The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Thursday, August 16, 2007 — 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. You may remove this sheet from this booklet. 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.**

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 Given the true statements: "t is a multiple of 3" and "t is even." What could be a value of t?

(1) 8   (3) 15
(2) 9   (4) 24

**2** The accompanying circle graph shows how Joan invested her money.

Joan's Investments
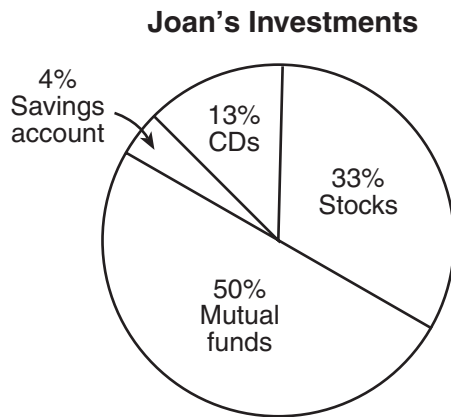
If she invested a total of $12,000, how much money did she invest in CDs?

(1) $1,560   (3) $15,600
(2) $9,230   (4) $92,308

3 Super Painters charges $1.00 per square foot plus an additional fee of $25.00 to paint a living room. If x represents the area of the walls of Francesca's living room, in square feet, and y represents the cost, in dollars, which graph best represents the cost of painting her living room?
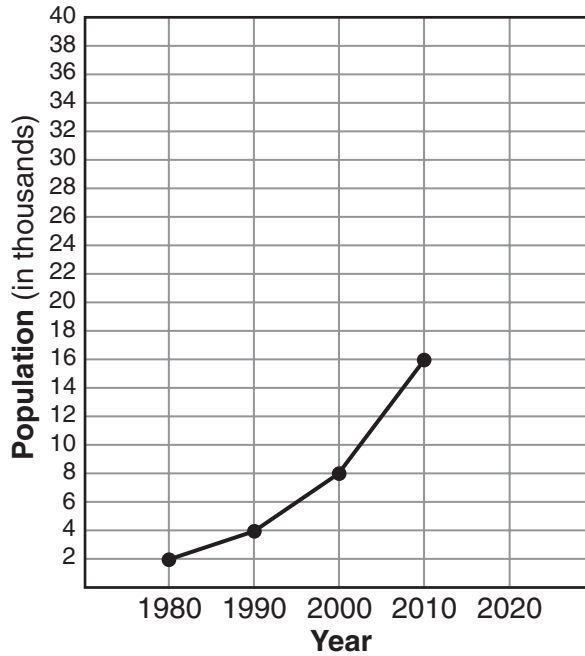

(1)

(3)

(2)

