

MATHEMATICS A

Thursday, January 26, 2006 — 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 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. 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 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.

Part I

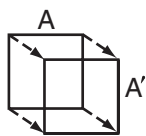
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

1 What is the value of x in the equation $5(2x - 7) = 15x - 10$?

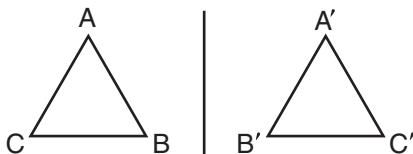
- (1) 1
(2) 0.6
(3) -5
(4) -9

Use this space for computations.

2 Ms. Brewer's art class is drawing reflected images. She wants her students to draw images reflected in a line. Which diagram represents a correctly drawn image?



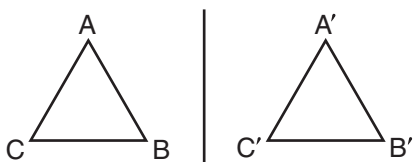
(1)



(3)

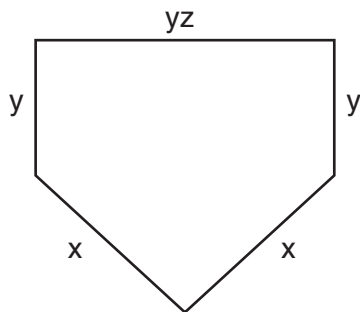


(2)



(4)

3 The lengths of the sides of home plate in a baseball field are represented by the expressions in the accompanying figure.



Which expression represents the perimeter of the figure?

- (1) $5xyz$
(2) $x^2 + y^3z$
(3) $2x + 3yz$
(4) $2x + 2y + yz$

4 Which expression represents “5 less than the product of 7 and x ”?

- (1) $7(x - 5)$ (3) $7 + x - 5$
(2) $7x - 5$ (4) $5 - 7x$

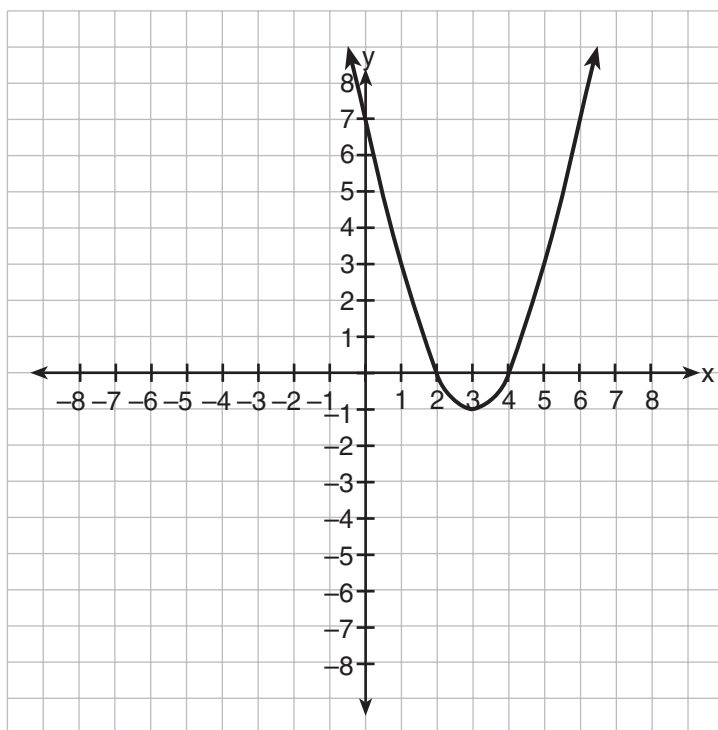
**Use this space for
computations.**

5 What is the y -intercept of the graph of the line whose equation is

$$y = -\frac{2}{5}x + 4?$$

- (1) $-\frac{5}{2}$ (3) 0
(2) $-\frac{2}{5}$ (4) 4

6 Which is an equation of the line of symmetry for the parabola in the accompanying diagram?



- (1) $x = 2$ (3) $x = 3$
(2) $x = 4$ (4) $y = 3$

Use this space for computations.

7 For which value of x will the fraction $\frac{3}{2x+4}$ be undefined?

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

8 The equation $A = \frac{1}{2}(12)(3 + 7)$ is used to find the area of a trapezoid. Which calculation would *not* result in the correct area?

