

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.

Part I

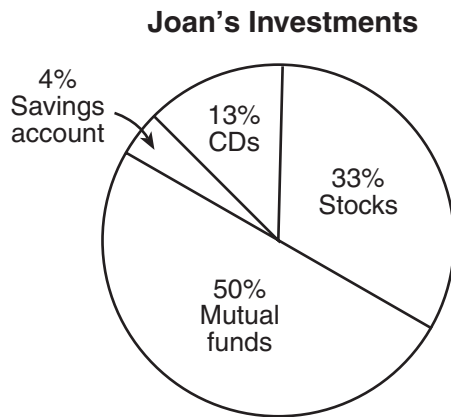
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

Use this space for
computations.

- 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.

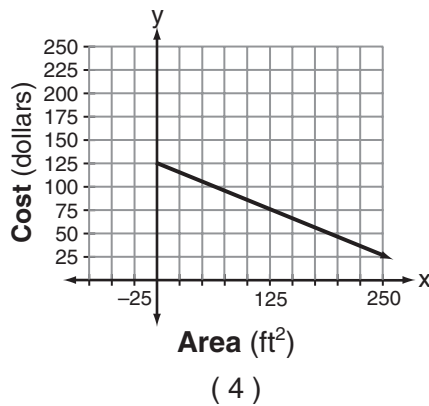
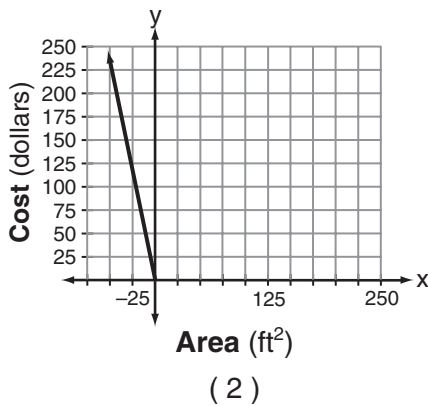
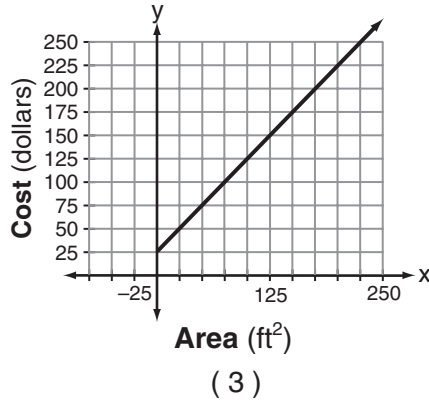
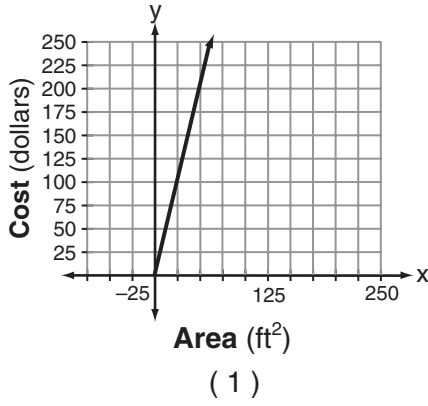


If she invested a total of \$12,000, how much money did she invest in CDs?

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

Use this space for computations.

- 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?