(4)
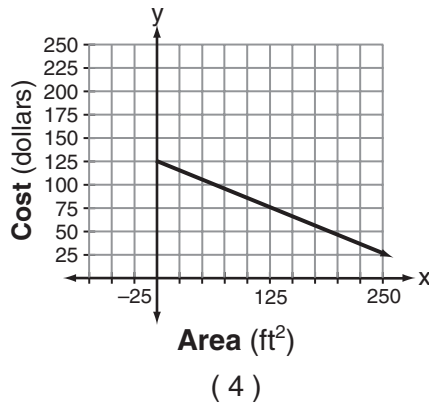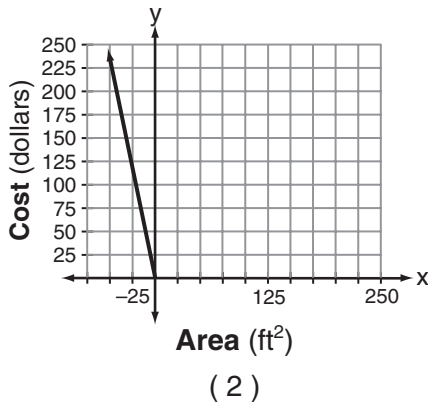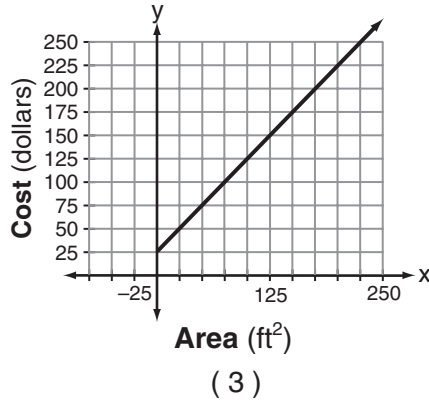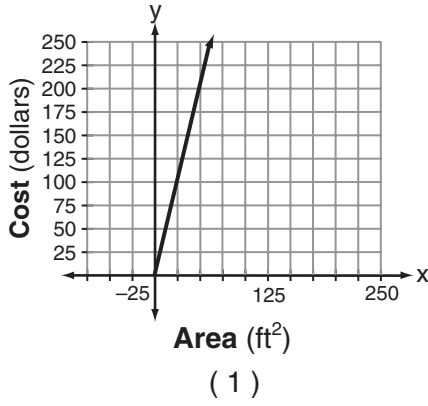
4 Jen and Barry's ice cream stand has three types of cones, six flavors of ice cream, and four kinds of sprinkles. If a serving consists of a cone, one flavor of ice cream, and one kind of sprinkles, how many different servings are possible?

(1) 90　　　　　　　　　　　(3) $_{13}C_3$

(2) 72　　　　　　　　　　　(4) $_{13}P_3$

5 The population growth of Boomtown is shown in the accompanying graph.

If the same pattern of population growth continues, what will the population of Boomtown be in the year 2020?

(1) 20,000   (3) 40,000
(2) 32,000   (4) 64,000

6 If $a + 3b = 13$ and $a + b = 5$, the value of b is

(1) 1   (3) 4.5
(2) 7   (4) 4

7 A cable 20 feet long connects the top of a flagpole to a point on the ground that is 16 feet from the base of the pole. How tall is the flagpole?

(1) 8 ft   (3) 12 ft
(2) 10 ft   (4) 26 ft

8 In the equation $\frac{1}{4}n + 5 = 5\frac{1}{2}$, n is equal to

(1) 8   (3) $\frac{1}{2}$
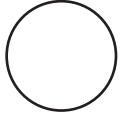
(2) 2   (4) $\frac{1}{8}$

9 Which geometric shape does *not* have any lines of symmetry?

(1)   (3)
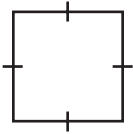
(2)   (4)

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

(1) $8x^2 + 9$ (3) $8x^2 - 2x + 9$
(2) $8x^2 - 1$ (4) $8x^2 - 2x - 1$

11 One factor of the expression $x^2y^2 - 16$ is

(1) $xy - 4$ (3) $x^2 - 4$
(2) $xy - 8$ (4) $x^2 + 8$

12 What is the sum of $\sqrt{50}$ and $\sqrt{8}$?

(1) $\sqrt{58}$ (3) $9\sqrt{2}$
(2) $7\sqrt{2}$ (4) $29\sqrt{2}$

13 What are the coordinates of point (2,–3) after it is reflected over the x-axis?

(1) (2,3)   (3) (–2,–3)

(2) (–2,3)   (4) (–3,2)

14 The accompanying stem-and-leaf plot represents Ben's test scores this year.

6	5	8			
7	2	3	3	3	3	9
8	1	3	3	6	7
9	6	9	9		

Key: 7 | 2 = 72

What is the median score for this set of data?

(1) 73   (3) 80

(2) 79   (4) 81

15 The video of the movie *Star Wars* earned $193,500,000 in rental fees during its first year. Expressed in scientific notation, the number of dollars earned is

(1) 1935×10^8 (3) 1.935×10^6

(2) 193.5×10^6 (4) 1.935×10^8

16 In the Ambrose family, the ages of the three children are three consecutive even integers. If the age of the youngest child is represented by $x + 3$, which expression represents the age of the oldest child?

