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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 EXAMINATIONS IN MATHEMATICS JANUARY 2011 ADMINISTRATION

INTEGRATED ALGEBRA
GEOMETRY
ALGEBRA 2/TRIGONOMETRY

GENERAL INFORMATION

The general procedures to be followed in administering the Regents Examinations in Integrated Algebra, Geometry, and Algebra 2/Trigonometry are provided in the publication *Directions for Administering Regents Examinations, January 2011 Administration* (DET 541), and *Regents Examinations, Regents Competency Tests, and Second Language Proficiency Examinations: School Administrator's Manual, 2008 Edition*. Copies of the *Directions* are shipped to schools prior to each Regents Examination period and are also available on the Department's web site at: http://www.p12.nysed.gov/osa/hsgen/home.html. The *School Administrator's Manual* is available on the Department's web site at: http://www.p12.nysed.gov/osa/sam/secondary/home.html.

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

School administrators should print or photocopy this information booklet and distribute copies to all school personnel who will be scoring these examinations.

SCORING THE EXAMINATIONS

The Scoring Key and Rating Guide

Printed copies of scoring keys and rating guides will **not** be sent to schools for the January 2011 Regents Examinations. Instead, scoring keys and rating guides will be posted on the Department's web site at: http://www.p12.nysed.gov/osa/scoring/home.html at approximately 11:00 a.m. for morning examinations and approximately 3:00 p.m. for afternoon examinations. Schools must print sufficient copies to supply one to each rater.

Beginning in January 2011, all scoring keys and rating guides posted on the Department's web site will be password protected. The school principal will receive an e-mail from the Department on the day of the examination that provides the password to be used to access all scoring keys and rating guides being posted that day. In order to access these documents, all schools will be required to enter the password sent by the Department.

The Regents Examinations in Integrated Algebra, Geometry, and Algebra 2/Trigonometry are 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.

Each examination is accompanied by a scoring key that includes the answers to the Part I multiple-choice questions and 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 detachable answer sheet contains a table with spaces for recording the Part I score; the score for each question in Parts II, III, and IV; the total-test raw score; and the scale score. The answer sheet also contains designated spaces for the raters to record their names and initials.

Scoring of Multiple-Choice Questions

Multiple-choice questions may be either hand scored or machine scored. When hand scoring, indicate by means of a check mark each incorrect or omitted answer to multiple-choice questions on the designated answer sheet. Do not place a check mark beside a correct answer. Use only red ink or red pencil. In the appropriate space on the student's answer sheet, record the number of credits earned for the Part I, multiple-choice questions the student answered correctly. Each correct answer receives two credits.

If used, machine-scorable answer sheets must be provided and scored by the school. Answer sheets supplied by the school must provide the same number of response options as are given in the examination questions, and the choices must be labeled 1, 2, 3, 4 not *A, B, C, D*. Instructions for using the answer sheets must be developed locally and provided to the proctors administering the examinations.

Before answer sheets can be machine scored, several samples must be both machine and manually scored to ensure the accuracy of the machine-scoring process. All discrepancies must be rectified before student answer sheets are machine scored. When machine scoring is completed, a sample of the scored answer sheets must be scored manually to verify the accuracy of the machine-scoring process.

DETERMINING THE STUDENT'S FINAL EXAMINATION SCORE

A chart for converting the student's total-test raw score to a scale score is provided for each administration on the Department's web site at: http://www.p12.nysed.gov/osa/. Because the scale scores corresponding to raw scores change from one examination administration to another, it is *crucial* that, for each administration, scorers use *only* the conversion chart provided for that administration to determine the student's final score. Take extreme care in recording the student's scores on each part of the examination, adding these scores to determine the total-test raw score, and using the conversion chart to obtain the correct scale score.

For the Regents Examinations in Integrated Algebra, Geometry, and Algebra 2/Trigonometry, all student answer papers that receive a scale score of 60 through 64 must be scored a second time. The principal may elect to have the scoring committee also score a second time those student answer papers that received a scale score of 50 through 54, or all student answer papers. 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 this certificate 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, a principal 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 Assessment Policy, Development and Administration 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 a principal has substantial reason to believe that the teacher scoring committee has failed to accurately score more than five student answer papers on any examination or such errors are detected more than four months later, the administrator must first obtain permission in writing from the Office of Assessment Policy, Development and Administration before arranging for or permitting a rescoring of student papers. The written request to the Office of Assessment Policy, Development and Administration 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 on the previous pages 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 Examinations in Mathematics

The information below refers to the scoring of open-ended questions on the Regents Examinations in Integrated Algebra, Geometry, and Algebra 2/Trigonometry.

The open-ended questions (Parts II, III, and IV) on the Regents Examinations in Integrated Algebra, Geometry, and 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 and round down (3 credits for a 6-credit question, 2 credits for a 4-credit question, 1 credit for a 2-credit question, and 1 credit for a 3-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 or if incorrect units are used. 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.

  A fully correct answer for a multiple-part question requires correct responses for all parts of the question. For example, if a 3-credit question has three parts, the correct response to one or two parts of the question that required work to be shown is *not* considered a fully correct response with no work shown and would receive 0 credit.

  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.

Examples of Scored Student Responses with Comments

Sample Question 1 – Integrated Algebra

Solve for g: $3 + 2g = 5g - 9$

Rubric

[2] 4, and appropriate work is shown.

