

# FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## MATHEMATICS B

Friday, January 28, 2005 — 9:15 a.m. to 12:15 p.m., only

### SCORING KEY

#### Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Mathematics B 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 Friday, January 28, 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 40 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) 1	(16) 3
(2) 2	(7) 3	(12) 2	(17) 2
(3) 1	(8) 4	(13) 3	(18) 3
(4) 2	(9) 1	(14) 4	(19) 3
(5) 3	(10) 2	(15) 1	(20) 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.

- (21) [2] An appropriate reflection of  $f(x)$  in the line  $y = x$  is sketched, and the coordinates of one point are stated correctly.

- [1] An appropriate graph is sketched, but no coordinates or incorrect coordinates are stated.

*or*

- [1] A reflection in some other line is sketched, but appropriate coordinates are stated.

*or*

- [1] An incorrect graph is sketched, based on an error in plotting one of the points, but appropriate coordinates are stated.

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

- (22) [2] 4, 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] The second root of the equation is found, but the sum of the roots is not calculated or is calculated incorrectly.

*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 B – *continued*

(23) [2] 30 and 150, 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] Appropriate work is shown, but only 30 or 150 is found.

**or**

[1] 30 and 150, but no work is shown.

[0] 30 *or* 150, but no work is shown.

**or**

[0] The value of  $\sin \theta$  is shown to be  $\frac{1}{2}$ .

**or**

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

(24) [2]  $\frac{15,120}{78,125}$  or 19.35% or an equivalent answer, and appropriate work is shown, such as  ${}_{7}C_{3}(.6)^3(.4)^4$ .

[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 expression, such as  ${}_{7}C_{3}(.6)^3(.4)^4$ , is written, but no further correct work is shown.

**or**

[1] An incorrect expression of equal difficulty is evaluated appropriately.

**or**

[1]  $\frac{15,120}{78,125}$  or 19.35% or an equivalent answer, 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 B – *continued*

(25) [2] \$1.48, and appropriate work is shown, such as providing a correctly labeled table or solving the equation  $(1.39)(1.005)^{12} = C$ .

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

*or*

[1] Appropriate work is shown, but one conceptual error is made, such as using 1.05 or 1.5 or using an incorrect exponent.

*or*

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

*or*

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

*or*

[1] \$1.48, 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.

(26) [2] 4, 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] 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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**Part III**

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.

(27) [4] (0,1) and (1,2), and a correct graph is drawn with at least one function labeled.

[3] Appropriate work is shown, but one graphing error is made, such as plotting one point incorrectly or not labeling either function.

***or***

[3] The graphs are drawn correctly, but only one correct solution is found or only the  $x$ - or the  $y$ -values are found correctly.

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

***or***

[2] (0,1) and (1,2), but the solution is found by a nongraphic method.

***or***

[2] The graphs are drawn correctly, but no correct solutions are found.

[1] The graph of only one equation is drawn correctly, and no further correct work is shown.

***or***

[1] (0,1) and (1,2), but no work is shown.

[0] (0,1) *or* (1,2), 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.

MATHEMATICS B – *continued*

- (28) [4] 5,513 and a correct diagram is drawn, and appropriate work is shown, such as using the Law of Cosines.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] 5,513, and appropriate work is shown, but no diagram is drawn.
- or***
- [3] Appropriate work is shown, but the calculations are performed in radians, resulting in an answer of 6,698.
- or***
- [3] An incorrect diagram is drawn, but an appropriate solution is found using the Law of Cosines.
- [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.
- or***
- [2] Appropriate work is shown, but an incorrect substitution is made into the Law of Cosines, but an appropriate solution is found.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [1] Correct substitution is made into the Law of Cosines, but no further correct work is shown.
- or***
- [1] A correctly labeled diagram is drawn, but no further correct work is shown.
- or***
- [1] 5,513, but no work is shown and no diagram 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.

MATHEMATICS B – *continued*

- (29) [4] 75, and appropriate work is shown, such as determining the mean (278.5833333) and the standard deviation for the sample (3.146667309).
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [3] Appropriate work is shown, but the standard deviation for the population ( $\sigma$ ) is used.
- or***
- [3] The mean, standard deviation for the sample, and interval are determined correctly, but an error is made in determining the percentage.
- or***
- [3] The mean and standard deviation for the sample are determined correctly, but an appropriate percentage is determined for an incorrect interval.
- [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.
- or***
- [2] The mean and standard deviation for the sample are determined correctly, but no further correct work is shown.
- or***
- [2] Either the mean or the standard deviation for the sample is determined incorrectly, but an appropriate percentage is found.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [1] The standard deviation for the sample is determined correctly, but no further correct work is shown.
- or***
- [1] 75, 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 B – *continued*

(30) [4]  $y = -34739.71292x + 313309.0909$  and 209,090, and appropriate work is shown.

