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The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12234

INFORMATION BOOKLET FOR SCORING THE REGENTS EXAMINATION IN ALGEBRA 2/TRIGONOMETRY JUNE 15, 2010 ADMINISTRATION

GENERAL INFORMATION

The general procedures to be followed in administering the June 2010 Regents Examination in Algebra 2/Trigonometry are provided in the publication *Directions for Administering and Scoring the Regents Examination in Algebra 2/Trigonometry* (DET 548). Copies of the *Directions* will be sent to schools prior to the June 2010 Regents Examination period and may also be accessed on the Department's web site at: <http://www.emsc.nysed.gov/osa/hsgen.html>.

Questions about **general administration procedures** for Regents Examinations should be directed to the Office of State Assessment at 518-474-8220 or 518-474-5902. For information about the **rating** of the Regents Examination in Algebra 2/Trigonometry, contact the Office of State Assessment at 518-474-5900.

School administrators should print or photocopy this information booklet and distribute copies to all school personnel who will be scoring the Regents Examination in Algebra 2/Trigonometry.

SCORING THE EXAMINATION

The Regents Examination in Algebra 2/Trigonometry is to be scored by committees of mathematics teachers. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. The committee must be comprised of at least three teachers. Each of these teachers is responsible for scoring a similar number of the open-ended questions. The more teachers serving on a committee, the fewer open-ended questions each teacher scores. This process yields consistent and reliable scores and allows scoring to proceed quickly.

For the June 2010 administration, a scoring overlay is provided that includes the answers to the Part I multiple-choice questions. A rating guide is also provided that includes the rubrics for scoring each of the open-ended questions. Teachers must become thoroughly familiar with the rubrics for the open-ended questions they are scoring before beginning to score student responses to examination questions.

The answer sheets provided to all schools by the Department's contractor, Pearson, for the June 2010 examination contain a table with spaces for recording the Part I score; the score for each question in Parts II, III, and IV; and the total-test raw score.

Multiple-choice questions must be hand scored using the scoring overlay provided in the package of scoring materials. Teachers of subjects other than mathematics may score the multiple-choice questions and tabulate students' total raw scores; this will enable the mathematics teachers to focus on scoring the students' responses to the open-ended questions.

When scoring the June 2010 Regents Examination in Algebra 2/Trigonometry:

- use only a No. 2 pencil
- use scissors to cut out the rectangle as indicated on the bottom of the scoring overlay, but do not make any perforations elsewhere on the scoring overlay

- **do not** make any marks on the Pearson answer sheet, other than in the spaces provided for recording scores, scorer names, and code letters denoting the scorer for Part I and for each open-ended question in Parts II, III, and IV.
- **do not** machine scan the Pearson answer sheets. Marking up or scanning these answer sheets will interfere with the Department's score collection.
- take extreme care in recording the student's scores on each part of the examination and adding these scores to determine the total-test raw score
- make a careful record of each student's total raw score on the form provided for this purpose in the *Directions for Administering and Scoring the Regents Examination in Algebra 2/Trigonometry*
- make a photocopy of each student's answer sheet after the student's scores for all questions have been recorded on it

DETERMINING THE STUDENT'S FINAL EXAMINATION SCORE

The Score Conversion Chart for this examination will be made available on the Department's web site no later than Thursday, June 24, which is the Rating Day for the June 2010 examination period. The conversion chart, which enables teachers to convert the raw score to the scale score, will be provided on the Department's web site at: <http://www.emsc.nysed.gov/osa/concht/home.html>. Because the scale scores corresponding to raw scores in the Score Conversion Chart change from one examination administration to another, it is *crucial* that, for each administration, you use *only* the conversion chart provided for that administration to determine the student's final score. Use the school's record of each student's total raw score and the conversion chart to obtain the correct scale score.

It is recommended that once the conversion chart has been posted, all student answer papers with a scale score of 60-64 be scored a second time to ensure the accuracy of the score. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper. However, *no* teacher may score the same open-ended questions that he or she scored in the first rating of the paper. It is the responsibility of the school principal to ensure that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

When the teacher scoring committee completes the scoring process, test scores must be considered final and must be entered onto students' permanent records. In addition, each rater must sign the Examination Scoring Certificate attesting that he or she fully and faithfully observed the rules and regulations for scoring the examinations. The principal must also sign to attest that the rules and regulations for scoring were fully and faithfully observed.