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

or

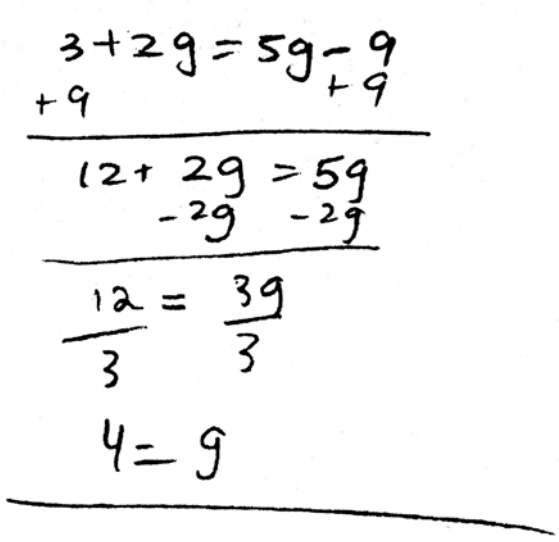
[1] Appropriate work is shown, but one conceptual error is made.

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.

Student Response

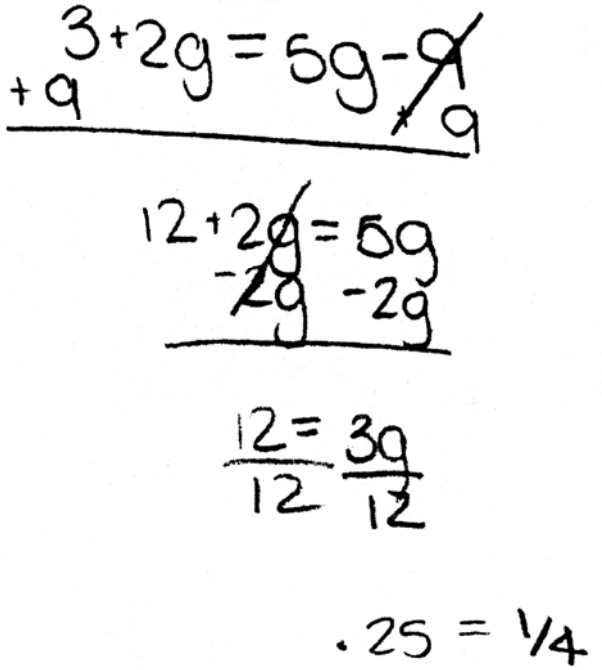


Comment

Score: 2

The student has a complete and correct response.

Student Response

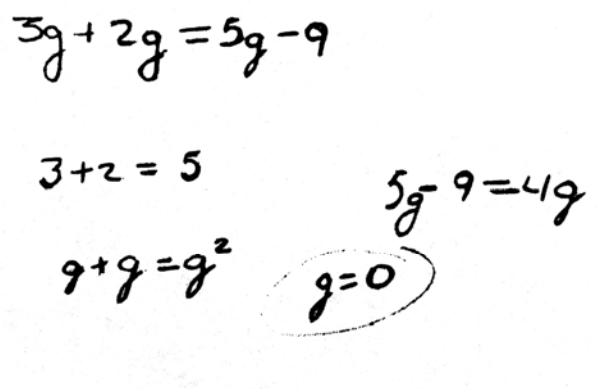


Comment

Score: 1

The student has made a conceptual error.

Student Response



Comment

Score: 0

The student's response is completely incorrect.

Sample Question 2 – Integrated Algebra

One prom ticket at Smith High School is $120. Tom is going to save money for his ticket by walking his neighbor's dog for $15 per week. If Tom already has saved $22, determine the minimum number of weeks Tom must walk the dog to earn enough money to pay for his prom ticket. [Only an algebraic solution can receive full credit.]

Rubric

[3] 7, and appropriate algebraic work is shown.

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

or

[2] Appropriate work is shown, but the answer is left as the inequality $x \geq 6.5$.

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

or

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

or

[1] An incorrect inequality is written, but it is solved appropriately, and an appropriate solution is stated.

or

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

or

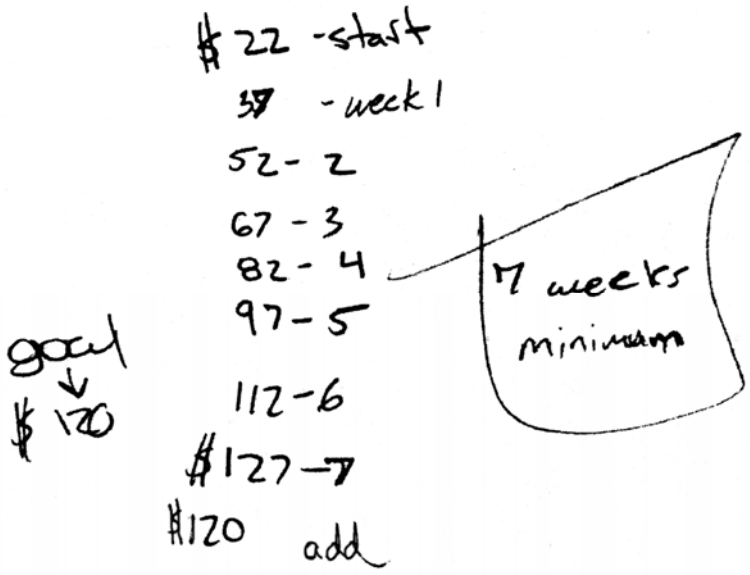
[1] 7, but a method other than algebraic is used.

or

[1] 7, 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



Comment

Score: 3

The student has a complete and correct response.

Student Response

Let x = # of weeks

$15x + 22 \geq 120$

$-22 \quad -22$

$\frac{15x}{15} \geq \frac{88}{15}$

$x \geq 5.8\overline{6}$

5 weeks would not be enough.

$15(5) + 22 =$

$75 + 22 = \$97$

He would have to walk the dog for 6 weeks

Comment

Score: 2

The student has made one computational error.