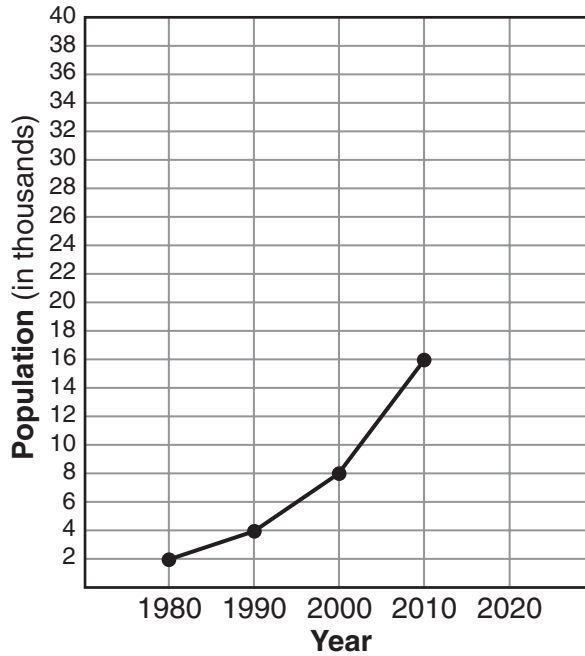


- 4 Jen and Barry's ice cream stand has three types of cones, six flavors of ice cream, and four kinds of sprinkles. If a serving consists of a cone, one flavor of ice cream, and one kind of sprinkles, how many different servings are possible?

- (1) 90 (3) ${}_{13}C_3$
 (2) 72 (4) ${}_{13}P_3$

Use this space for
computations.

- 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

Use this space for
computations.

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

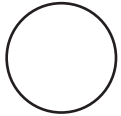
(1) 8

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

(2) 2

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

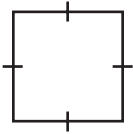
9 Which geometric shape does *not* have any lines of symmetry?



(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) $29\sqrt{2}$

Use this space for
computations.

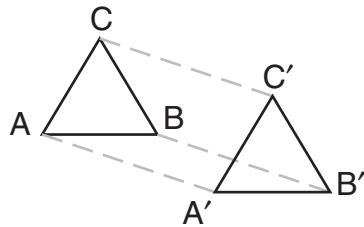
17 If $t < \sqrt{t}$, t could be

- (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, $\Delta A'B'C'$ is the image of ΔABC and $\Delta A'B'C' \cong \Delta ABC$.



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

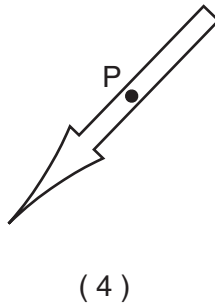
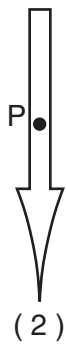
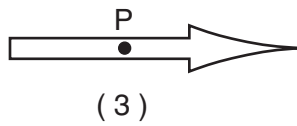
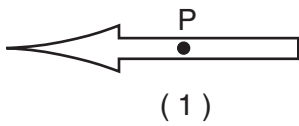
- (1) ${}_8C_5$ (3) ${}_8P_3$
(2) $\frac{8!}{3!}$ (4) ${}_8P_5$

Use this space for computations.

- 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 ?



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

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

(3) $y = 15 - 3x$

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

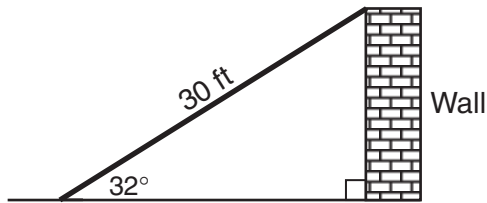
(4) $y = 3x - 15$

Use this space for
computations.

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
- (2) 18.7 ft
- (3) 25.4 ft
- (4) 56.6 ft

25 Which equation illustrates the associative property?

- (1) $a(1) = a$
- (2) $a + b = b + a$
- (3) $a(b + c) = (ab) + (ac)$
- (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) $\sqrt{5}$
- (2) $\sqrt{53}$
- (3) $\sqrt{193}$
- (4) $3\sqrt{6}$

Part II

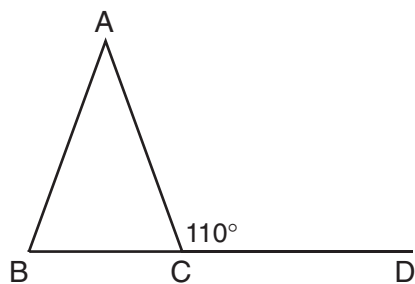
Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. [10]

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 $ACD = 110^\circ$. What is $m\angle BAC$?