Principals and other administrative staff in a school or district do not have the authority to set aside the scores arrived at by the teacher scoring committee and rescore student examination papers or to change any scores assigned through the procedures described in this manual and in the scoring materials provided by the Department. Any principal or administrator found to have done so, except in the circumstances described below, will be in violation of Department policy regarding the scoring of State examinations. Teachers and administrators who violate Department policy with respect to scoring State examinations may be subject to disciplinary action in accordance with Sections 3020 and 3020-a of Education Law or to action against their certification pursuant to Part 83 of the Regulations of the Commissioner of Education.

On rare occasions, an administrator may learn that an isolated error occurred in the calculation of a final score for a student or in recording students' scores in their permanent records. For example, the final score may have been based on an incorrect summing of the student's raw scores for parts of the test or from a misreading of the conversion chart. When such errors involve no more than five students' final scores on any Regents Examination and when such errors are detected within four months of the test date,

the principal may arrange for the corrected score to be recorded in the student's permanent record. However, in all such instances, the principal must advise the Office of State Assessment in writing that the student's score has been corrected. The written notification to the Department must be signed by the principal or superintendent and must include the names of the students whose scores have been corrected, the name of the examination, the students' original and corrected scores, and a brief explanation of the nature of the scoring error that was corrected.

If an administrator has substantial reason to believe that the teacher scoring committee has failed to accurately score more than five student answer papers on any examination, the administrator must first obtain permission in writing from the Office of State Assessment before arranging for or permitting a rescoring of student papers. The written request to the Office of State Assessment must come from the superintendent of a public school district or the chief administrative officer of a nonpublic or charter school and must include the examination title, date of administration, and number of students whose papers would be subject to such rescoring. This request must also include a statement explaining why the administrator believes that the teacher scoring committee failed to score appropriately and, thus, why he or she believes rescoring the examination papers is necessary. As part of this submission, the school administrator must make clear his or her understanding that such extraordinary re-rating may be carried out only by a full committee of teachers constituted in accordance with the scoring guidelines presented above and fully utilizing the scoring materials for this test provided by the Department.

The Department sometimes finds it necessary to notify schools of a revision to the scoring key and rating guide for an examination. Should this occur after the scoring committee has completed its work, the principal is authorized to have appropriate members of the scoring committee review students' responses only to the specific question(s) referenced in the notification and to adjust students' final examination scores when appropriate. Only in such circumstances is the school not required to notify or obtain approval from the Department to correct students' final examination scores.

Specific Information for Scoring the Regents Examination in Algebra 2/Trigonometry

The information below refers to the scoring of open-ended questions on the Regents Examination in Algebra 2/Trigonometry.

The open-ended questions (Parts II, III, and IV) on the Regents Examination in Algebra 2/Trigonometry should be scored in accordance with these guidelines:

- If the student gives one legible response, even if it is crossed out, teachers should score the response.
- If there are two or more responses with all but one crossed out, teachers should score only the response not crossed out.
- If there are one or more partial responses and one complete response, teachers should score the complete response. No credit is deducted for incorrect startups.
- If there are two or more complete responses, teachers should score each one. Credit will be allocated in the following way:

If one response is completely correct and the others are completely incorrect, teachers should award 50% credit (3 credits for a 6-credit question, 2 credits for a 4-credit question, and 1 credit for a 2-credit question).

If each response warrants more than 50%, the lesser of the responses is awarded credit. (For example, if a 4-credit question is done two ways, with one worth 4 credits and another worth 3 credits, the student should be awarded 3 credits for the question.)

- If the question requires the student to include units of measure, full credit cannot be awarded if the student omits the unit. Students may include the appropriate unit of measure even if it is not required.

Examples:

If the question asks for the number of feet in the length of a figure, no unit is required in the answer.

If the question asks for the dimensions of a figure, the proper unit of measure is required in the answer in order to receive full credit.