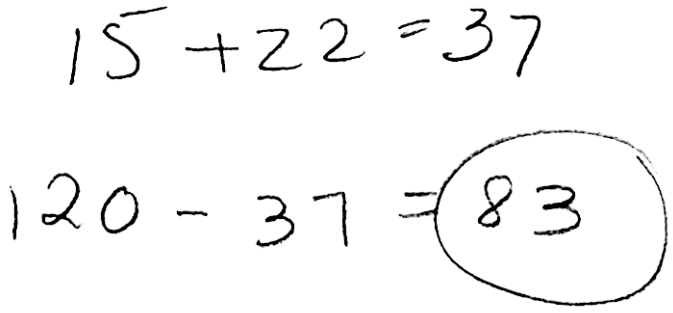
Student Response

Comment

Score: 1

The student has given an answer without showing any work.

Student Response



Comment

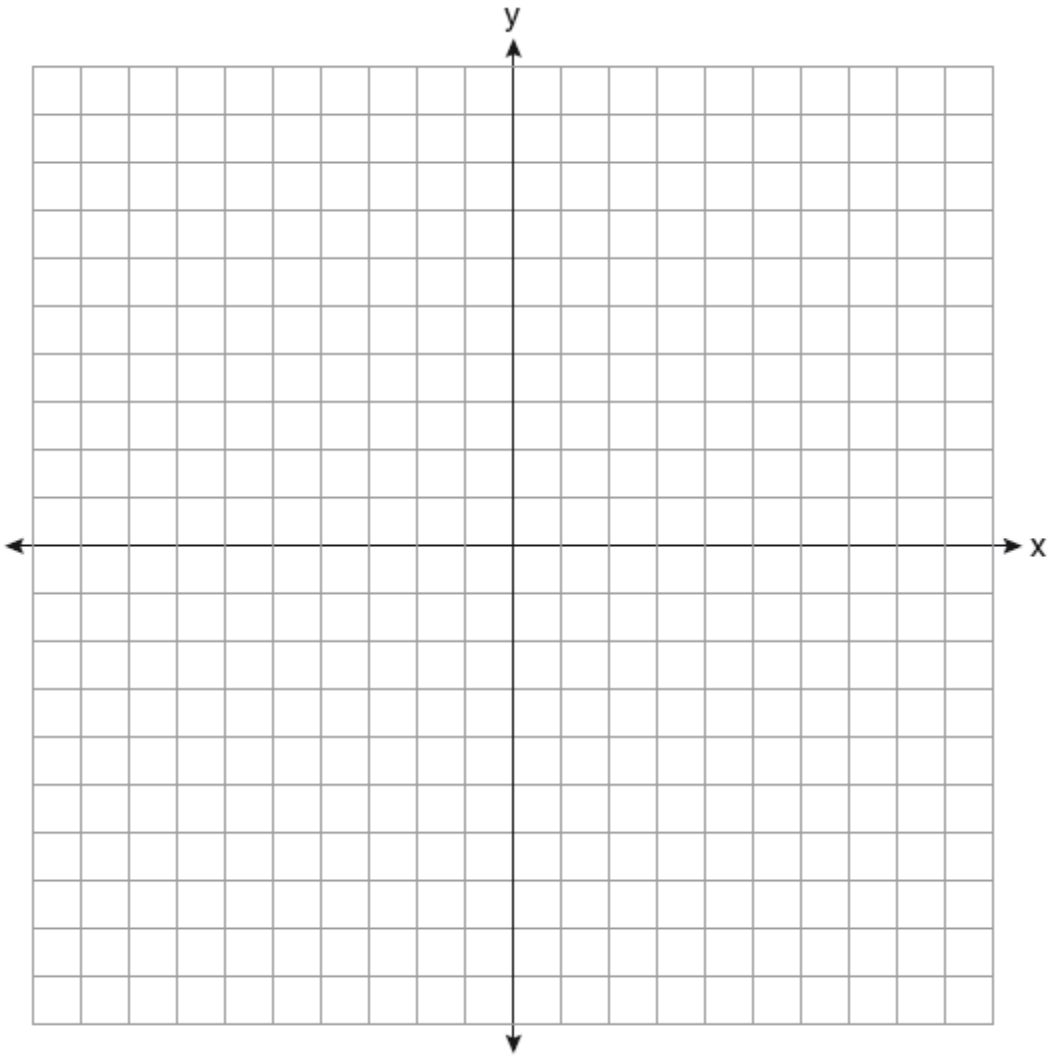
Score: 0

The student's response is completely incorrect.

Sample Question 3 – Integrated Algebra

On the set of axes below, solve the following system of equations graphically for *all* values of x and y.

$y = x^2 - 6x + 5$
$2x + y = 5$



Rubric

[4] Both equations are graphed correctly, and (0,5) and (4,–3) are stated.

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

or

[3] Both equations are graphed correctly, but only one solution is stated.

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

or

[2] Appropriate work is shown, but one conceptual error is made, but appropriate solutions are stated.

or

[2] Both equations are graphed correctly, but no solutions are stated or they are stated incorrectly.

or

[2] Appropriate work is shown to find (0,5) and (4,–3), but a method other than graphing is used.

[1] Both equations are graphed, but one conceptual error and one computational or graphing error are made, but appropriate solutions are stated.

or

[1] One of the equations is graphed correctly, but no further correct work is shown.

