

# FOR TEACHERS ONLY

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

## ALGEBRA 2/TRIGONOMETRY

Tuesday, June 15, 2010 – 9:15 a.m. to 12:15 p.m., only

### SCORING KEY AND RATING GUIDE

#### Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra 2/Trigonometry. More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Algebra 2/Trigonometry*.

Use only a No. 2 pencil in rating the Regents Examination in Algebra 2/Trigonometry. Do *not* attempt to correct the student's work by making insertions or changes of any kind. Scoring overlays have been included in the package of scoring materials and must be used to score Part I, the multiple-choice section. When scoring the examination:

- **cut out** the rectangular space on the bottom of the scoring overlay to record the total Part I score
- **do not** punch holes in the scoring overlay
- **do not** make any marks on the answer sheet, other than in the spaces provided for recording scores
- **do not** machine scan the answer sheets. Marking up or scanning these answer sheets will interfere with the score collection.

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 write their name in the box under the heading "Rater's/Scorer's Name," and also bubble in the circle under "Rater's/Scorer's Code Letter" that corresponds to their name.

Raters should record the student's scores for all questions and the total raw score on the student's answer sheet. Make a careful record to be retained in the school of the total raw score earned by each student. The State Education Department will provide a recordkeeping form for this purpose as part of the detailed directions for administering and scoring the June 2010 Regents Examination in Algebra 2/Trigonometry.

The conversion chart for the Regents Examination in Algebra 2/Trigonometry will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> no later than Rating Day, Thursday, June 24, 2010.

**Part I**

Allow a total of 54 credits, 2 credits for each of the following:

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

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 Examination in Algebra 2/Trigonometry 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 Examination in Algebra 2/Trigonometry*, 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, graphs, 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.

(28) [2] 4 and  $-4$ , and appropriate work using the discriminant 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 one value of  $k$  is found.

*or*

[1]  $k^2 - 4(1)(4) = 0$  or an equivalent equation, but no further correct work is shown.

*or*

[1] 4 and  $-4$ , but a method other than the discriminant is used.

*or*

[1] 4 and  $-4$ , but no work is shown.

[0] 4 or  $-4$ , 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.

(29) [2] 7.4

[1] One rounding error is made.

*or*

[1] One conceptual error is made, such as stating 7.5, the sample standard deviation.

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

- (30) [2] Sum =  $-\frac{11}{5}$  and product =  $-\frac{3}{5}$  or an equivalent answer, and appropriate work is shown, such as stating the formulas.

[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 the answers are not labeled or are labeled incorrectly.

*or*

[1] Appropriate work is shown to find sum =  $-\frac{11}{5}$  or product =  $-\frac{3}{5}$ , but no further correct work is shown.

*or*

[1] Sum =  $-\frac{11}{5}$  and product =  $-\frac{3}{5}$ , but no work is shown.

[0]  $-\frac{11}{5}$  and  $-\frac{3}{5}$ , 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.

- (31) [2] A correct graph is drawn, and  $y = 0$ .

[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 graph is drawn, and  $x$ -axis is stated as the asymptote.

*or*

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

*or*

[1]  $y = 0$ , 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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(32) [2]  $-x\sqrt{3x}$ , 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, such as not expressing the answer in simplest radical form.

*or*

[1]  $-x\sqrt{3x}$ , 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.

(33) [2] An angle in standard position is drawn correctly and  $-\frac{\sqrt{3}}{2}$ .

[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 stating the value of  $\sin 240$  to be  $-0.866$ .

*or*

[1] An angle in standard position is drawn correctly, but no further correct work is shown.

*or*

[1]  $-\frac{\sqrt{3}}{2}$ , 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.

(34) [2] 604, and appropriate work is shown.

[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.

*or*

[1] 604, but no work is shown.

[0] Appropriate work is shown to find 720, but no further 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.

(35) [2]  $\frac{d-8}{5}$ , 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]  $\frac{d-8}{5}$ , 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.

