

# FOR TEACHERS ONLY

The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

## MATHEMATICS A

Wednesday, June 16, 2004 — 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 Administering and 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 Wednesday, June 16, 2004. 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) 2	(11) 2	(16) 2	(21) 3	(26) 2
(2) 1	(7) 1	(12) 3	(17) 4	(22) 3	(27) 4
(3) 3	(8) 1	(13) 4	(18) 2	(23) 1	(28) 1
(4) 3	(9) 2	(14) 4	(19) 1	(24) 1	(29) 4
(5) 2	(10) 4	(15) 2	(20) 4	(25) 3	(30) 1

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. Visit the site <http://www.emsc.nysed.gov/osa/> and select the link “Latest Information” for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded.

### **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 Administering and Scoring 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] 120, and appropriate work is shown, such as  $m\angle CDB = 180 - 130 = 50$  and  $m\angle CBA = 70 + 50 = 120$  or correctly labeled angles in a 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]  $m\angle CBD = 60$  is found, but no further correct work is shown.

*or*

[1] 120, 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] No, and an appropriate explanation is given or the expression is evaluated correctly.

[1] No, and the correct order of operations is used to evaluate  $2(3)^2 + 5$ , but one computational error is made.

*or*

[1] One conceptual error is made in evaluating the expression, but the question is answered appropriately.

*or*

[1] Appropriate work is shown, but the question is not answered.

[0] No, but no explanation or an inappropriate explanation is given.

*or*

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

(33) [2]  $2\frac{4}{5}$ ,  $\sqrt{8}$ ,  $3.\bar{1}$ ,  $\pi$ ,  $2\sqrt{3}$ , and appropriate work is shown, such as converting each value to a decimal equivalent.

[1] All values are correctly converted to decimal equivalents, but the order is not indicated or is indicated incorrectly.

**or**

[1] One or two computational errors are made in finding decimal equivalents, but the appropriate order is indicated.

**or**

[1] Appropriate work is shown, but one conceptual error is made, such as indicating the order from greatest to least.

**or**

[1]  $2\frac{4}{5}$ ,  $\sqrt{8}$ ,  $3.\bar{1}$ ,  $\pi$ ,  $2\sqrt{3}$ , 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] (1,1), and appropriate work is shown, such as a correct graph of  $\overline{AB}$  and an appropriate explanation of how point A is found or the use of the midpoint formula.

[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, such as finding the midpoint of the given coordinates.

**or**

[1] The midpoint and points A and B are graphed correctly, but the coordinates of point A are not stated or are stated incorrectly.

**or**

[1] (1,1), 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.

MATHEMATICS A – *continued*

(35) [2] A correct construction is drawn, showing the arcs intersecting above and below  $\overline{AB}$ , and line  $c$  is drawn.

[1] A correct construction is drawn, but line  $c$  is not labeled.

[0] A drawing that is not a construction is shown with arc marks sketched.

***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] 50, and appropriate work is shown, such as a Venn diagram.
- [2] Appropriate work is shown, but one computational error is made.
- or***
- [2] 200, and appropriate work is shown to find the number of students that have brown hair and/or brown eyes.
- [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 numbers of students who have brown hair only (40) and brown eyes only (70) are found, but no further correct work is shown.
- or***
- [1] 50, 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] Perimeter =  $4x + 4$  or  $4(x + 1)$  and area =  $x^2 + 2x - 24$ , and appropriate work is shown.
- [2]  $4x + 4$  and  $x^2 + 2x - 24$ , and appropriate work is shown, but the answers are not labeled or are labeled incorrectly.
- or***
- [2] Appropriate work is shown, but one computational error is made.
- or***
- [2] Area =  $x^2 + 2x - 24$ , and appropriate work is shown, but the perimeter is not found or is found incorrectly.
- or***
- [2] The area and perimeter are represented correctly, but only one of them is expressed in simplest form.
- [1] Appropriate work is shown, but two or more computational errors are made.
- or***
- [1] Perimeter =  $4x + 4$ , and appropriate work is shown, but the area is not found or is found incorrectly.
- or***
- [1] The area and perimeter are represented correctly, but neither is expressed in simplest form.
- or***
- [1] Perimeter =  $4x + 4$  or  $4(x + 1)$  and area =  $x^2 + 2x - 24$ , but no work is shown.
- [0] Perimeter =  $4x + 4$  or area =  $x^2 + 2x - 24$ , but no work is shown.
- or***
- [0]  $4x + 4$  and  $x^2 + 2x - 24$ , 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.
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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] Median = 91.5, mode = 92, and seventh test score = 96, and appropriate work is shown.

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

*or*

[3] Seventh test score = 96, but only the median *or* the mode is found correctly, but appropriate work is shown.

*or*

[3] 91.5, 92, and 96, and appropriate work is shown, but the median and mode are not labeled or are labeled incorrectly.

[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] Both the median and the mode are found and labeled correctly, and appropriate work is shown, but the seventh test score is not found or is found incorrectly.

*or*

[2] Seventh test score = 96, and appropriate work is shown, but the median and the mode are not found or are found incorrectly.

[1] Either the median *or* the mode is found and labeled correctly, and appropriate work is shown, but no further correct work is shown.

*or*

[1] Median = 91.5, mode = 92, and seventh test score = 96, but no work is shown.

[0] Median = 91.5 *or* mode = 92 *or* seventh test score = 96, but no work is shown.

*or*

[0] 91.5, 92, and 96, but no work is shown and the answers are not labeled.

*or*

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



- (39) [4] (3,4) and (–3,–4), and a correct algebraic or graphic solution is shown.
- [3] Appropriate work is shown, but one computational or graphing error is made.
- or***
- [3] Appropriate work is shown for an algebraic or graphic solution, but only one correct ordered pair is found or the correct values are found only for  $x$  or for  $y$ .
- [2] Appropriate work is shown, but two or more computational or graphing errors are made.
- or***
- [2] Both equations are graphed correctly, but neither ordered pair is identified.
- or***
- [2] The line is graphed correctly, but the circle is graphed as a semicircle, and only one correct solution is identified.
- or***
- [2] An incorrect quadratic equation of equal difficulty is solved appropriately, and an appropriate solution or solutions are found.
- or***
- [2] The linear equation is graphed correctly and correct points of the circle are graphed, but the points are connected to form a quadrilateral, but appropriate ordered pairs are identified.
- [1] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.
- or***
- [1] One equation is graphed correctly, but no further correct work is shown.
- or***
- [1] An incorrect equation of a lesser degree of difficulty, such as a linear equation, is solved appropriately, and an appropriate solution or solutions are found.
- or***
- [1] A correct quadratic equation is set equal to zero, but no further correct work is shown.
- or***
- [1] (3,4) and (–3,–4), but no work is shown.
- [0] (3,4) or (–3,–4), but no work is shown.
- or***
- [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**

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

**Regents Examination in Mathematics A**

**June 2004**

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

**The *Chart for Determining the Final Examination Score for the June 2004 Regents Examination in Mathematics A*, normally located on this page, will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Wednesday, June 16, 2004. Conversion charts provided for previous administrations of the Mathematics A examination must NOT be used to determine students’ final scores for this administration.**