or

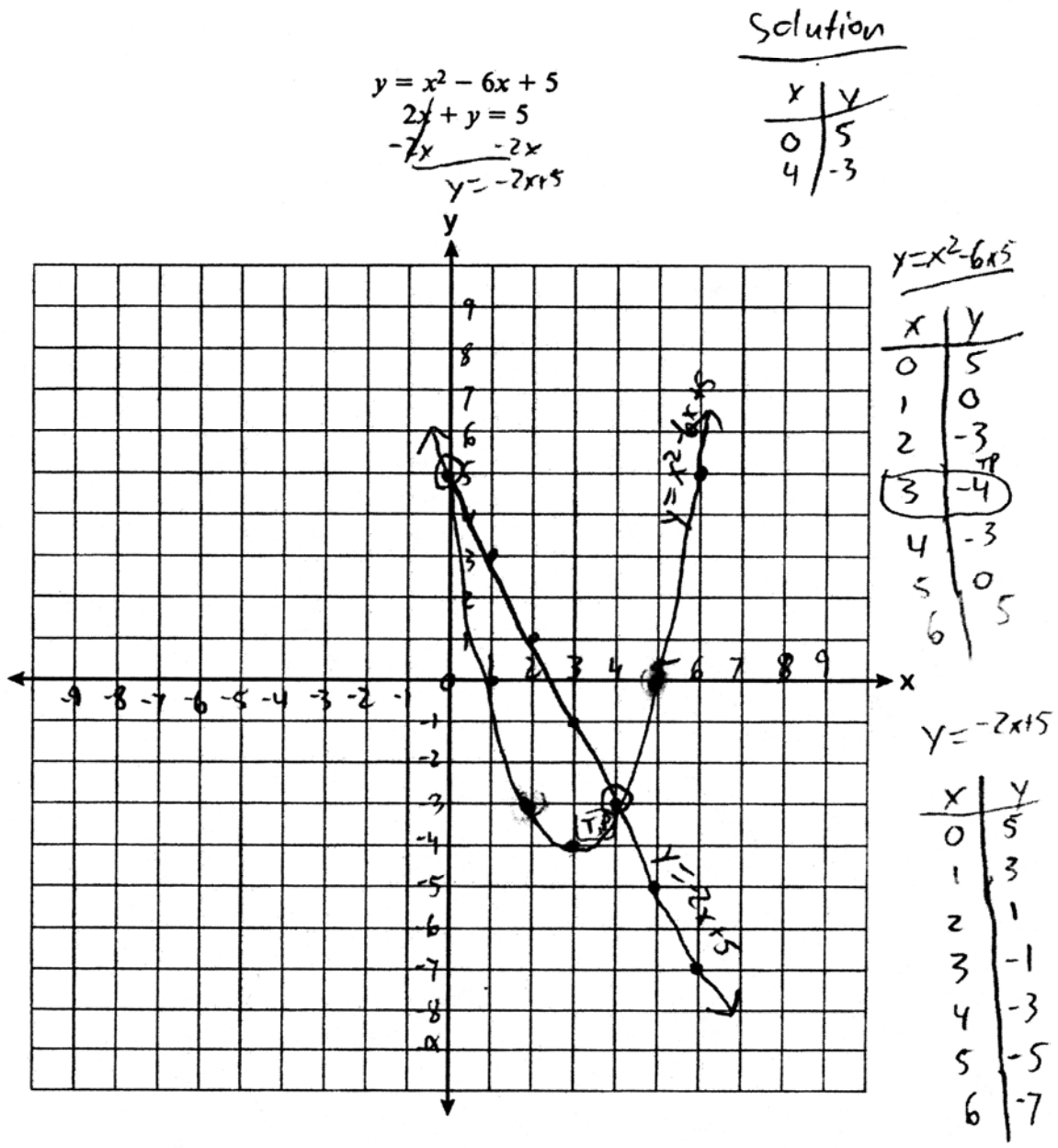
[1] (0,5) and (4,–3) are stated, but no work is shown.

[0] (0,5) or (4,–3) 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.