The rubric will specify how much credit is awarded if units are not used when required.

- If a student gives only a correct numerical answer to a problem but does not show how he or she arrived at the answer, the student will be awarded only 1 credit. All open-ended questions require the student to show work. If the question has only one part, this rule is straightforward, but this rule needs some clarification for multiple-part questions.

The rubric of a multiple-part question will specify credit for various amounts of work shown.

- Students should receive 0 credit if the solution is completely incorrect, irrelevant, or incoherent or if a correct response was arrived at using an obviously incorrect procedure.

This last statement is illustrated by a student who, when asked to find one leg of a right triangle if the hypotenuse is 5 and the other leg is 3, gives a correct response of 4 by showing that 4 is the average of 3 and 5.

The method of solution must be obviously incorrect to warrant a score of 0.

In some cases, the rubric will specifically state which responses should receive a score of 0.

- Students who use trial and error to solve a problem must show their method. Merely showing that the answer checks or is correct is not considered a complete response for full credit. Most rubrics will address this issue directly.

Sample Question 1 – Algebra 2/Trigonometry

A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Find how many different committees can be formed if 2 members must be teachers and 3 members must be students.

Rubric

[2] 41,040, 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] ${}^9C_2 \cdot {}^{20}C_3$, but no further correct work is shown.

or

[1] 41,040, 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.

Student Response

$${}^9C_2 \cdot {}^{20}C_3$$

$$36 \cdot 1140 = 41040$$

Comment

Score: 2

The student has a complete and correct response.

Student Response

$$\begin{array}{r} 9C_2 \cdot 20C_3 \quad 1176 \\ 9C_2 + 20C_3 \\ 36 \quad 1140 = \textcircled{1176} \end{array}$$

Comment

Score: 1

The student has made one conceptual error.

Student Response

$$\begin{array}{r} 9P_2 \quad 20P_3 \\ 72 + 6840 \\ 6912 \end{array}$$

Comment

Score: 0

The student's response was completely incorrect.

Sample Question 2 – Algebra 2/Trigonometry

Solve the equation $8x^3 + 4x^2 - 18x - 9 = 0$ algebraically for all values of x .

Rubric

[4] $\pm\frac{3}{2}, -\frac{1}{2}$ or an equivalent answer, and appropriate algebraic work is shown.

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

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

or

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

or

[2] $(4x^2 - 9)(2x + 1) = 0$ is found, but no further correct work is shown.

or

[2] $\pm\frac{3}{2}, -\frac{1}{2}$, but a method other than algebraic is used.

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

or

[1] $4x^2(2x + 1) - 9(2x + 1) = 0$ is found, but no further correct work is shown.

or

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

Student Response

$$8x^3 + 4x^2 - 18x - 9 = 0$$

$$4x^2(2x+1) - 9(2x+1) = 0$$

$$(4x^2 - 9)(2x+1) = 0$$

$$(2x+1)(2x+3)(2x-3) = 0$$

$$2x+1=0$$

$$2x = -1$$

$$x = -\frac{1}{2}$$

$$2x+3=0$$

$$2x = -3$$

$$x = -\frac{3}{2}$$

$$2x-3=0$$

$$2x = 3$$

$$x = \frac{3}{2}$$

Comment

Score: 4

The student has a complete and correct response.

Student Response

$$4x^2(2x+1) - 9(2x+1) = 0$$

$$(4x^2 - 9)(2x+1) = 0$$

$$4x^2 - 9 = 0$$

$$4x^2 = 9$$

$$x^2 = \frac{9}{4}$$

$$x = \sqrt{\frac{9}{4}}$$

$$x = \frac{3}{2}$$

$$2x+1 = 0$$

$$2x = -1$$

$$x = -\frac{1}{2}$$

Comment

Score: 3

The student has made one computational error.

Student Response

$$8x^3 + 4x^2 = 18x + 9$$

$$4x^2(\cancel{2x+1}) = 9(\cancel{2x+1})$$

$$4x^2 = 9$$

$$x^2 = \frac{9}{4}$$

$$x = \pm \frac{3}{2}$$

Comment

Score: 2

The student has made one conceptual error.