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} .

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 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?

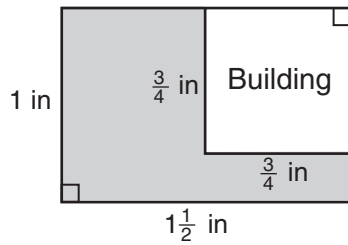
37 In the diagram below, town C lies on straight road p . Sketch the points that are 6 miles from town C . Then sketch the points that are 3 miles from road p . How many points satisfy both conditions?



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?



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

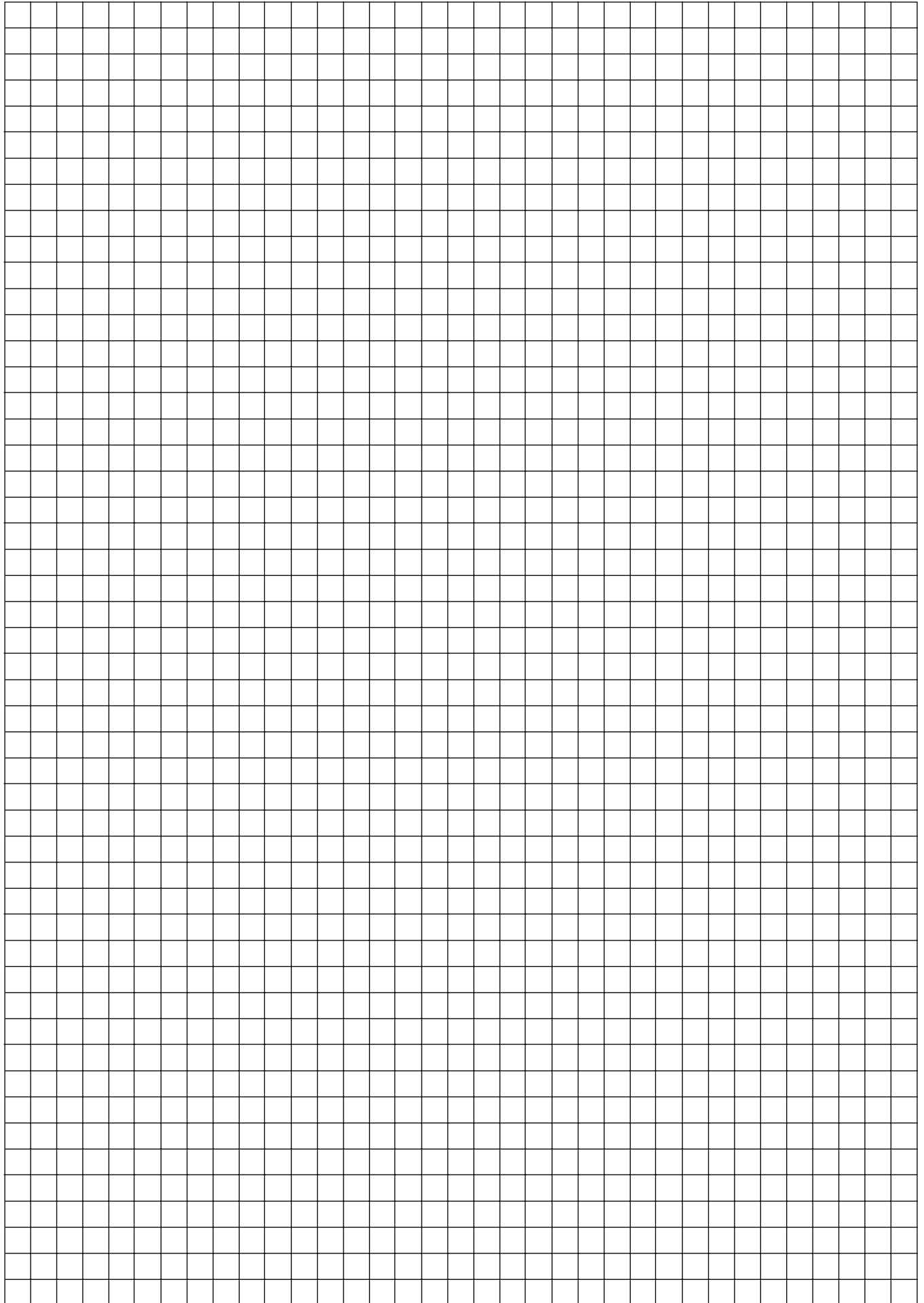
converse

contrapositive

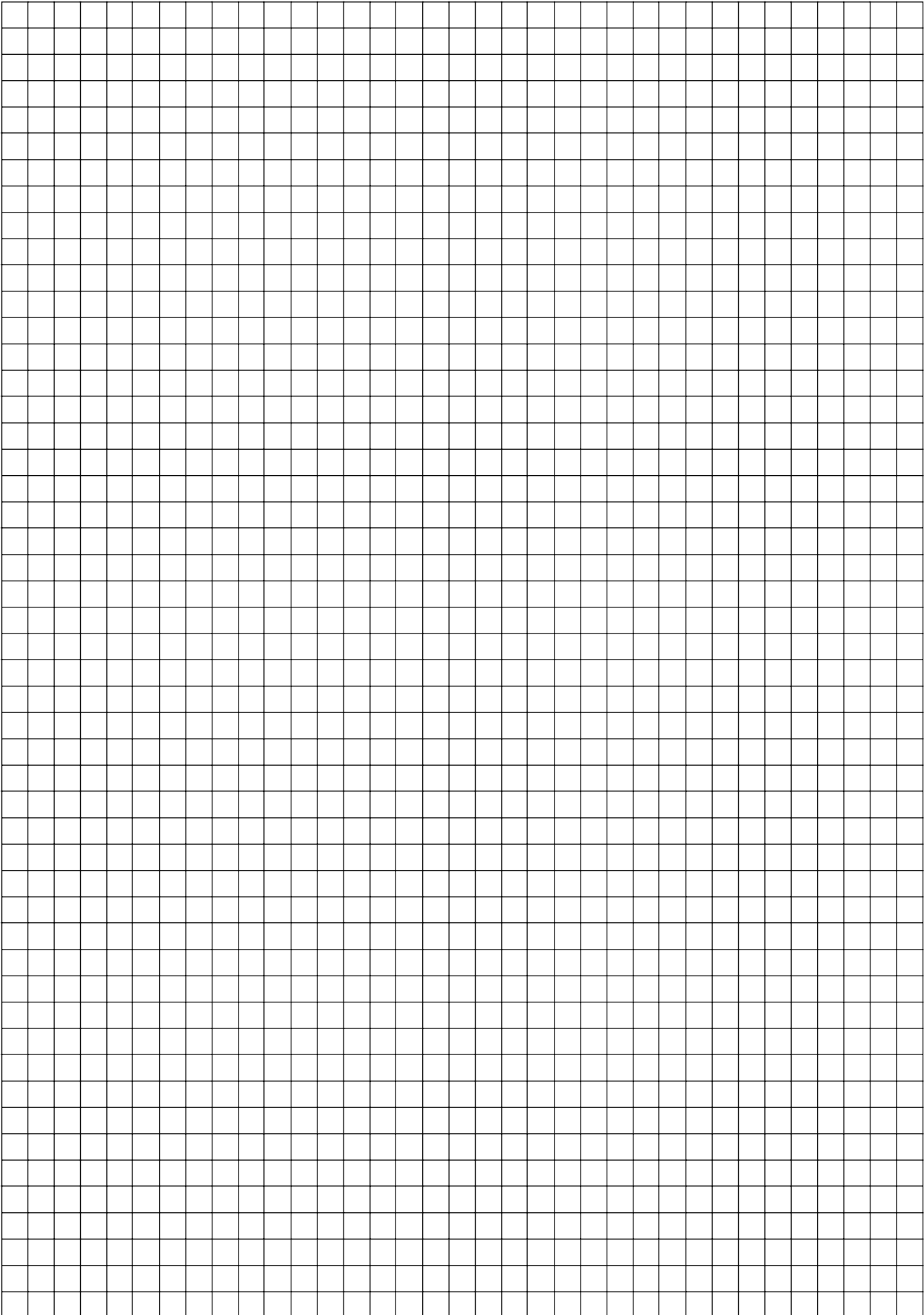
Scrap Graph Paper — This sheet will *not* be scored.