- (1) $\frac{12(3+7)}{2}$ (3) $0.5(12)(10)$
(2) $6(3 + 7)$ (4) $\frac{12}{2} \times \frac{10}{2}$

9 The size of a certain type of molecule is 0.00009078 inch. If this number is expressed as 9.078×10^n , what is the value of n ?

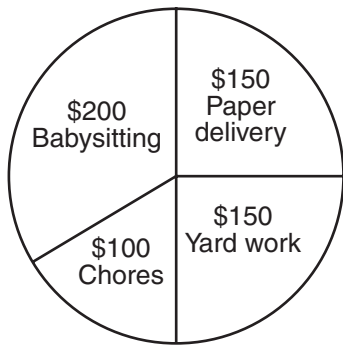
- (1) -5 (3) -8
(2) 5 (4) 8

10 In order to be admitted for a certain ride at an amusement park, a child must be greater than or equal to 36 inches tall and less than 48 inches tall. Which graph represents these conditions?



- 11 The accompanying circle graph shows how Shannon earned \$600 during her summer vacation.

Use this space for computations.

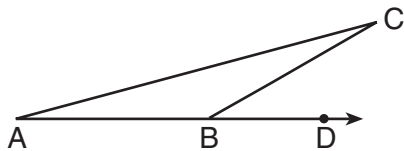


What is the measure of the central angle of the section labeled “Chores”?

- (1) 30° (3) 90°
(2) 60° (4) 120°
- 12 Robin has 8 blouses, 6 skirts, and 5 scarves. Which expression can be used to calculate the number of different outfits she can choose, if an outfit consists of a blouse, a skirt, and a scarf?

- (1) $8 + 6 + 5$ (3) $8!6!5!$
(2) $8 \cdot 6 \cdot 5$ (4) ${}_{19}C_3$

- 13 In the accompanying diagram of $\triangle ABC$, \overline{AB} is extended through D , $m\angle CBD = 30$, and $\overline{AB} \cong \overline{BC}$.



What is the measure of $\angle A$?

- (1) 15° (3) 75°
(2) 30° (4) 150°

**Use this space for
computations.**

14 The image of point $(-2,3)$ under translation T is $(3,-1)$. What is the image of point $(4,2)$ under the same translation?

- (1) $(-1,6)$ (3) $(5,4)$
(2) $(0,7)$ (4) $(9,-2)$

15 A builder is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the sides form 90° angles, what should each diagonal measure?

- (1) 16 ft (3) 34 ft
(2) 30 ft (4) 46 ft

16 Which statement is the inverse of “If the waves are small, I do not go surfing”?

- (1) If the waves are not small, I do not go surfing.
(2) If I do not go surfing, the waves are small.
(3) If I go surfing, the waves are not small.
(4) If the waves are not small, I go surfing.

17 A dog is tied with a rope to a stake in the ground. The length of the rope is 5 yards. What is the area, in square yards, in which the dog can roam?

- (1) 25π (3) 25
(2) 10π (4) 20

18 Melissa’s test scores are 75, 83, and 75. Which statement is true about this set of data?

- (1) mean $<$ mode (3) mode = median
(2) mode $<$ median (4) mean = median

19 When $3a^2 - 7a + 6$ is subtracted from $4a^2 - 3a + 4$, the result is

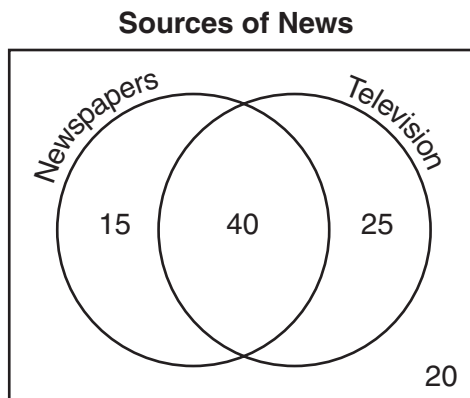
- (1) $a^2 + 4a - 2$ (3) $-a^2 - 4a + 2$
(2) $a^2 - 10a - 2$ (4) $7a^2 - 10a + 10$

Use this space for computations.

20 In the equation $A = p + prt$, t is equivalent to

- (1) $\frac{A - pr}{p}$ (3) $\frac{A}{pr} - p$
(2) $\frac{A - p}{pr}$ (4) $\frac{A}{p} - pr$

21 The accompanying Venn diagram shows the results of a survey asking 100 people if they get news by reading newspapers or by watching television.



What is the probability that a person selected at random from this survey does *not* claim television as a source of getting the news?