Student Response

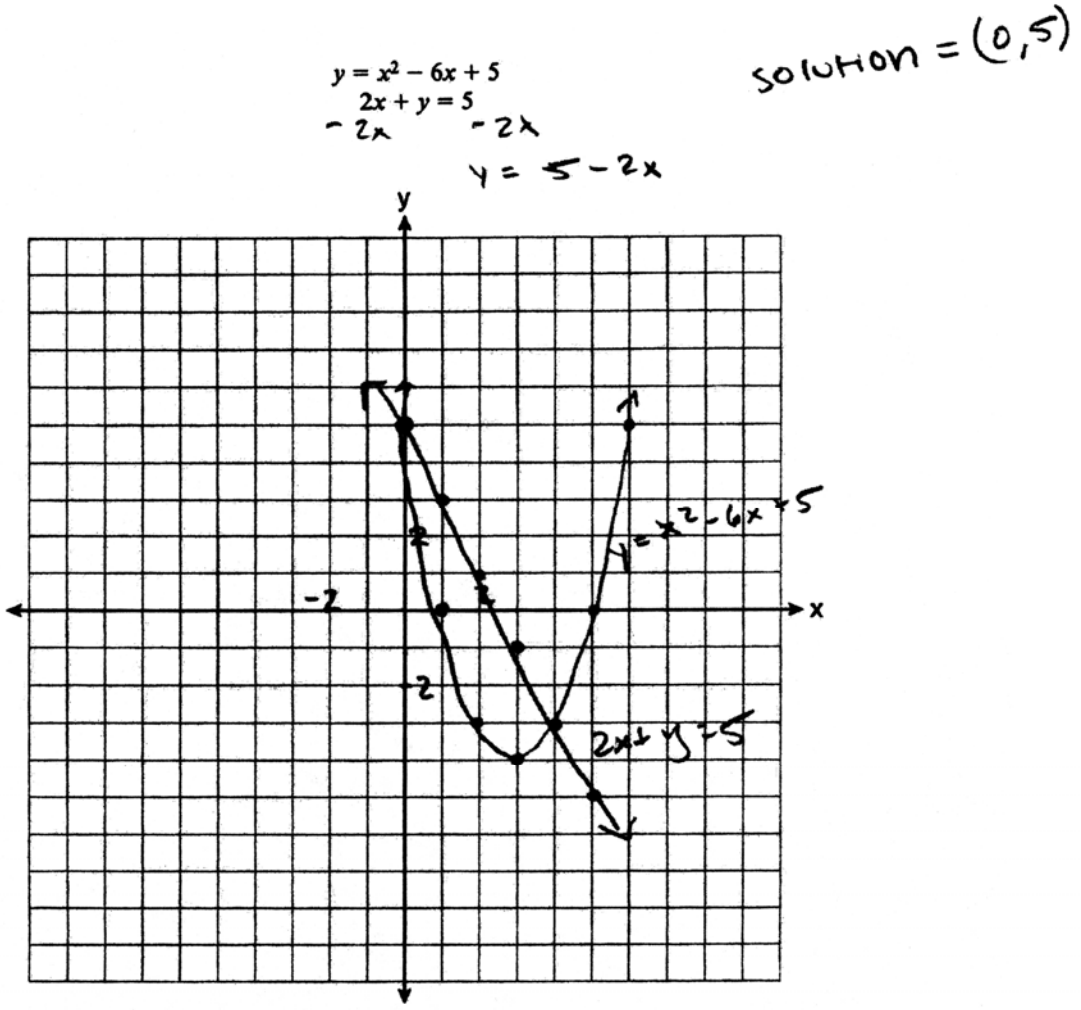


Comment

Score: 4

The student has a complete and correct response.

Student Response

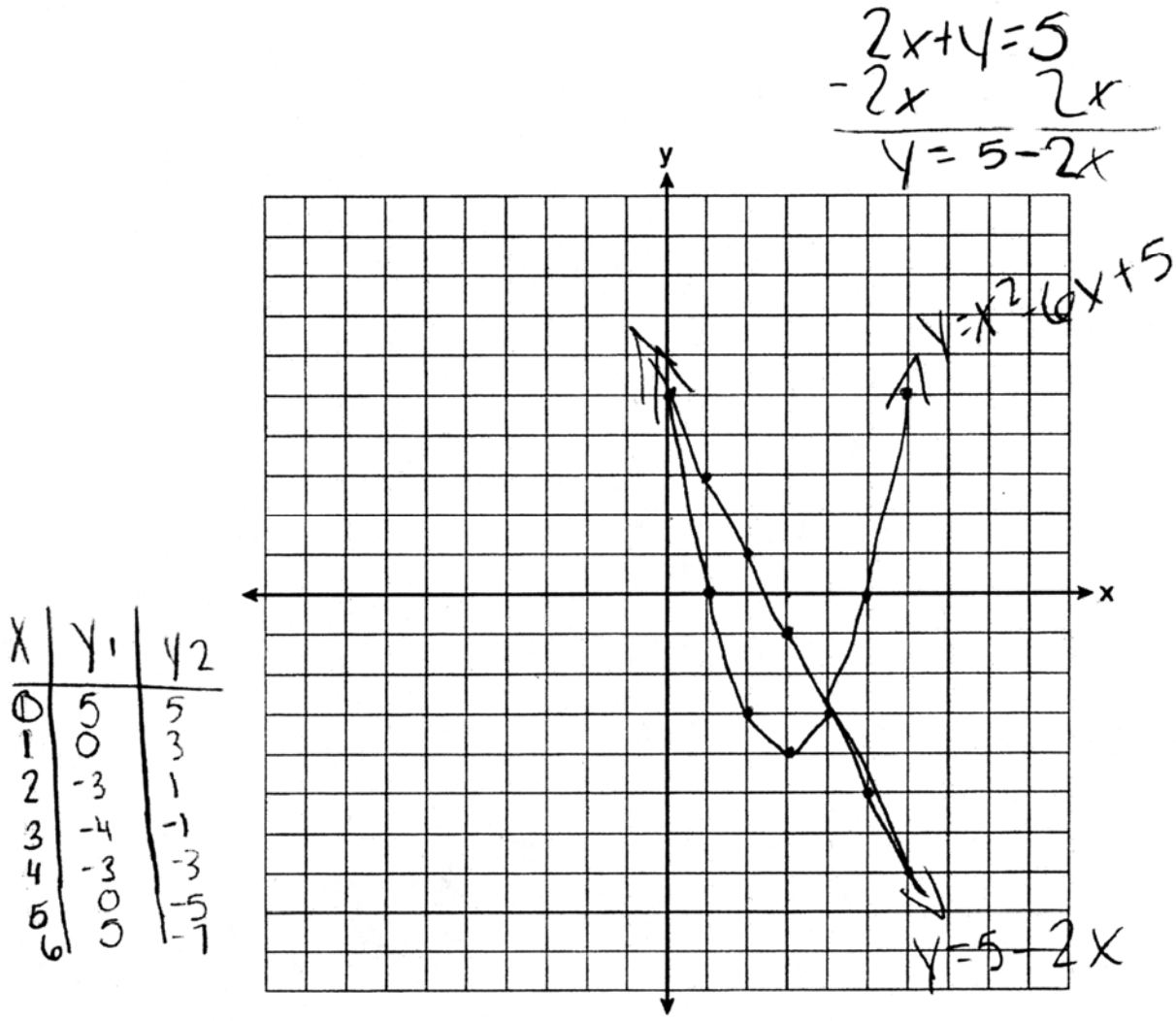


Comment

Score: 3

The student has stated only one solution.

Student Response



Comment

Score: 2

The student has not stated any solution.

Student Response

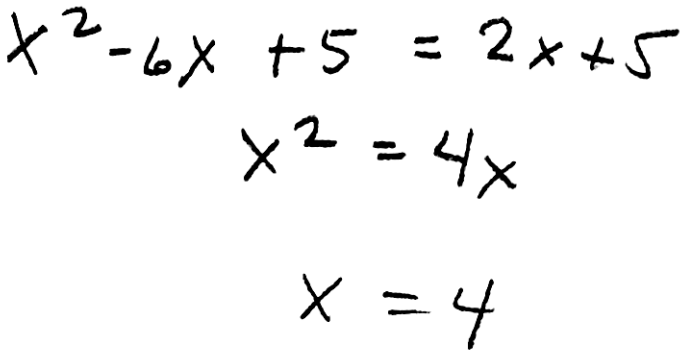
(0,5) and (4,-3)

Comment

Score: 1

The student has stated the correct answers, but without showing any work.