Student Response

$$8x^3 + 4x^2 - 18x - 9 = 0$$

$$4x^2(2x+1) - 9(2x+1) = 0$$

Comment

Score: 1

The student has the correct quadratic equation set equal to zero, but no further correct work is shown.

Student Response

$$8x^3 + 4x^2 - 18x - 9 = 0$$

$$2x(4x^2 + 2x - 9) - 9 = 0$$

Comment

Score: 0

The student's response is completely incorrect.

Sample Question 3 – Algebra 2/Trigonometry

Two forces of 25 newtons and 85 newtons acting on a body form an angle of 55° .

Find the magnitude of the resultant force, to the *nearest hundredth of a newton*.

Find the measure, to the *nearest degree*, of the angle formed between the resultant and the larger force.

Rubric

[6] 101.43 and 12, 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.

or

[4] The magnitude of the resultant force is found correctly, but 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 and one computational or rounding error are made.

[2] Appropriate work is shown, but two conceptual errors are made.

or

[2] 101.43 and 12, but no work is shown.

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

or

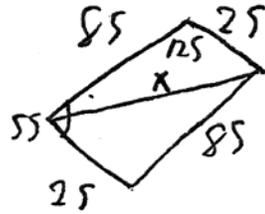
[1] A correct substitution is made into the Law of Cosines, but no further correct work is shown.

or

[1] 101.43 or 12, 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.

Student Response



$$x^2 = (85)^2 + (25)^2 - 2(85)(25)\cos 125^\circ$$

$$x = 101.43 \text{ degrees}$$

$$\frac{\sin(125^\circ)}{101.43} = \frac{\sin(x)}{25}$$

$$\sin(x) = \frac{25 \sin(125^\circ)}{101.43}$$

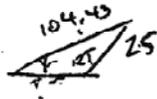
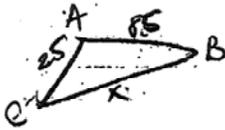
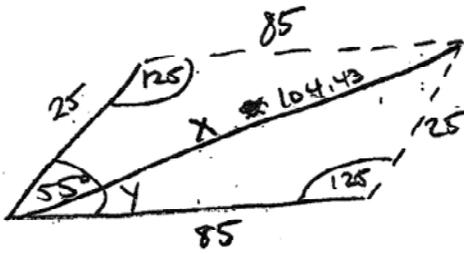
$$x = 12^\circ$$

Comment

Score: 6

The student has a complete and correct response.

Student Response



$$X^2 = 25^2 + 85^2 - 2(25)(85)\cos 125$$
$$7205 = 10287.5 - 6875\cos Y$$
$$X \approx 101.43 \text{ Newtons}$$

$$\frac{\sin Y}{25} = \frac{\sin 125}{104.43}$$

$$\sin Y = .196007479$$

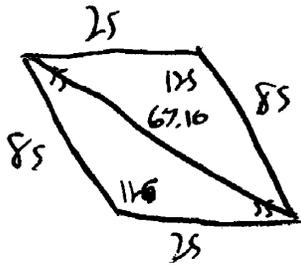
$$Y \approx 11^\circ$$

Comment

Score: 5

The student has made one computational error.

Student Response



$$c^2 = 85^2 + 25^2 - 2(85)(25)\cos(116^\circ)$$

$$c^2 = 4502.21$$

$$c = 67.10$$

$$\frac{\sin 116^\circ}{67.10} = \frac{\sin x}{25}$$

$$\sin x = .365$$

$$x = 21.8^\circ$$

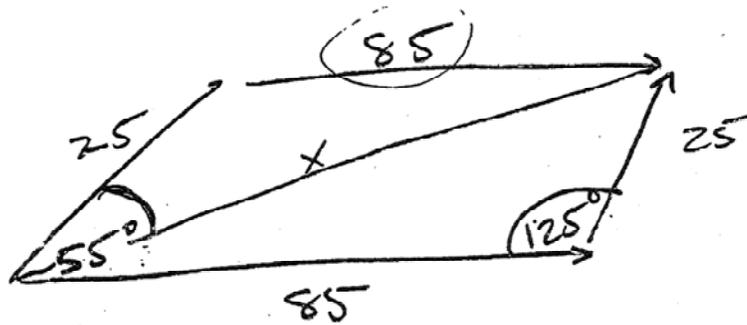
119

Comment

Score: 4

The student has made one computational and one rounding error.