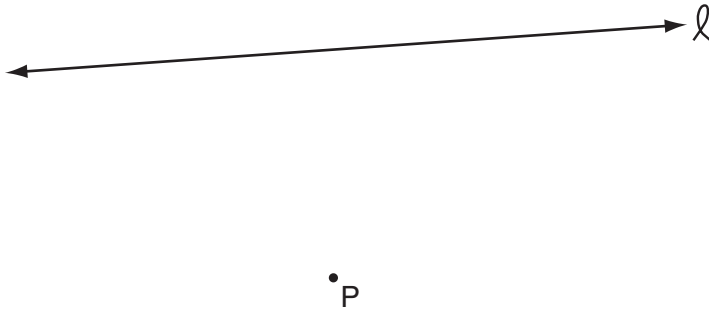
- (1) $\frac{15}{100}$ (3) $\frac{55}{100}$
(2) $\frac{35}{100}$ (4) $\frac{75}{100}$

22 The expression $\frac{6\sqrt{20}}{3\sqrt{5}}$ is equivalent to

- (1) $3\sqrt{15}$ (3) 8
(2) $2\sqrt{15}$ (4) 4

23 In the accompanying diagram, point P lies 3 centimeters from line ℓ .

Use this space for
computations.



How many points are both 2 centimeters from line ℓ and 1 centimeter from point P ?

- | | |
|-------|-------|
| (1) 1 | (3) 0 |
| (2) 2 | (4) 4 |

24 The ratio of two supplementary angles is 3:6. What is the measure of the *smaller* angle?

- | | |
|----------------|----------------|
| (1) 10° | (3) 30° |
| (2) 20° | (4) 60° |

25 Which point is on the circle whose equation is $x^2 + y^2 = 289$?

- | | |
|-----------------|-----------------|
| (1) $(-12, 12)$ | (3) $(-1, -16)$ |
| (2) $(7, -10)$ | (4) $(8, -15)$ |

26 The Edison Lightbulb Company tests 5% of their daily production of lightbulbs. If 500 bulbs were tested on Tuesday, what was the total number of bulbs produced that day?

- | | |
|-----------|-------------|
| (1) 25 | (3) 10,000 |
| (2) 1,000 | (4) 100,000 |

Use this space for
computations.

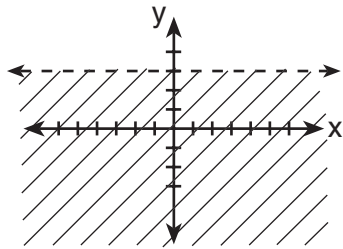
27 Which statement is expressed as a biconditional?

- (1) Two angles are congruent if they have the same measure.
- (2) If two angles are both right angles, then they are congruent.
- (3) Two angles are congruent if and only if they have the same measure.
- (4) If two angles are congruent, then they are both right angles.

28 A committee of five members is to be randomly selected from a group of nine freshmen and seven sophomores. Which expression represents the number of different committees of three freshmen and two sophomores that can be chosen?

- (1) ${}_9C_3 + {}_7C_2$
- (2) ${}_9C_3 \cdot {}_7C_2$
- (3) ${}_{16}C_3 \cdot {}_{16}C_2$
- (4) ${}_9P_3 \cdot {}_7P_2$

29 Which inequality is represented by the accompanying graph?



- (1) $y < 3$
- (2) $y > 3$
- (3) $y \leq 3$
- (4) $y \geq 3$

30 Which equation illustrates the multiplicative inverse property?

- (1) $1 \cdot x = x$
 - (2) $x \cdot \frac{1}{x} = 1$
 - (3) $1 \cdot 0 = 0$
 - (4) $-1 \cdot x = -x$
-

