

FOR TEACHERS ONLY

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

GEOMETRY (Common Core)

Thursday, January 28, 2016 — 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 Geometry (Common Core). More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Geometry (Common Core)*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the open-ended questions, use check marks 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. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Thursday, January 28, 2016. Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

If the student’s responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Part I

Allow a total of 48 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	(9) 4	(17) 4
(2) 4	(10) 2	(18) 1
(3) 3	(11) 4	(19) 2
(4) 2	(12) 3	(20) 4
(5) 3	(13) 1	(21) 3
(6) 1	(14) 3	(22) 2
(7) 2	(15) 2	(23) 1
(8) 1	(16) 3	(24) 3

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 at: <http://www.p12.nysed.gov/assessment/> and select the link “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.

The Department is providing supplemental scoring guidance, the “Model Response Set,” for the Regents Examination in Geometry (Common Core). This guidance is intended to be part of the scorer training. Schools should use the Model Response Set along with the rubrics in the Scoring Key and Rating Guide to help guide scoring of student work. While not reflective of all scenarios, the Model Response Set illustrates how less common student responses to constructed-response questions may be scored. The Model Response Set will be available on the Department’s web site at: <http://www.nysedregents.org/geometrycc/>.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Geometry (Common Core) 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 Geometry (Common Core)*, use their own professional judgment, confer with other mathematics teachers, and/or contact 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 a 4-credit question and no more than 3 credits should be deducted in a 6-credit question. 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.

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.

For 4- and 6-credit questions, 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. Refer to the rubric for specific scoring guidelines.

Part II

For each question, use the specific criteria to award a maximum of 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

- (25) [2] Triangle $A'B'C'$ is graphed and labeled correctly.
- [1] One graphing error is made, but appropriate vertices are graphed and labeled.
- or**
- [1] One conceptual error is made, such as reflecting $\triangle ABC$ over the line $y = 1$, but appropriate vertices are graphed and labeled.
- or**
- [1] The image of $\triangle ABC$ is graphed correctly, but is not labeled or is labeled incorrectly.
- [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] 120 or an equivalent radian measure is found, and appropriate work is shown, such as a labeled 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] $m\widehat{DB} = 60^\circ$, $m\widehat{AC} = 60^\circ$, and $m\widehat{AB} = 120^\circ$, but no further correct work is shown.
- or**
- [1] $m\angle ABO$ and $m\angle BAO = 30^\circ$, but no further correct work is shown.
- or**
- [1] $m\angle AOB = 120^\circ$, 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.

- (27) [2] (2,5), and correct work is shown.
- [1] Appropriate work is shown, but one computational error is made. Appropriate coordinates are stated.
- or*
- [1] Appropriate work is shown, but one conceptual error is made. Appropriate coordinates are stated.
- or*
- [1] Appropriate work is shown to find 2 and 5, but the answer is not written as coordinates.
- or*
- [1] Point J is graphed correctly, but the coordinates are not stated or are stated incorrectly.
- or*
- [1] (2,5), 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.
- (28) [2] Yes, and a correct explanation is written.
- [1] Yes, and an incomplete explanation is stated.
- or*
- [1] Yes, and a correct sequence of transformations is written.
- or*
- [1] Yes, and a statement other than properties of rigid motions is used.
- [0] Yes or an equivalent statement is stated, but no explanation is written.
- 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] 32, and correct 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] $\sin 70 = \frac{30}{x}$ or $\cos 20 = \frac{30}{x}$ is written, 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.

(30) [2] A, and correct work is shown.

[1] Appropriate work is shown, but one computational error is made. An appropriate petri dish is stated.

or

[1] Appropriate work is shown, but one conceptual error is made. An appropriate petri dish is stated.

or

[1] Appropriate work is shown to find the population density of each petri dish, but no petri dish or an incorrect petri dish is stated.

[0] A, 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]** $y = 3x - 8$ or an equivalent equation is written, and correct 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] $y = 3x - 8$, 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 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

- (32) [4] 42, and correct work is shown.
- [3] Appropriate work is shown, but one computational or rounding error is made. An appropriate screen size is found, to the *nearest inch*.
- or**
- [3] Correct work is shown to find the width. The diagonal 42 is stated, but no work is shown.
- or**
- [3] Correct work is shown to find the diagonal for 16 by 9 dimensions. The diagonal 42 is stated, but no work is shown.
- [2] Appropriate work is shown, but two or more computational or rounding errors are made. An appropriate screen size is found, to the *nearest inch*.
- or**
- [2] Appropriate work is shown, but one conceptual error is made. An appropriate screen size is found, to the *nearest inch*.
- or**
- [2] Correct work is shown to find the width, but no further correct work is shown.
- or**
- [2] Using the aspect ratio 16:9 ($w:h$), correct work is shown to find the diagonal for 16 by 9 dimensions. No further correct work is shown.
- [1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made. An appropriate screen size is found, to the *nearest inch*.
- or**
- [1] 42, 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) [4] All four reasons are correct.

[3] Three reasons are correct.

[2] Two reasons are correct.

[1] One reason is correct.

[0] No reasons are correct.

