = 90$.

Find, to the *nearest degree*, the measure of $\angle A$.

33 Jon is buying tickets for himself for two concerts. For the jazz concert, 4 tickets are available in the front row, and 32 tickets are available in the other rows. For the orchestra concert, 3 tickets are available in the front row, and 23 tickets are available in the other rows. Jon is randomly assigned one ticket for each concert.

Determine the concert for which he is more likely to get a front-row ticket. Justify your answer.

Part III

Answer all 3 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. [9]

34 Find the roots of the equation $x^2 - x = 6$ algebraically.

35 Ms. Mosher recorded the math test scores of six students in the table below.

| Student | Student Score |
|----------------|----------------------|
| Andrew | 72 |
| John | 80 |
| George | 85 |
| Amber | 93 |
| Betty | 78 |
| Roberto | 80 |

Determine the mean of the student scores, to the *nearest tenth*.

Determine the median of the student scores.

Describe the effect on the mean and the median if Ms. Mosher adds 5 bonus points to each of the six students' scores.

36 Using his ruler, Howell measured the sides of a rectangular prism to be 5 cm by 8 cm by 4 cm. The actual measurements are 5.3 cm by 8.2 cm by 4.1 cm. Find Howell's relative error in calculating the volume of the prism, to the *nearest thousandth*.

Part IV

Answer all 3 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. [12]

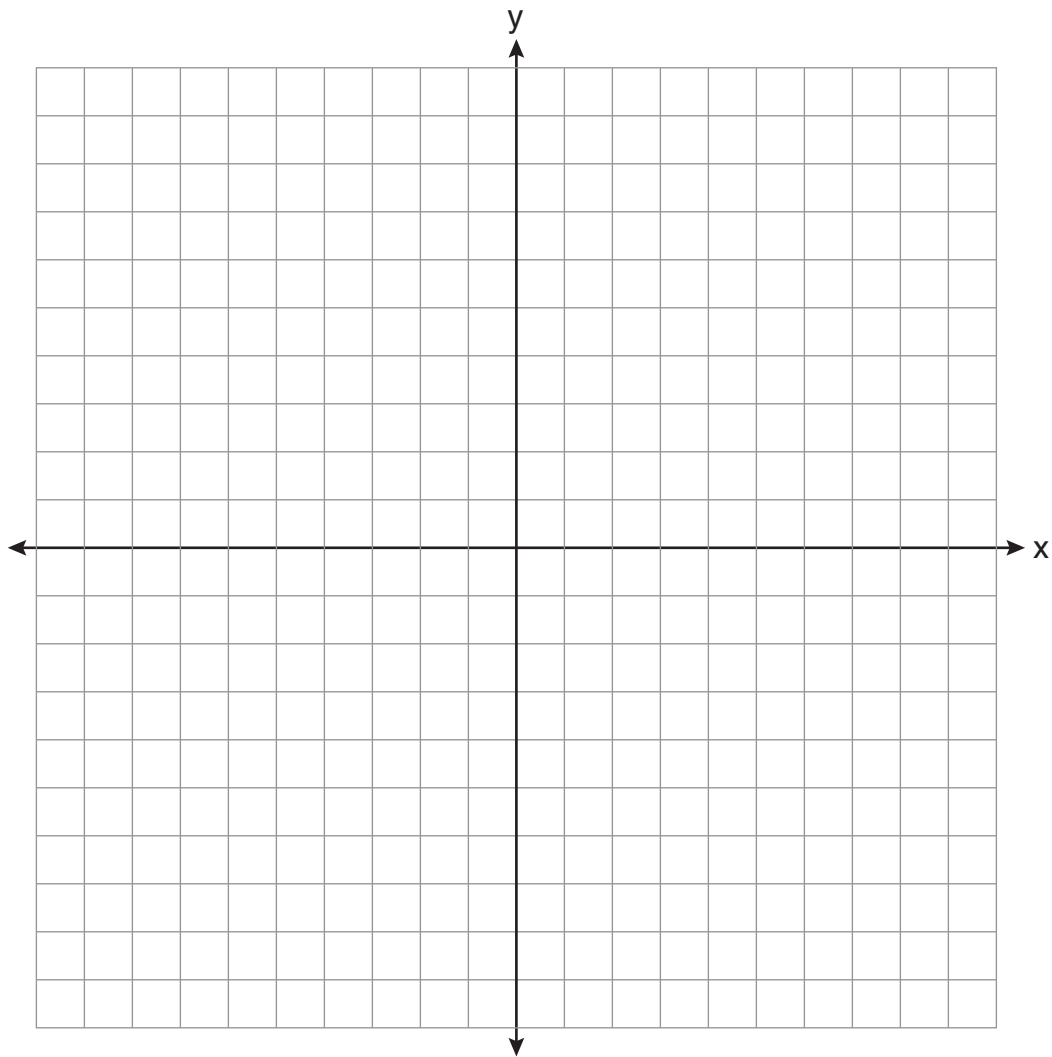
37 A password consists of three digits, 0 through 9, followed by three letters from an alphabet having 26 letters.