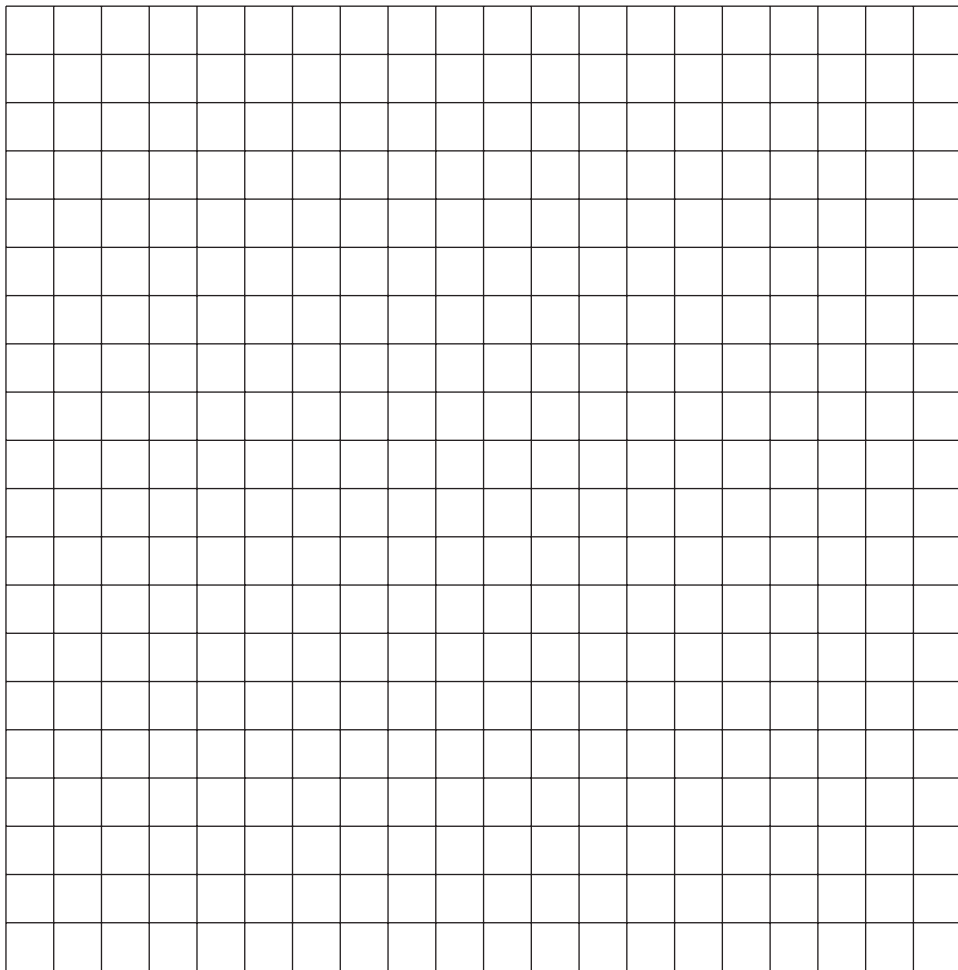
Part II

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]

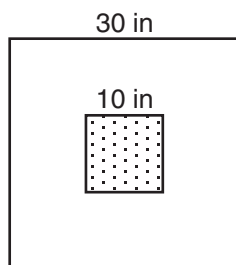
31 Simplify: $\frac{x^2 + 6x + 5}{x^2 - 25}$

32 Write an irrational number and explain why it is irrational.

33 In a circle whose center is $(2,3)$, one endpoint of a diameter is $(-1,5)$. Find the coordinates of the other endpoint of that diameter. [The use of the accompanying grid is optional.]



- 34 The accompanying diagram shows a square dartboard. The side of the dartboard measures 30 inches. The square shaded region at the center has a side that measures 10 inches. If darts thrown at the board are equally likely to land anywhere on the board, what is the theoretical probability that a dart does *not* land in the shaded region?



35 A candy store sells 8-pound bags of mixed hazelnuts and cashews. If c pounds of cashews are in a bag, the price p of the bag can be found using the formula $p = 2.59c + 1.72(8 - c)$. If one bag is priced at \$18.11, how many pounds of cashews does it contain?

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. [6]

36 Solve for x : $\frac{1}{16}x + \frac{1}{4} = \frac{1}{2}$

37 Solve for x : $x^2 + 2x - 24 = 0$

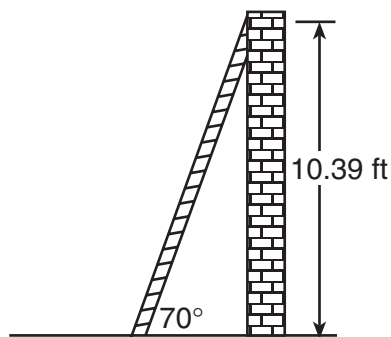
Part IV

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. [8]

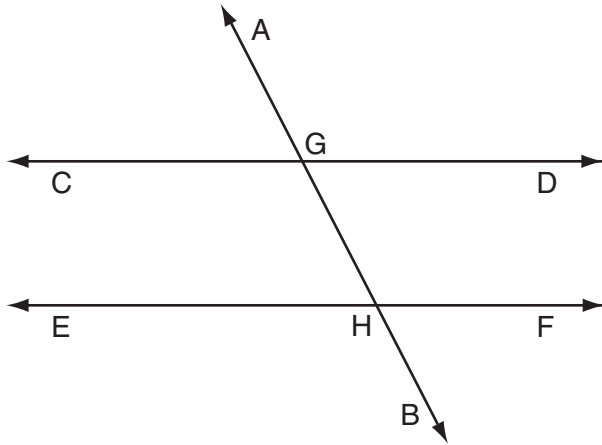
38 As shown in the accompanying diagram, a ladder is leaning against a vertical wall, making an angle of 70° with the ground and reaching a height of 10.39 feet on the wall.