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

***or***

[3] An incorrect linear equation with a negative slope is written, but an appropriate price is found for three blocks from the beach.

[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.

***or***

[2] A correct linear function is written, but no further correct work is shown.

***or***

[2] An incorrect linear equation with a positive slope is written, but an appropriate price is found for three blocks from the beach.

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

***or***

[1] 209,090, 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 B – *continued*

- (31) [4] 4.3–5.3, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made.
- or**
- [3] Appropriate work is shown, but the answer is not stated as an interval.
- or**
- [3] Appropriate work is shown, but the answer is expressed in inches.
- [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.
- or**
- [2] An appropriate inequality, such as  $-3.25 \leq \frac{h - 57.5}{2} \leq 3.25$ , is written, 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] Only half of the inequality is solved, but an appropriate answer is found and expressed to the nearest tenth of a foot.
- or**
- [1] 4.3–5.3, 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.

MATHEMATICS B – *continued*

(32) [4] A correct table of values is provided, a correct graph is drawn, and 670; 12, and appropriate work is shown, such as extending the graph or solving algebraically.

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

***or***

[3] A correct table of values is provided, a correct graph is drawn, and 670, but no further correct work is shown.

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

***or***

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

***or***

[2] 670 and 12, but an algebraic solution is provided.

***or***

[2] 670 and 12, but either the graph is not drawn or the table of values is not provided.

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

***or***

[1] A correct graph is drawn, but no further correct work is shown.

***or***

[1] A correct table of values is provided, but no further correct work is shown.

***or***

[1] 670 and 12, but no work is shown and no graph is drawn.

[0] 670 *or* 12, but no work is shown and no graph is 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 IV**

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

- (33) [6] A complete and correct proof is shown.
- [5] Appropriate work is shown, but one computational error is made.
- or***
- [5] Appropriate work is shown, but the final conclusion is not justified or is justified incorrectly.
- [4] Appropriate work is shown, but two or more computational errors are made.
- or***
- [4] Appropriate work is shown to prove *TEAM* is a parallelogram and not a square, but no work is shown to prove it is a rhombus.
- or***
- [4] Appropriate work is shown to prove *TEAM* is a rhombus, and partial work is shown to prove *TEAM* is not a square, but the conclusion is not adequately justified.
- [3] Appropriate work is shown to prove *TEAM* is a rhombus, but no further correct work is shown.
- or***
- [3] Appropriate work is shown to prove *TEAM* is not a square, but an incorrect method is used to prove *TEAM* is a rhombus.
- or***
- [3] An accurate explanation of the process required to complete the proof is stated, and needed formulas are given, but no further correct work is shown.
- [2] Appropriate work is shown to prove *TEAM* is a parallelogram, but no further correct work is shown.
- [1] A complete explanation of the method of the proof is written, but no further correct work is shown.
- or***
- [1] A statement that *TEAM* is not a square and a correct reason are written, but no further correct 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 B – *continued*

- (34) [6] A correct diagram is drawn and 134, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- or***
- [5] 134, and appropriate work is shown, but the diagram is not drawn or is drawn incorrectly.
- [4] Appropriate work is shown, but two or more computational or rounding errors are made.
- or***
- [4] A correct diagram is drawn and one correct equation using the Law of Sines is solved appropriately, but no further correct work is shown.
- [3] Appropriate work is shown, but one conceptual error is made.
- or***
- [3] An incorrect diagram is drawn, but an appropriate solution with an equal degree of difficulty is provided.
- or***
- [3] A correct diagram is drawn and correct equations are written, but no further correct work is shown.
- [2] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or***
- [2] A correct diagram is drawn, but only one correct trigonometric equation is written, and no further correct work is shown.
- [1] A correct diagram is drawn, but no further correct work is shown.
- or***
- [1] An incorrect diagram is drawn, but one correct trigonometric equation is solved appropriately.
- or***
- [1] 134, but no work is shown and no diagram 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.
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**Map to Learning Standards**

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

**Regents Examination in Mathematics B**

**January 2005**

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

*The Chart for Determining the Final Examination Score for the January 2005 Regents Examination in Mathematics B, normally located on this page, will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> on Friday, January 28, 2005. Conversion charts provided for previous administrations of the Mathematics B examination must NOT be used to determine students’ final scores for this administration.*