(1) $x + 5$ (3) $x + 7$

(2) $x + 6$ (4) $x + 8$

17 If $t < \sqrt{t}$, t could be

(1) 0   (3) $\frac{1}{2}$

(2) 2   (4) 4

18 Which number is irrational?

(1) $\frac{5}{4}$ (3) $\sqrt{121}$

(2) $0.\overline{3}$ (4) π

19 In the accompanying diagram, $\triangle A'B'C'$ is the image of $\triangle ABC$ and $\triangle A'B'C' \cong \triangle ABC$.
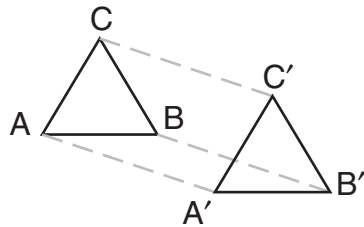
Which type of transformation is shown in the diagram?

(1) line reflection   (3) translation

(2) rotation   (4) dilation

20 The expression $_8C_3$ is equivalent to

(1) $_8C_5$ (3) $_8P_3$

(2) $\frac{8!}{3!}$ (4) $_8P_5$

21 The accompanying diagram shows the starting position of the spinner on a board game.

How does this spinner appear after a 270° counterclockwise rotation about point *P*?

(1)

(3)

(2)

(4)
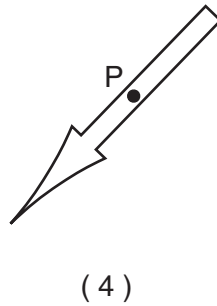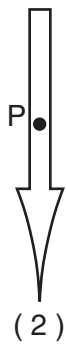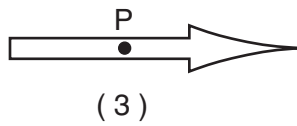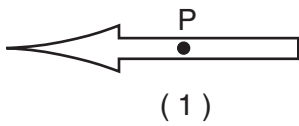
22 Which equation is equivalent to $3x + 4y = 15$?

(1) $y = \dfrac{15 - 3x}{4}$

(3) $y = 15 - 3x$

(2) $y = \dfrac{3x - 15}{4}$

(4) $y = 3x - 15$

23 When graphed on the coordinate plane, the equations $y = 2x^2 + 4x + 5$ and $x^2 + y^2 = 36$ form

(1) a parabola and a straight line
(2) a parabola and a circle
(3) two parabolas
(4) two circles

24 The accompanying diagram shows a ramp 30 feet long leaning against a wall at a construction site.
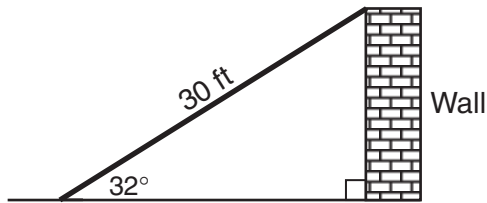
If the ramp forms an angle of 32° with the ground, how high above the ground, to the *nearest tenth*, is the top of the ramp?

(1) 15.9 ft   (3) 25.4 ft
(2) 18.7 ft   (4) 56.6 ft

25 Which equation illustrates the associative property?

(1) $a(1) = a$ (3) $a(b + c) = (ab) + (ac)$
(2) $a + b = b + a$ (4) $(a + b) + c = a + (b + c)$

26 What is the length of the line segment that joins the points whose coordinates are (4,7) and (−3,5)?

(1) $\sqrt{5}$ (3) $\sqrt{193}$

(2) $\sqrt{53}$ (4) $3\sqrt{6}$

27 Which expression represents the number of different 8-letter arrangements that can be made from the letters of the word "SAVANNAH" if each letter is used only once?