If repetition of digits is allowed, but repetition of letters is not allowed, determine the number of different passwords that can be made.

If repetition is not allowed for digits or letters, determine how many fewer different passwords can be made.

38 Graph the solution set for the inequality $4x - 3y > 9$ on the set of axes below.

Determine if the point $(1, -3)$ is in the solution set. Justify your answer.



39 Find three consecutive positive even integers such that the product of the second and third integers is twenty more than ten times the first integer. [Only an algebraic solution can receive full credit.]

Reference Sheet

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Trigonometric Ratios

$$\sin A = \frac{\textit{opposite}}{\textit{hypotenuse}}$$

$$\cos A = \frac{\textit{adjacent}}{\textit{hypotenuse}}$$

$$\tan A = \frac{\textit{opposite}}{\textit{adjacent}}$$

Area

trapezoid $A = \frac{1}{2}h(b_1 + b_2)$

Volume

cylinder $V = \pi r^2 h$

Surface Area

rectangular prism $SA = 2lw + 2hw + 2lh$

cylinder $SA = 2\pi r^2 + 2\pi rh$

Coordinate Geometry

$$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

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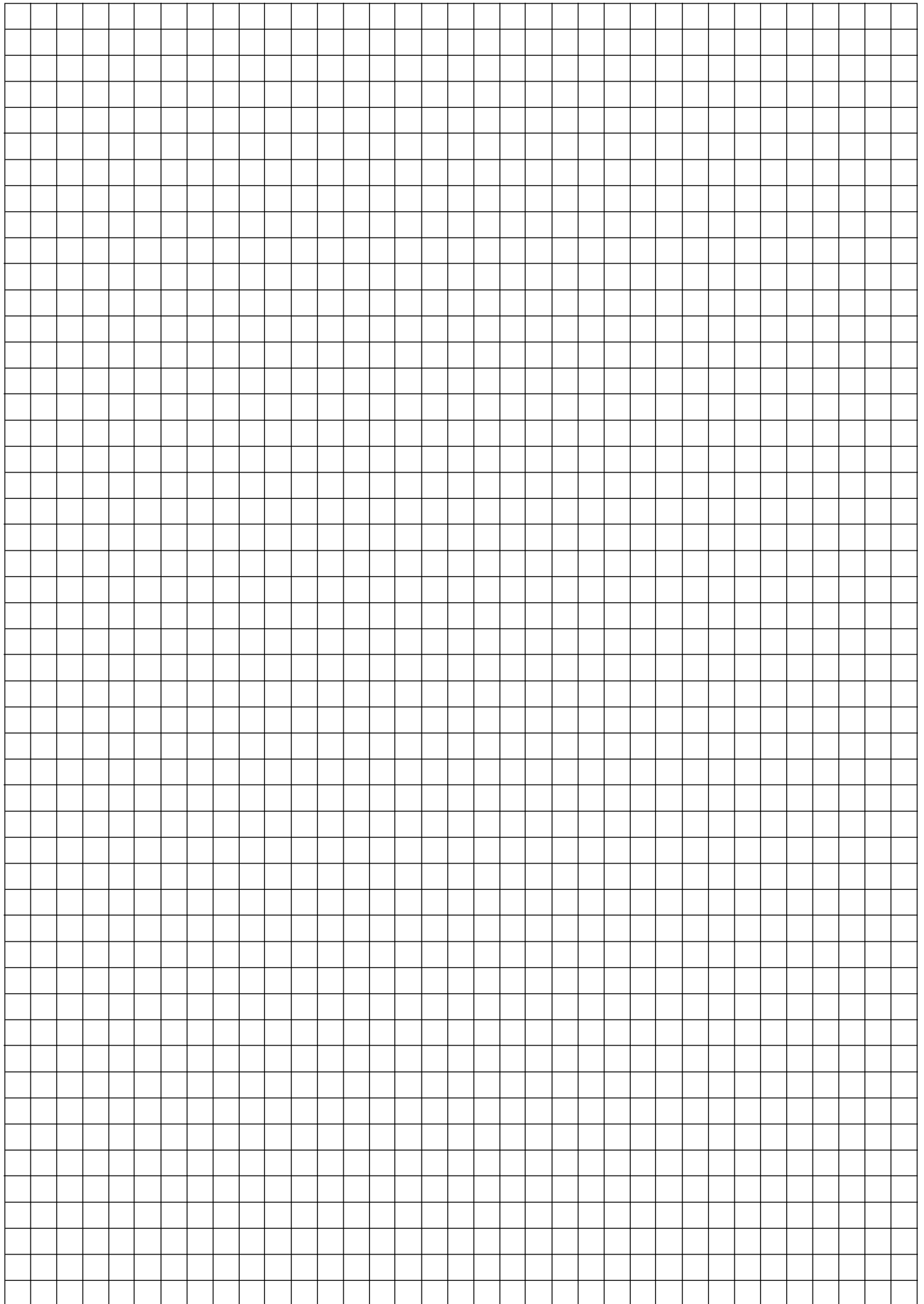
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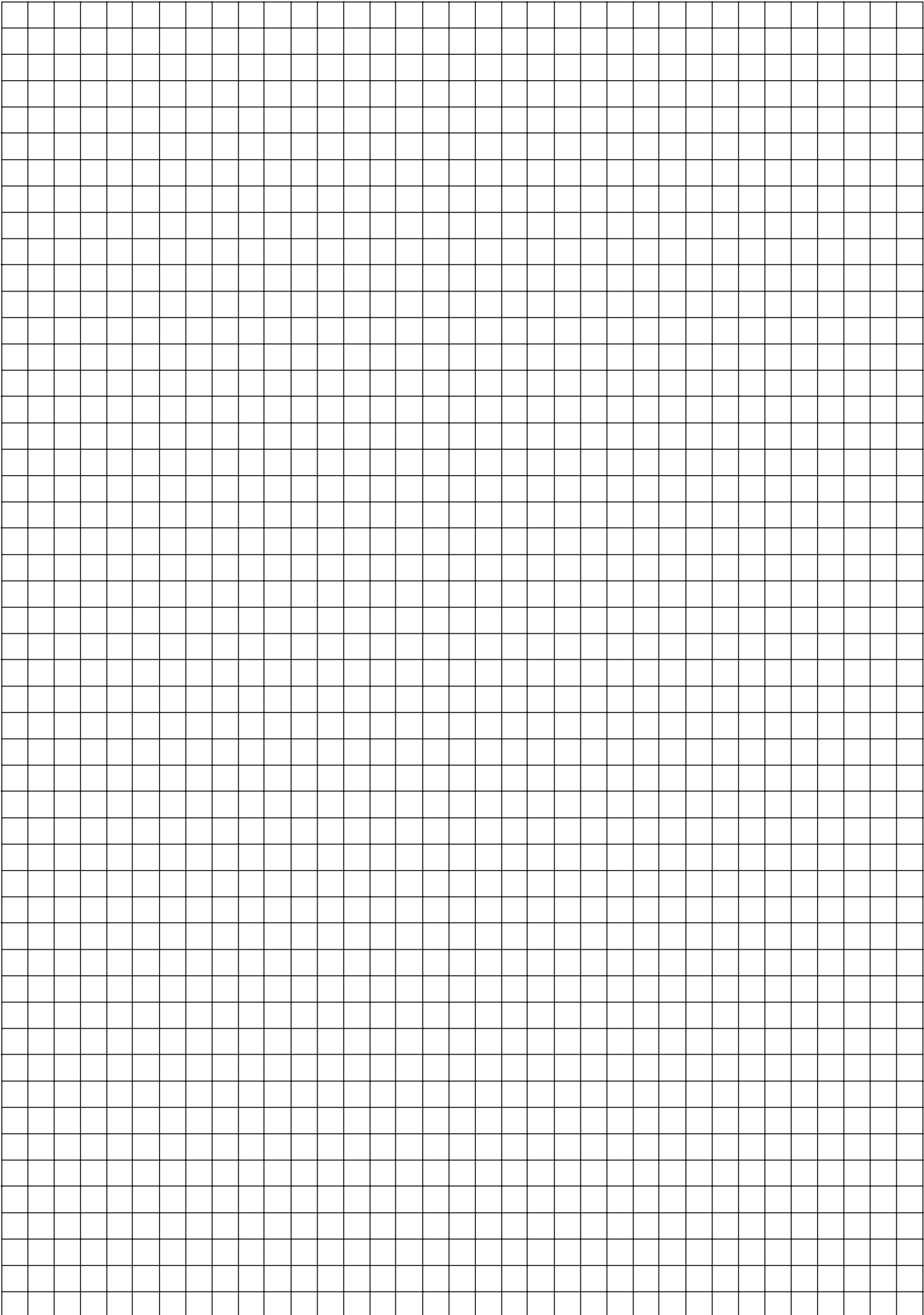
Scrap Graph Paper — This sheet will *not* be scored.

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Thursday, January 28, 2010 — 1:15 to 4:15 p.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 30 questions in this part.

- 1 9 17 25
2 10 18 26
3 11 19 27
4 12 20 28
5 13 21 29
6 14 22 30
7 15 23
8 16 24

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

The declaration below must 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

