

# FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## MATHEMATICS A

Thursday, June 15, 2006 — 1:15 to 4:15 p.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 checkmarks 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, June 15, 2006. 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) 3	(6) 3	(11) 3	(16) 2	(21) 1	(26) 2
(2) 3	(7) 1	(12) 2	(17) 2	(22) 3	(27) 2
(3) 4	(8) 4	(13) 3	(18) 2	(23) 1	(28) 1
(4) 4	(9) 4	(14) 4	(19) 3	(24) 4	(29) 3
(5) 1	(10) 2	(15) 4	(20) 1	(25) 3	(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] 256, and appropriate work is shown, such as finding the side of the square and calculating the area.

[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] Appropriate work is shown, but only the area of the circle is found.

*or*

[1] An incorrect value for the side of the square is determined, but an appropriate area is found.

*or*

[1] A correct value for the side of the square is determined, but the area is not found or is found incorrectly.

*or*

[1] The area for the square inscribed in the circle is found, resulting in an answer of 128.

*or*

[1] 256, 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.

- (32) [2] 10, and appropriate work is shown, such as  ${}_5C_2$  or a diagram or a list.

[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] 10, 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*

(33) [2] 5, and appropriate work is shown, such as the distance formula, the Pythagorean theorem, or a Pythagorean triple.

[1] Appropriate work is shown, but one computational or graphing 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] 5, 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.

(34) [2] 2.1, and appropriate work is shown.

[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] 2.1, 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.

- (35) [2] The four correct lines of symmetry are drawn.
- [1] At least two correct lines of symmetry are drawn, and no inappropriate lines are drawn.
- or***
- [1] All four correct lines of symmetry are drawn, but one or more inappropriate lines are also drawn.
- [0] At least one of the correct lines of symmetry is missing, and one or more inappropriate lines are drawn.
- or***
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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**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] 5, and appropriate work is shown, such as the quadratic equation  $(x + 7)(x - 3) = 24$  or trial and error with at least three trials and appropriate checks.

[2] A correct quadratic equation is written, but one computational error is made in finding Tamara’s age.

*or*

[2] 12 and 2 are found as the sisters’ ages, but Tamara’s age is not found.

*or*

[2] The trial-and-error method is used to find the correct solution, but only two trials and appropriate checks are 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] A correct quadratic equation is written, but no further correct work is shown.

*or*

[1] An incorrect equation of equal difficulty is solved appropriately for Tamara’s age.

*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] 5, but no work or only one trial with an appropriate check 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] Mean = 79, median = 79, and mode = 78, and appropriate work is shown.

[2] Appropriate work is shown, but only two of the three measures of central tendency are determined and identified correctly.

*or*

[2] Appropriate work is shown and all three measures of central tendency are determined correctly, but the measures are not identified or are identified incorrectly.

[1] Appropriate work is shown, but only one of the three measures of central tendency is determined and identified correctly.

*or*

[1] Mean = 79, median = 79, and mode = 78, but no work is shown.

[0] 79, 79, and 78, but no work is shown, and the answers are not identified or are identified incorrectly.

*or*

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

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**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] 17 nickels and 15 dimes, and appropriate work is shown, such as the equation  $0.05x + 0.10(32 - x) = 2.35$  or trial and error with at least three trials and appropriate checks.

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

*or*

[3] Appropriate work is shown, and the correct answers are found, but they are not labeled or are labeled incorrectly.

*or*

[3] Appropriate work is shown, but only the correct number of nickels or the correct number of dimes is found and labeled.

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

*or*

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

*or*

[2] The trial-and-error method is used to find the correct solution, but only two trials and appropriate checks are shown.

*or*

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

*or*

[2] An incorrect system of equations of equal difficulty is solved appropriately for both the number of nickels and dimes.

*or*

[2] A correct equation is solved for  $x$ , but no further correct work is shown.

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

*or*

[1] A correct equation is written, but no further correct work is shown.

*or*

[1] 17 nickels and 15 dimes, but no work or only one trial with an appropriate check is shown.

[0] 17 nickels *or* 15 dimes, but no work or only one trial with an appropriate check is shown.

*or*

[0] 17 and 15, but no work is shown, and the answers are not labeled or are labeled incorrectly.

*or*

[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] 79.4, and appropriate work is shown, such as  $\tan 52 = \frac{x}{62}$ .
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] An incorrectly labeled diagram is drawn, but the appropriate trigonometric function is used, and an appropriate answer is found.
- [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 trigonometric function or ratio.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [1] A correctly labeled diagram is drawn, but no further correct work is shown.
- or***
- [1] A correct equation is written, but no further correct work is shown.
- or***
- [1] An incorrectly labeled diagram is drawn, but an appropriate equation is written, but no further correct work is shown.
- or***
- [1] 79.4, 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.
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**Map to Learning Standards**

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

**Regents Examination in Mathematics A**

**June 2006**

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

*The Chart for Determining the Final Examination Score for the June 2006 Regents Examination in Mathematics A* will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Thursday, June 15, 2006. Conversion charts provided for previous administrations of the Mathematics A examination must NOT be used to determine students’ final scores for this administration.

*The Teacher Evaluation of State Examinations* forms will also be posted on the same web site. Please select the link “Teacher Evaluation Forms” and then the examination title to complete the evaluation form for the *June 2006 Regents Examination in Mathematics A*.