(1) $\dfrac{8!}{5!}$

(3) $_8P_5$

(2) $\dfrac{8!}{3!2!}$

(4) $8!$

28 Line segment AB has a slope of $\dfrac{3}{4}$. If the coordinates of point A are (2,5), the coordinates of point B could be

(1) (6,8)

(3) (−1,1)

(2) (5,9)

(4) (6,2)

29 Which is *not* a property of all similar triangles?

(1) The corresponding angles are congruent.
(2) The corresponding sides are congruent.
(3) The perimeters are in the same ratio as the corresponding sides.
(4) The altitudes are in the same ratio as the corresponding sides.

30 The expression $\left(\dfrac{3}{4}\right)^2 \bullet \left(\dfrac{1}{4}\right)^{-2}$ is equivalent to

(1) $\dfrac{9}{16}$

(3) 3

(2) $\dfrac{9}{256}$

(4) 9

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 Solve for x: $5(x - 2) = 2(10 + x)$

32 Thelma and Laura start a lawn-mowing business and buy a lawnmower for $225. They plan to charge $15 to mow one lawn. What is the *minimum* number of lawns they need to mow if they wish to earn a profit of *at least* $750?

33 What is the positive solution of the equation $4x^2 - 36 = 0$?

34 In the accompanying diagram of isosceles triangle ABC, $\overline{AB} \cong \overline{AC}$, and exterior angle $ACD = 110°$. What is $m\angle BAC$?

A
110°
B   C   D

35 In rhombus *ABCD*, the measure, in inches, of $\overline{AB}$ is $3x + 2$ and $\overline{BC}$ is $x + 12$. Find the number of inches in the length of $\overline{DC}$.
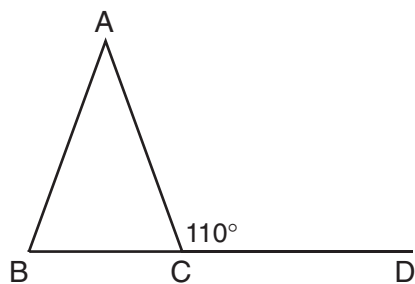
Answer all questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [6]

36 The trip from Manhattan to Montauk Point is 120 miles by train or by car. A train makes the trip in 2 hours, while a car makes the trip in $2\frac{1}{2}$ hours. How much faster, in miles per hour, is the average speed of the train than the average speed of the car?

37 In the diagram below, town C lies on straight road p. Sketch the points that are 6 miles from town C. Then sketch the points that are 3 miles from road p. How many points satisfy both conditions?

p   C

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 The accompanying diagram represents a scale drawing of the property where Brendan's business is located. He needs to purchase rock salt to melt the ice on the parking lot (shaded area) around his building. A bag of rock salt covers an area of 1,500 square feet. How many bags of rock salt does Brendan need to purchase to salt the entire parking lot?

1 in

$\frac{3}{4}$ in   Building

$\frac{3}{4}$ in

$1\frac{1}{2}$ in
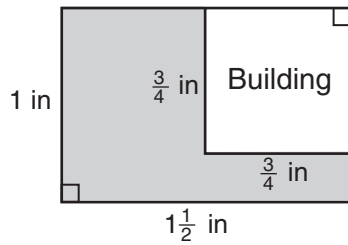
Scale: $\frac{1}{4}$ in = 18 ft

39 Given the statement: "If I live in Albany, then I am a New Yorker."

In the spaces provided below, write the inverse, the converse, and the contrapositive of this statement.