**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.

(36) [4] 0.167, and appropriate work is shown.

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

[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 finding at most 8 black vests.

*or*

[2] A correct expression, such as  ${}_{10}C_8(0.6)^8(0.4)^2 + {}_{10}C_9(0.6)^9(0.4)^1 + {}_{10}C_{10}(0.6)^{10}(0.4)^0$ , 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] The probability for *exactly* eight times is calculated correctly.

*or*

[1] 0.167, 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.

- (37) [4] 0, 60, 180, and 300, and appropriate work is shown.
- [3] Appropriate work is shown, but one computational, factoring, or substitution error is made.
- or*
- [3] Appropriate work is shown, but only three of the four correct solutions are found.
- [2] Appropriate work is shown, but two or more computational, factoring, or substitution errors are made.
- or*
- [2] Appropriate work is shown, but one conceptual error is made.
- or*
- [2] Appropriate work is shown, but only two of the four correct solutions are found.
- or*
- [2] Appropriate work is shown, and  $\sin \theta = 0$  and  $2 \cos \theta - 1 = 0$  is written, but no further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational, factoring, or substitution error are made.
- or*
- [1] Appropriate work is shown, and  $\sin \theta (2 \cos \theta - 1) = 0$  is written, but no further correct work is shown.
- or*
- [1] 0, 60, 180, and 300, but no work is shown.
- [0] A correct substitution is made for  $\sin 2\theta$ , but no further correct work is shown.
- or*
- [0] 0 or 60 or 180 or 300, 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.

(38) [4] No, and an appropriate justification is given, such as comparing  $7!$  for Vermont to  $\frac{9!}{4!2!2!}$  for Tennessee.

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

*or*

[3] Appropriate work is shown to find 5,040 and 3,780, but No is not stated.

[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] Appropriate work is shown to find 3,780, but no further correct work is shown.

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

*or*

[1] Appropriate work is shown to find 5,040, but no further correct work is shown.

*or*

[1] 5,040 and 3,780 and No, but no work is shown.

[0] 5,040 and 3,780, 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.

**Part IV**

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

- (39) [6] 33, and appropriate work is shown.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- [4] Appropriate work is shown, but two computational or rounding errors are made.
- or*
- [4] Appropriate work is shown, but one conceptual error is made.
- [3] Appropriate work is shown, but three or more computational or rounding errors are made.
- or*
- [3] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.
- or*
- [3] Appropriate work is shown to find the third side, but no further correct work is shown.
- [2] Appropriate work is shown, but one conceptual error and two or more computational or rounding errors are made.
- or*
- [2] Appropriate work is shown, but two conceptual errors are made.
- or*
- [2] Incorrectly uses the proportion  $\frac{10}{\sin 80} = \frac{6}{\sin x}$  or  $\frac{6}{\sin 80} = \frac{10}{\sin x}$  to find the smallest angle.
- [1] Appropriate work is shown, but two conceptual errors and one computational or rounding error are made.
- or*
- [1] A correct substitution is made into the Law of Cosines, but no further correct work is shown.
- or*
- [1] 33, 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 Core Curriculum**

<b>Content Strand</b>	<b>Item Numbers</b>
Number Sense and Operations	6, 12, 19, 32
Algebra	1, 3, 4, 5, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 20, 22, 23, 24, 25, 26, 27, 28, 30, 31, 33, 34, 35, 37, 39
Measurement	2
Statistics and Probability	7, 21, 29, 36, 38

**Regents Examination in Algebra 2/Trigonometry****June 2010****Chart for Converting Total Test Raw Scores to  
Final Examination Scores (Scale Scores)**

***The Chart for Determining the Final Examination Score for the June 2010 Regents Examination in Algebra 2/Trigonometry will be posted on the Department’s web site <http://www.emsc.nysed.gov/osa/> no later than Rating Day, Thursday, June 24, 2010.***

**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 <http://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.