Tear Here

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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

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

FOR TEACHERS ONLY

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

SCORING KEY

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Mathematics A examination. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examinations in Mathematics A and Mathematics B*.

Use only *red* ink or *red* pencil in rating Regents papers. Do *not* attempt to correct the student's work by making insertions or changes of any kind. Use check marks to indicate student errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. On the back of the student's detachable answer sheet, raters must enter their initials in the boxes next to the questions they have scored and also write their name in the box under the heading "Rater's/Scorer's Name."

Raters should record the student's scores for all questions and the total raw score on the student's detachable answer sheet. Then the student's total raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Thursday, August 16, 2007. The student's scaled score should be entered in the box provided on the student's detachable answer sheet. The scaled score is the student's final examination score.

Part I

Allow a total of 60 credits, 2 credits for each of the following. Allow credit if the student has written the correct answer instead of the numeral 1, 2, 3, or 4.

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department’s web site during the rating period. Check this web site <http://www.emsc.nysed.gov/osa/> and select the link “Examination Scoring Information” for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents examination period.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examinations in Mathematics A and Mathematics B are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher’s professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examinations in Mathematics A and Mathematics B*, use their own professional judgment, confer with other mathematics teachers, and/or contact the consultants at the State Education Department for guidance. During each Regents examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase “such as”), it does **not** mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

III. Appropriate Work

Full-Credit Responses: The directions in the examination booklet for all the constructed-response questions state: “Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, charts, etc.” The student has the responsibility of providing the correct answer **and** showing how that answer was obtained. The student must “construct” the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

Responses With Errors: Rubrics that state “Appropriate work is shown, but ...” are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete, i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has **not** been shown. Other rubrics address incomplete responses.

IV. Multiple Errors

Computational Errors, Graphing Errors, and Rounding Errors: Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in any response. The teacher must carefully review the student’s work to determine what errors were made and what type of errors they were.

Conceptual Errors: A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents. A response with one conceptual error can receive no more than half credit.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

If a response shows two (or more) different major conceptual errors, it should be considered completely incorrect and receive no credit.

If a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors: i.e., awarding half credit for the conceptual error and deducting 1 credit for each mechanical error (maximum of two deductions for mechanical errors).

Part II

For each question, use the specific criteria to award a maximum of two credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

- (31) [2] 10, and appropriate work is shown, such as solving the equation or trial and error with at least three trials and appropriate checks.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or

[1] 10, but no work or fewer than three trials and appropriate checks are shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- (32) [2] 65, and appropriate work is shown, such as solving the inequality $15x \geq 225 + 750$ or trial and error with at least three trials and appropriate checks.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or

[1] 65, but no work or fewer than three trials and appropriate checks are shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