Find, to the *nearest foot*, the length of the ladder.

Find, to the *nearest foot*, the distance from the base of the ladder to the wall.



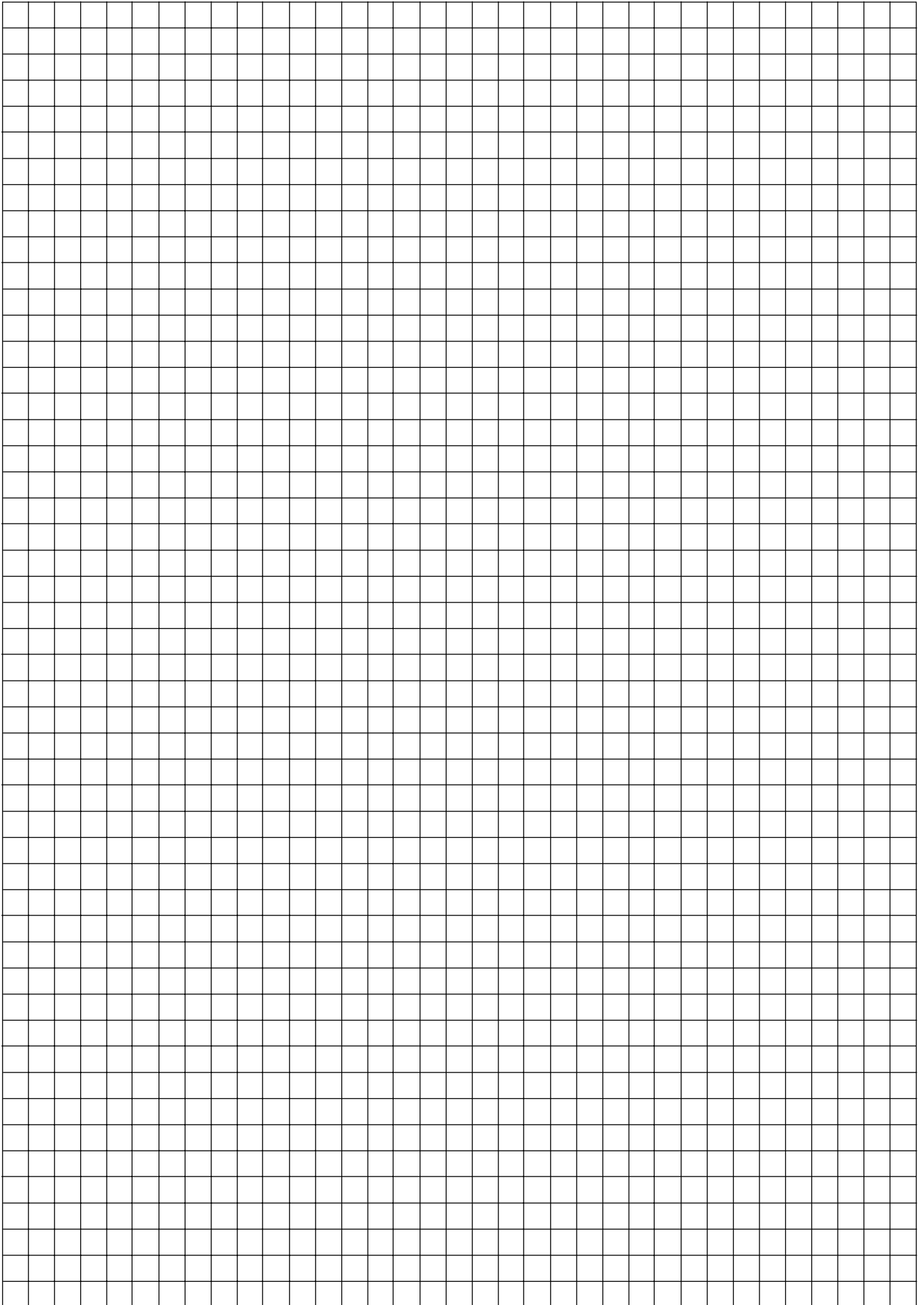
39 In the accompanying diagram, $\overleftrightarrow{CD} \parallel \overleftrightarrow{EF}$, \overleftrightarrow{AB} is a transversal, $m\angle DGH = 2x$, and $m\angle FHB = 5x - 51$. Find the measure, in degrees, of $\angle BHE$.