Student Response



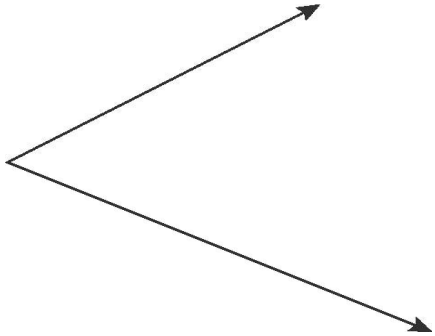
Comment

Score: 0

The student's response is completely incorrect.

Sample Question 1 – Geometry

Using a compass and straightedge, construct the bisector of the angle shown below. [*Leave all construction marks.*]



Rubric

[2] A correct construction is drawn showing all appropriate arcs, and the angle bisector is drawn.

[1] All construction arcs are drawn, but the angle bisector is not drawn.

or

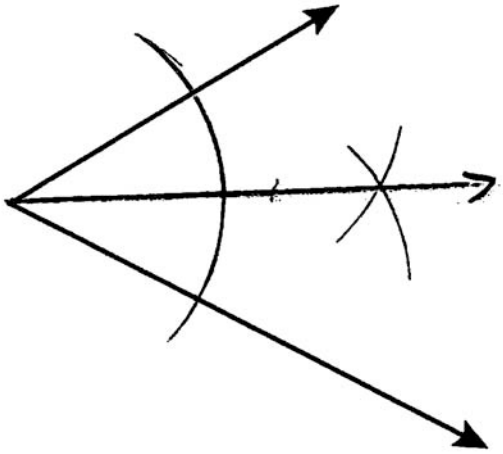
[1] The appropriate method is demonstrated, but one construction error is made, such as not extending the sides to show points of intersection by the arc.

[0] A drawing that is not an appropriate construction 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.

Student Response

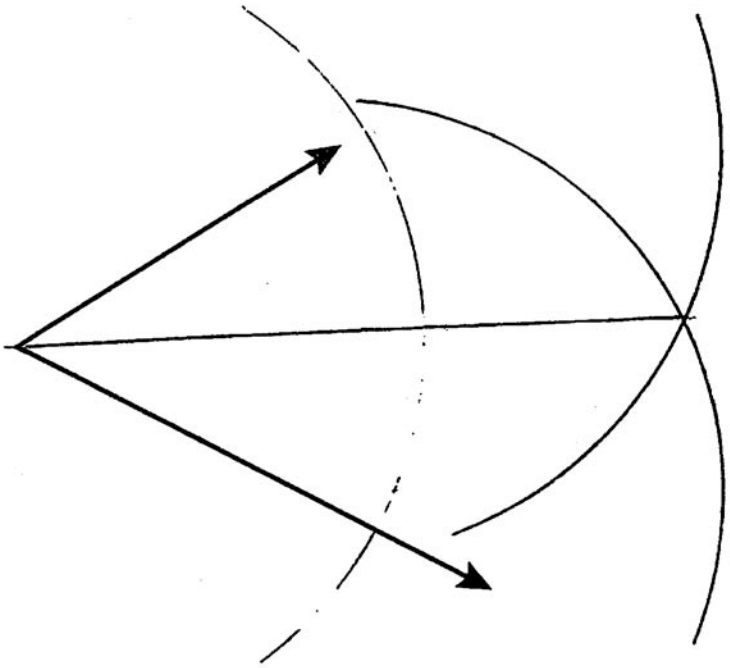


Comment

Score: 2

The student has a complete and correct response.

Student Response

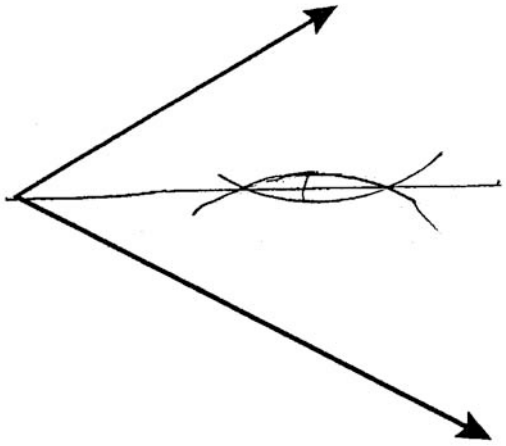


Comment

Score: 1

The student demonstrated an appropriate method, but one construction error is made. The first arc did not intersect both rays.

Student Response



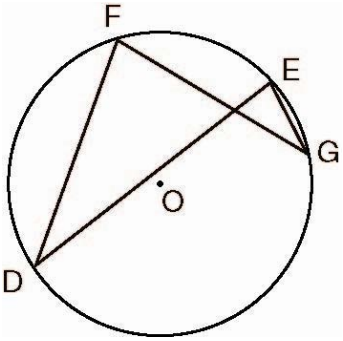
Comment

Score: 0

The student's response is completely incorrect.

Sample Question 2 – Geometry

In the diagram below of circle O, chords $\overline{DF}$, $\overline{DE}$, $\overline{FG}$, and $\overline{EG}$ are drawn such that $m\overset{\frown}{DF} : m\overset{\frown}{FE} : m\overset{\frown}{EG} : m\overset{\frown}{GD} = 5 : 2 : 1 : 7$. Identify one pair of inscribed angles that are congruent to each other and give their measure.



Rubric

[4] $\angle D$ and $\angle G$ and 24, or $\angle E$ and $\angle F$ and 84, and appropriate work is shown.

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

or

[3] The measure of at least one inscribed angle is found correctly, and appropriate work is shown, but a pair of angles is not identified or is identified 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.

or

[2] Appropriate work is shown to find the measures of all four arcs, but no further correct work is shown.