MATHEMATICS A – *continued*

- (33) [2] 3, and appropriate work is shown, such as factoring or trial and error with at least three trials and appropriate checks.
- [1] Appropriate work is shown, but one computational error is made.
- or***
- [1] Appropriate work is shown, but one conceptual error is made, such as not rejecting the negative root.
- or***
- [1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.
- or***
- [1] 3, but no work or fewer than three trials and appropriate checks are shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
- (34) [2] 40, and appropriate work is shown, such as $x = 180 - (70 + 70)$ or correctly labeling all the angles in the diagram.
- [1] Appropriate work is shown, but one computational error is made.
- or***
- [1] Appropriate work is shown, but one conceptual error is made.
- or***
- [1] A correct equation is written, but no further correct work is shown.
- or***
- [1] The measures of $\angle ACB$ and $\angle ABC$ are both found to be 70° , but no further correct work is shown.
- or***
- [1] An incorrect equation of equal difficulty is solved appropriately.
- or***
- [1] 40, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

MATHEMATICS A – *continued*

(35) [2] 17, and appropriate work is shown, such as solving the equation $x + 12 = 3x + 2$.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] A correct equation is written and solved for x , but no further correct work is shown.

or

[1] 17, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Part III

For each question, use the specific criteria to award a maximum of three credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(36) [3] 12, and appropriate work is shown, such as finding the rates of both vehicles and then subtracting 48 from 60.

[2] Appropriate work is shown, but one computational error is made.

or

[2] The rates of both vehicles are found correctly, and appropriate work is shown, but they are not subtracted.

or

[2] The rates of both vehicles are found correctly, and the correct difference is found, but no work is shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] The rates of both vehicles are found correctly, but no work is shown, and the difference is not found.

or

[1] 12, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

MATHEMATICS A – *continued*

(37) [3] 4, and an appropriate sketch is drawn that shows a circle with C as its center and a radius of 6 and two parallel lines, one 3 units above and one 3 units below line p .

[2] An appropriate sketch is drawn, but the answer 4 is not found.

or

[2] Only one locus is drawn correctly, but the appropriate number of points of intersection is found.

[1] Only one locus is drawn correctly, and no further correct work is shown.

or

[1] Both loci are drawn incorrectly, but the appropriate number of points of intersection is found.

or

[1] 4, but no work or sketch is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Part IV

For each question, use the specific criteria to award a maximum of four credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

- (38) [4] 4, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or*
- [3] Appropriate work is shown to find 4,860, the area of the parking lot, but no further correct work is shown.
- [2] Appropriate work is shown, but two or more computational or rounding errors are made.
- or*
- [2] Appropriate work is shown, but one conceptual error is made, such as using an incorrect conversion.
- or*
- [2] The property has been divided into appropriate sections (e.g., 108×72 , the entire property, and 54×54 , the building) and correct areas are found, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or*
- [1] 4, but no work is shown.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

MATHEMATICS A – *continued*

- (39) [4] Contrapositive, and all three statements are written correctly.
- [3] Contrapositive, and only two of the statements are written correctly.
- or*
- [3] All three statements are written correctly, but the contrapositive is not identified.
- [2] Contrapositive, and only one statement is written correctly.
- or*
- [2] Only two statements are written correctly, and the contrapositive is not identified.
- [1] All three statements are written incorrectly, but the contrapositive is identified.
- or*
- [1] Only one statement is written correctly, and the contrapositive is not identified.
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
-

Map to Learning Standards

Key Ideas	Item Numbers
Mathematical Reasoning	1, 39
Number and Numeration	17, 18, 25
Operations	9, 10, 11, 12, 15, 19, 21, 30
Modeling/Multiple Representation	13, 16, 22, 29, 32, 34, 35, 37
Measurement	2, 7, 14, 24, 26, 36, 38
Uncertainty	4, 20, 27
Patterns/Functions	3, 5, 6, 8, 23, 28, 31, 33

Regents Examination in Mathematics A

August 2007

**Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scaled Scores)**

The Chart for Determining the Final Examination Score for the August 2007 Regents Examination in Mathematics A will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, August 16, 2007. Conversion charts provided for previous administrations of the Mathematics A examination must NOT be used to determine students’ final scores for this administration.

Submitting Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to www.emsc.nysed.gov/osa/exameval.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.