(34) [4] A correct construction of $\triangle ABC \cong \triangle XYZ$ is drawn showing all construction arcs. A correct theorem is stated to justify why the triangles are congruent.

[3] An appropriate construction of the congruent triangle is drawn, but one construction error is made. A correct theorem is stated to justify why the triangles are congruent.

or

[3] A correct construction of $\triangle ABC \cong \triangle XYZ$ is drawn. No theorem is stated or an incorrect theorem, based upon the construction, is stated.

or

[3] An appropriate construction of a congruent triangle is drawn, but the triangle is not labeled or is labeled incorrectly. A correct theorem is stated to justify why the triangles are congruent.

[2] An appropriate construction of a congruent triangle is drawn, but one construction error is made. No theorem is stated or an incorrect theorem, based upon the construction, is stated.

or

[2] An appropriate construction of a congruent triangle is drawn. The triangle is not labeled or is labeled incorrectly. No theorem is stated or an incorrect theorem, based upon the construction, is stated.

[1] All appropriate construction arcs are drawn, but the triangle is not drawn. No further correct work is shown.

or

[1] An appropriate congruency theorem is stated, but a drawing that is not an appropriate construction is shown.

[0] A triangle congruency theorem is stated, 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 each question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

- (35) [6] A complete and correct proof that includes concluding statements is written.
- [5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement and/or reason is missing or incorrect.
- [4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements and/or reasons are missing or incorrect.
- [3] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but three statements and/or reasons are missing or incorrect.
- or*
- [3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.
- or*
- [3] A proof is written that shows $\triangle ANW \cong \triangle DRE$, but no further correct work is shown.
- or*
- [3] A proof is written that shows $AWDE$ is a parallelogram, but no further correct work is shown.
- [2] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but four statements and/or reasons are missing or incorrect.
- [1] One correct relevant statement and reason about the proof are written.
- [0] The “given” and/or the “prove” statements are written, but no further correct relevant statements are written.
- or*
- [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

- (36) [6] 13.6, and correct work is shown.
- [5] Appropriate work is shown, but one computational or rounding error is made.
- or**
- [5] Correct work is shown, but the height of the survey instrument is not added to the flagpole height.
- [4] Appropriate work is shown, but two computational or rounding errors are made.
- or**
- [4] Correct work is shown to find the distance between the second sighting and the flagpole. No further correct work is shown.
- [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 is made.
- or**
- [3] The equation $(x + 8)(\tan 34.9) = x(\tan 52.8)$ or an equivalent equation is written. 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] Equations $\tan 52.8 = \frac{h}{x}$ and $\tan 34.9 = \frac{h}{x + 8}$ are written. No further correct work is shown.
- [1] The equation $\tan 52.8 = \frac{h}{x}$ or $\tan 34.9 = \frac{h}{x + 8}$ is written. No further correct work is shown.
- or**
- [1] 13.6, 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 the Common Core Learning Standards
Geometry (Common Core)
January 2016**

Question	Type	Credits	Cluster
1	Multiple Choice	2	G-GMD.B
2	Multiple Choice	2	G-GPE.B
3	Multiple Choice	2	G-CO.C
4	Multiple Choice	2	G-GMD.A
5	Multiple Choice	2	G-CO.B
6	Multiple Choice	2	G-CO.C
7	Multiple Choice	2	G-GMD.A
8	Multiple Choice	2	G-CO.A
9	Multiple Choice	2	G-SRT.C
10	Multiple Choice	2	G-SRT.A
11	Multiple Choice	2	G-CO.A
12	Multiple Choice	2	G-C.B
13	Multiple Choice	2	G-SRT.B
14	Multiple Choice	2	G-MG.A
15	Multiple Choice	2	G-GPE.B
16	Multiple Choice	2	G-SRT.C
17	Multiple Choice	2	G-GPE.A
18	Multiple Choice	2	G-GPE.B
19	Multiple Choice	2	G-MG.A
20	Multiple Choice	2	G-SRT.B
21	Multiple Choice	2	G-C.A
22	Multiple Choice	2	G-SRT.B
23	Multiple Choice	2	G-MG.A
24	Multiple Choice	2	G-SRT.B
25	Constructed Response	2	G-CO.B
26	Constructed Response	2	G-C.A
27	Constructed Response	2	G-GPE.B
28	Constructed Response	2	G-CO.B
29	Constructed Response	2	G-SRT.C
30	Constructed Response	2	G-MG.A
31	Constructed Response	2	G-SRT.A
32	Constructed Response	4	G-SRT.C
33	Constructed Response	4	G-CO.C
34	Constructed Response	4	G-CO.D
35	Constructed Response	6	G-CO.C
36	Constructed Response	6	G-SRT.C

Regents Examination in Geometry (Common Core)

January 2016

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

The *Chart for Determining the Final Examination Score for the January 2016 Regents Examination in Geometry (Common Core)* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Thursday, January 28, 2016. Conversion charts provided for previous administrations of the Regents Examination in Geometry (Common Core) must NOT be used to determine students' final scores for this administration.

Online Submission of 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.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm>.
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.