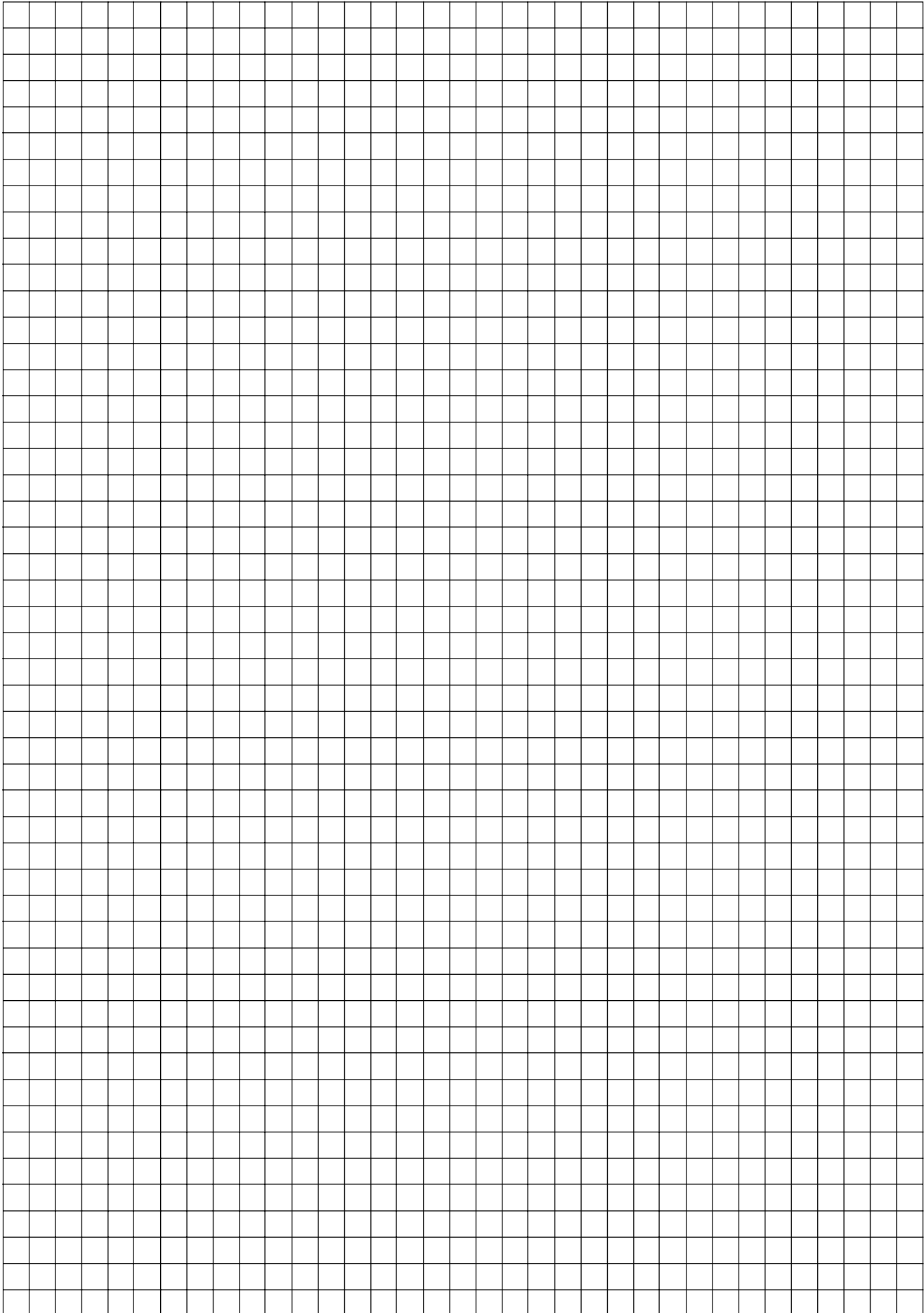
Scrap Graph Paper — This sheet will *not* be scored.

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The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Thursday, January 26, 2006 — 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 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