Inverse: _____

_____

Converse: _____

_____

Contrapositive: _____

_____
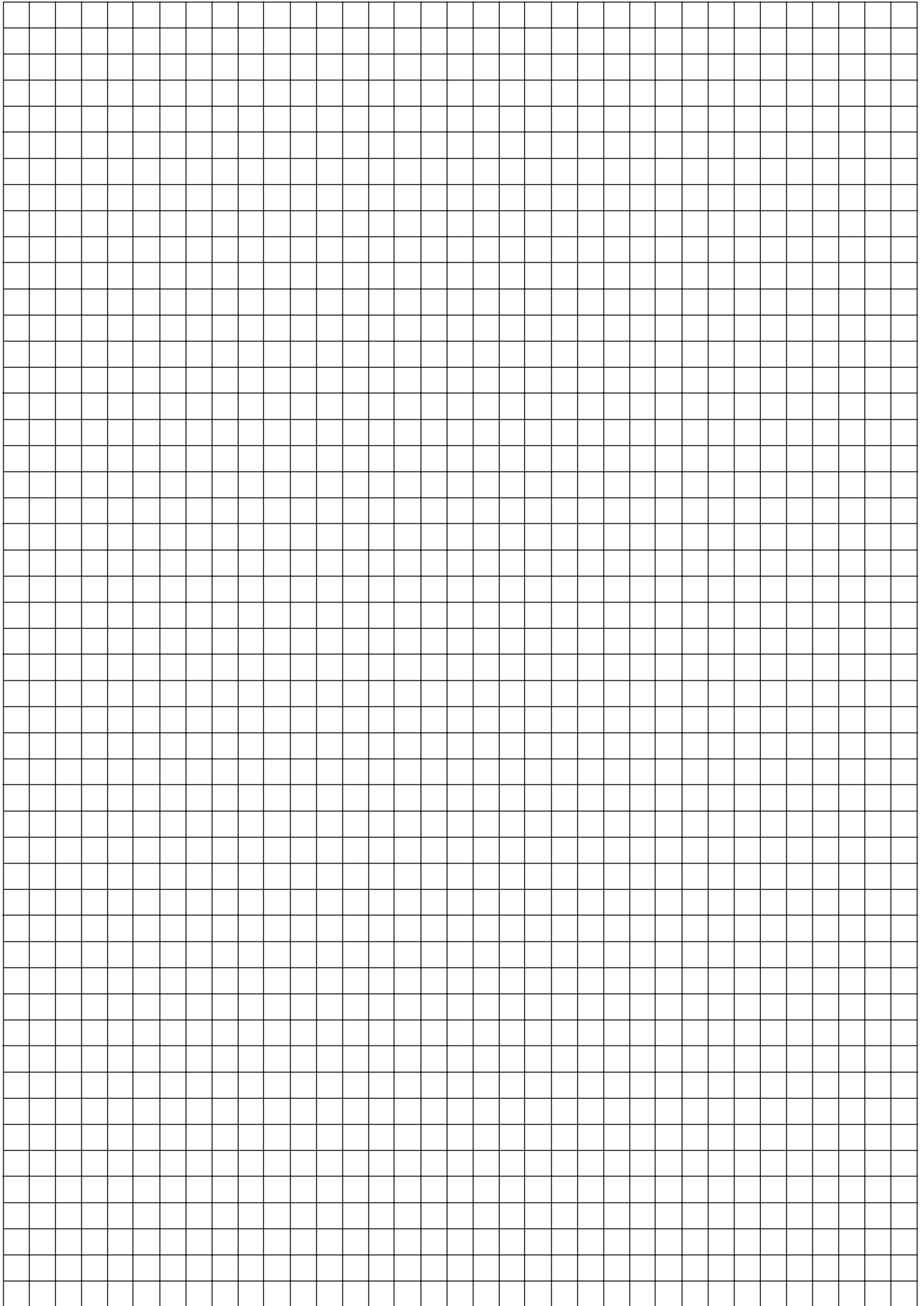
Which conditional is logically equivalent to its original statement?
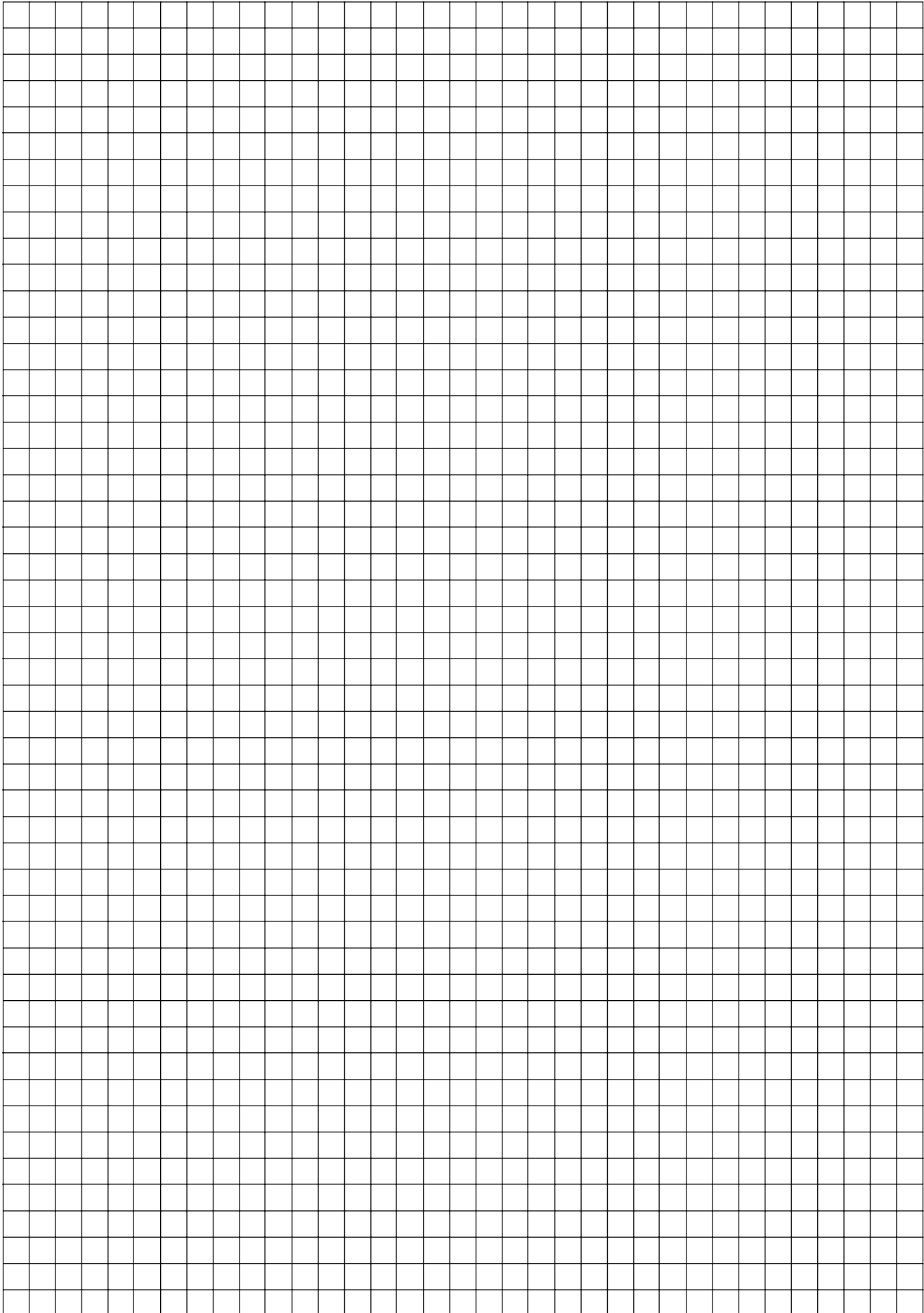
inverse   converse   contrapositive

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

MATHEMATICS A

Thursday, August 16, 2007 — 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 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

Tear Here

MATHEMATICS A			
Question	Maximum Credit	Credits Earned	Rater's/Scorer's Initials
Part I 1–30	60		
Part II 31	2		
32	2		
33	2		
34	2		
35	2		
Part III 36	3		
37	3		
Part IV 38	4		
39	4		
Maximum Total	84		

Total Raw Score   **Checked by**   **Scaled Score** (from conversion chart)

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

MATHEMATICS A