FOR TEACHERS ONLY

MATHEMATICS A

Thursday, June 16, 2005 — 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 Thursday, June 16, 2005. 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) 1	(6) 4	(11) 3	(16) 3	(21) 2	(26) 2
(2) 3	(7) 2	(12) 1	(17) 2	(22) 2	(27) 4
(3) 1	(8) 1	(13) 4	(18) 1	(23) 1	(28) 3
(4) 3	(9) 4	(14) 2	(19) 3	(24) 4	(29) 2
(5) 4	(10) 4	(15) 2	(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. 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]** 14 and 42, and appropriate work is shown, such as $x + 3x = 56$, a table, 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 only one of the two lengths is found.

or

   [1] A correct equation is written and solved, but the lengths are not stated.

or

   [1] An incorrect equation of equal difficulty is solved appropriately.

or

   [1] 14 and 42, but no work or fewer than three trials with 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]** A correct graph is drawn on the number line, with a closed circle at the left end and an open circle at the right end.

   [1] Appropriate work is shown, but one graphing error is made, such as writing an incorrect scale on the number line.

or

   [1] Appropriate work is shown, but one conceptual error is made, such as using a closed circle instead of an open circle.

or

   [1] A correct inequality is written, but the graph is not drawn.

   [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]** 40, and appropriate work is shown, such as a Venn diagram or $(240 + 210) - 90 = 360$ and $400 - 360 = 40$.

   [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] 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.

(34)   **[2]** 20,349, and appropriate work is shown, such as $_{21}C_5 = 20{,}349$.

   [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 determining the value of $_{21}P_5$.

or

   [1] 20,349, 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]** $3(x + 7)(x - 2)$, and appropriate work is shown.

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

or

   [1] A conceptual error is made, such as incomplete factoring.

or

   [1] $3(x + 7)(x - 2)$, 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]** 10 and 30, and appropriate work is shown, such as $2x + 2(2x + 10) = 80$ or trial and error with at least three trials and appropriate checks.

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

or

[2] Appropriate work is shown, but only one of the dimensions is found.

or

[2] The trial-and-error method is used to find a 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] 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] An incorrect equation of equal difficulty is solved appropriately.

or

[1] Appropriate solutions are found based on the incorrect use of the perimeter formula, such as $3x + 10 = 80$.

or

[1] 10 and 30, but no work or only one trial with an appropriate check is shown.

[0] 10 *or* 30, but no work or only one trial with an appropriate check 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.

[OVER]

(37)   **[3]** The figure is drawn accurately and the new coordinates are labeled and stated as $A'(7,-2)$, $B'(2,-1)$, $C'(3,-2)$, and $D'(2,-4)$.

[2] One error is made in drawing the figure, such as misplotting one point, but the new coordinates are labeled and stated appropriately, based on that figure.

or

[2] The figure is drawn and labeled accurately, but the new coordinates are not stated or are stated incorrectly.

or

[2] The new coordinates are labeled and stated correctly, but the figure is not drawn.

[1] Two errors are made in drawing the reflected figure, but the new coordinates are labeled and stated appropriately, based on that figure.

or

[1] Appropriate work is shown, but one conceptual error is made, such as reflecting the figure in the x-axis or the origin.

or

[1] Correct points are plotted and labeled, but the figure is not drawn, and the coordinates are not stated.

or

[1] The figure is drawn correctly, but the new coordinates are not labeled or stated.

[0] An appropriate reflection in the x-axis is drawn, and the coordinates are not labeled or stated.

or

[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]** A correct circle graph is drawn and labeled, and appropriate work is shown, such as using proportions. [A correct graph will show 150° for brown, 120° for black, 60° for blond, and 30° for red.]

   [3] Appropriate work is shown, but one computational error is made, but an appropriate graph is drawn.

or

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

or

   [3] Appropriate work is shown and a correct graph is drawn, but the sectors are not labeled or are labeled incorrectly.

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

or

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

or

   [2] Correct numbers of degrees or correct proportional values are found, but two or more graphing errors are made.

or

   [2] Correct numbers of degrees or correct proportional values are found, but no graph is drawn.

or

   [2] A correct circle graph is drawn and labeled, but no work is shown.

   [1] Appropriate work is shown and a graph is drawn, but two or more computational errors and two or more graphing errors are made.

or

   [1] At least two numbers of degrees or proportional values are found correctly, but no graph or an incorrect graph is drawn.

   [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]** 32, and appropriate work is shown, such as $12^2 + 16^2 = r^2$, $50 - r = s$, and $\sin x = \frac{16}{30}$.

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

or

[3] Appropriate work is shown to find $r = 20$ and $s = 30$ and the trigonometric equation $\sin x = \frac{16}{30}$ is written, but it is not solved or is solved 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, such as using an incorrect trigonometric function to find the angle.

or

[2] The lengths of r and s are found correctly, but no further correct work is shown.

or

[2] Incorrect lengths are found for r and s, but the sine function is used correctly to find an appropriate angle.

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

or

[1] The length of r is found correctly, but no further correct work is shown.

or

[1] 32, 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.

Map to Learning Standards

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

Regents Examination in Mathematics A

June 2005

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

The *Chart for Determining the Final Examination Score for the June 2005 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 Thursday, June 16, 2005. Conversion charts provided for previous administrations of the Mathematics A examination must NOT be used to determine students' final scores for this administration.