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

or

[1] One pair of inscribed angles is correctly identified, but no further correct work is shown.

or

[1] Appropriate work is shown to find $x = 24$, the measure of $\overset{\frown}{EG}$, but no further correct work is shown.

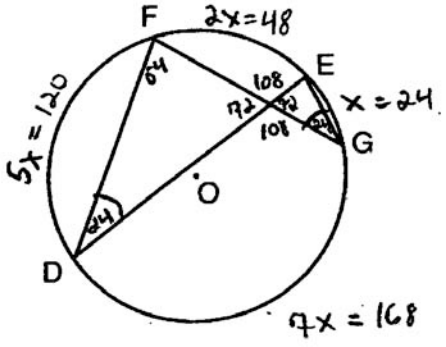
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student Response

$5x + 2x + x + 7x = 360$

$\frac{15x}{15} = \frac{360}{15}$

$x = 24$



$m\angle FGE = 24$

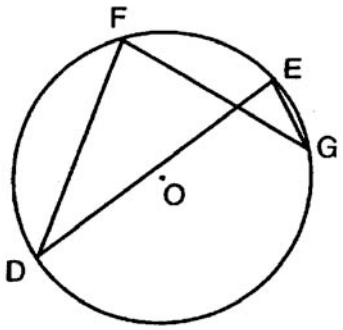
$m\angle FDE = 24$

Comment

Score: 4

The student has a complete and correct response.

Student Response



$5x + 2x + x + 7x = 360$

$\frac{15x}{15} = \frac{360}{15}$

$x = 24$

$5x = 120 = \overset{\frown}{DF}$

$2x = 48 = \overset{\frown}{FE}$

$x = 24 = \overset{\frown}{EG}$

$7x = 188 = \overset{\frown}{GD}$

Inscribed angles are equal to one-half the measure of their intercepted arcs

$\angle F$ and $\angle E$ both intercept $\overset{\frown}{GD}$

$188 \div 2 = 94$

$\angle F$ and $\angle E = 94°$

Comment

Score: 3

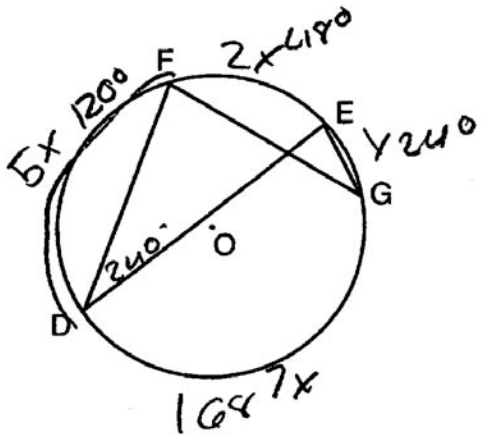
The student made one computational error.

Student Response

$5x + 2x + 1x + 7x =$

$\frac{15x}{15} = \frac{360}{15}$

$x = 24$



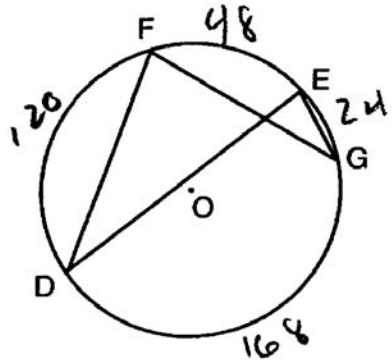
$m\angle FDE = 240$

Comment

Score: 3

The student found the measure of only one angle.

Student Response



$\angle DEG \cong \angle DFG$

$\angle DEG = 168°$

$\angle DFG = 168°$

$5x + 2x + x + 7x = 360$

$15x = 360$

$x = 24$

$2x = 48$

$5x = 120$

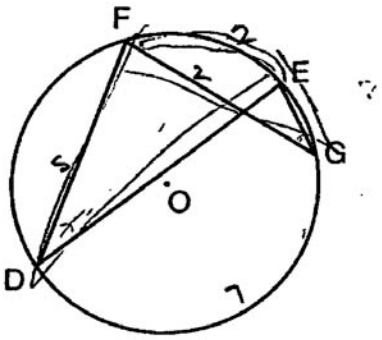
$7x = 168$

Comment

Score: 2

The student found the measures of all four arcs.

Student Response



$\angle FDE \approx \angle FGE$

Comment

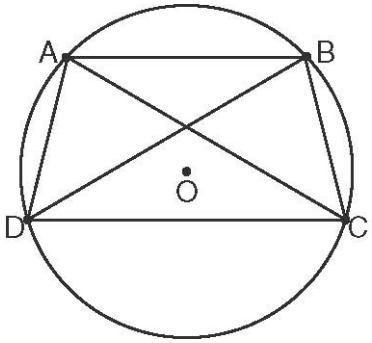
Score: 1

The student identified one pair of inscribed angles correctly.

Sample Question 3 – Geometry

In the diagram below, quadrilateral *ABCD* is inscribed in circle *O*, $\overline{AB} \parallel \overline{DC}$, and diagonals $\overline{AC}$ and $\overline{BD}$ are drawn.

Prove that $\triangle ACD \cong \triangle BDC$.



Rubric

[6] A complete and correct proof that includes a concluding statement 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 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 or reasons are missing or incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] A proof is written that demonstrates an understanding of the method of proof, but one conceptual error is made and one statement or reason is missing or incorrect.

or

[2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or incorrect.

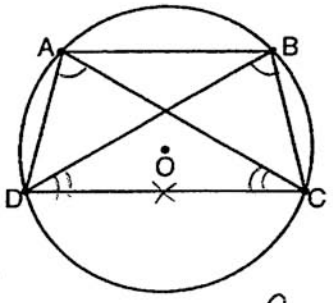
[1] Only one correct relevant statement and reason are written.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, 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.