Student Response



$$\frac{-180}{85} \\ \frac{55}{125}$$

$$a^2 = b^2 + c^2 - 2bc \cos 125$$

$$a^2 = 25^2 + 85^2 - 2(25)(85) \cos 125$$

$$a^2 = 625 + 7225 - 50 \cdot 85 \cos 125$$

$$a^2 = 7850 - 4250 \cos 125$$

$$(-.57)$$

$$a^2 = 7850 + 2422.5$$

$$a^2 = \sqrt{10272.5}$$

$$a = 101.353$$

$$a = 101.35 \text{ Newtons}$$

$$\frac{101.35}{\sin 125} = \frac{85}{\sin X}$$

$$.8191 \cdot 85 = 101.35 \sin X$$

$$\frac{69.627}{101.35} = \frac{101.35 \sin X}{101.35}$$

$$\sin X = .687$$

$$X = 43.39$$

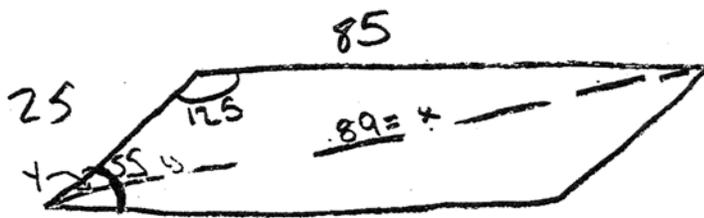
$X = 43^\circ$

Comment

Score: 3

The student has made three or more computational or rounding errors.

Student Response



85

$$x^2 = 85^2 + 25^2 - 2(25)(85)\cos 125$$

$$x^2 = 7878.678822$$

$$x = 88.8$$

$$x = 89$$

$$\frac{\sin 125}{89} = \frac{\sin y}{85}$$

$$\frac{85 \sin 125}{89} = \sin y$$

$$0.7823362221 = \sin y$$

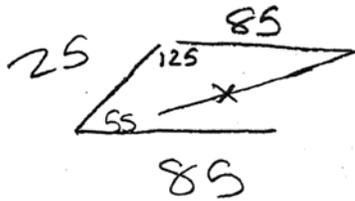
$$51 = y$$

Comment

Score: 2

The student has made one conceptual, one rounding, and one copying error.

Student Response



$$\begin{array}{r} 1710 \\ \cancel{180} \\ - 35 \\ \hline 125 \end{array}$$

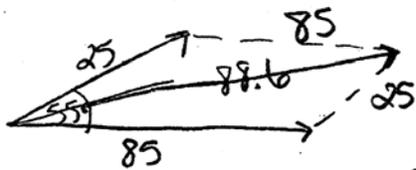
$$x^2 = 25^2 + 85^2 - 2(25)(85) \cos 125$$

Comment

Score: 1

The student has made a correct substitution into the Law of Cosines, but no further work is correct.

Student Response

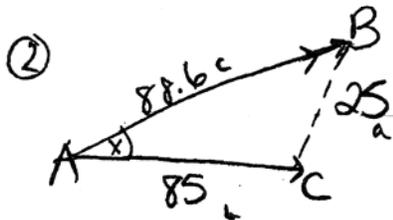


$$25^2 + 85^2 = x^2$$

$$\sqrt{1850} = x^2$$

$$x = 88.6$$

① 88.6 newtons



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$25^2 = 85^2 + 88.6^2 - 2(85)(88.6) \cos(x)$$

$$625 = 15074.96 - 15062 \cos(x)$$

$$.0415 = -15062 \cos(x)$$

$$-.00000275 = \cos(x)$$

$$\cos(1.57) =$$

$$\boxed{2^\circ}$$

Comment

Score: 0

The student's response is completely incorrect.