Student Response



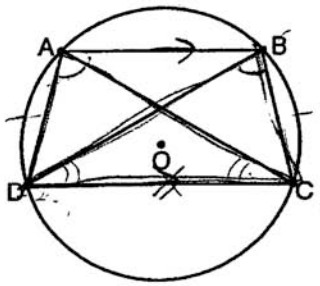
Statement	Reason
1. $\overline{AB} \parallel \overline{DC}$	1. Given
2. $\angle DAC \cong \angle DBC$	2. Inscribed angles intercepting the same arc are congruent
3. $\overline{DC} \cong \overline{DC}$	3. Reflexive Property
4. $\overset{\frown}{AD} \cong \overset{\frown}{BC}$	4. Parallel Lines intercept congruent arcs
5. $\angle BDC \cong \angle ACD$	5. Inscribed angles intercepting congruent arcs are congruent
6. $\triangle ACD \cong \triangle BDC$	6. AAS

Comment

Score: 6

The student has a complete and correct proof that includes a concluding statement.

Student Response



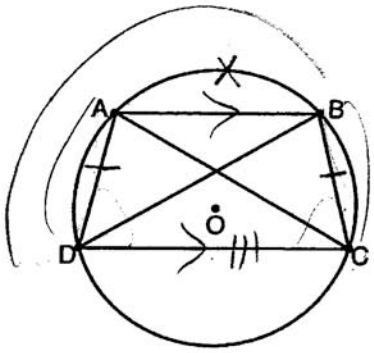
Statements	Reasons
(1) _____	(1) Given
(2) $\overline{DC} \cong \overline{DC}$	(2) Reflexive Prop. of $\cong$
(3) $\angle ACD \cong \angle BDC$	(3) circumscribed angles that intercept $\cong$ arcs are $\cong$
(4) $\angle DAC \cong \angle CBD$	(4) circumscribed angles that intercept the same arc are $\cong$
(5) $\triangle ACD \cong \triangle BDC$	(5) aas $\cong$ aas.

Comment

Score: 5

The student is missing the statement showing $m\overset{\frown}{AD} = m\overset{\frown}{BC}$.

Student Response



Statements	
1.	1. given
2. $\overset{\frown}{AD} \cong \overset{\frown}{BC}$	2. // lines intercept $\cong$ arcs
3. $\overline{AD} \cong \overline{BC}$	3. $\cong$ arcs have $\cong$ chords
4. $\overline{DC} \cong \overline{DC}$	4. Reflexive
5. $\overset{\frown}{AD} \cong \overset{\frown}{BC}$	5. // lines intercept $\cong$ arcs
6. $\overset{\frown}{DAB} \cong \overset{\frown}{CBA}$	6. Addition
7. $\overline{DB} \cong \overline{AC}$	7. $\cong$ arcs have $\cong$ chords
8. $\triangle ACD \cong \triangle BDC$	8. SSS $\cong$ SSS

$\overset{\frown}{AB} = \overset{\frown}{AB}$

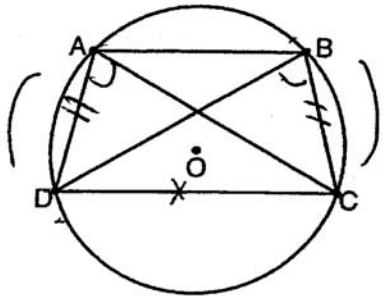
$\overset{\frown}{AD} + \overset{\frown}{AB} = \overset{\frown}{BC} + \overset{\frown}{AB}$

Comment

Score: 4

The student inserted two statements but didn't supply reasons.

Student Response



1. Given
2. $\overset{\frown}{AD} \cong \overset{\frown}{BC}$
3. $\overline{AD} \cong \overline{BC}$
4. $\angle DAC \cong \angle CBD$
5. $\overline{DC} \cong \overline{DC}$
6. $\triangle ACD \cong \triangle BDC$

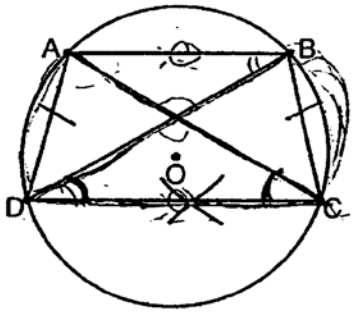
1.
2. // lines intercept $\cong$ arcs
3. $\cong$ arcs intercept $\cong$ chords
4. Inscribed Angles that intercept the same chord are $\cong$
5. Reflexive Prop
6. SSA

Comment

Score: 3

The student made one conceptual error.

Student Response



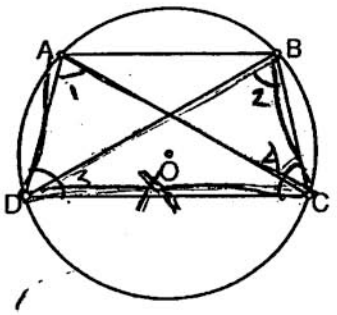
① Quad $\overline{ABCD}$	① Given
② $\overline{AB} \parallel \overline{DC}$	② Given
③ Quad $\overline{ABCD}$ is a trap	③ only One pair of opposite sides are ∥
~~④ $\overline{AD} \cong \overline{BC}$~~	~~④~~
④ $DC = DC$	④ Reflexive
⑤ $\overline{AD} \cong \overline{BC}$	⑤ Two Arcs are ≅ if they connect ∥ lines
⑥ $\angle C \cong \angle D$	⑥ Same Arcs have same inscribed ∠
⑦ $AD = BC$	⑦ Lines of ≅ ∠Arc are ≅
⑧ $\triangle ACD \cong \triangle BDC$	⑧ SAS

Comment

Score: 2

The student made one conceptual error and one reason is incorrect.

Student Response



Statement	Reason
1. ABCD is inscribed in circle O, $\overline{AB} \parallel \overline{DC}$, and $\overline{AC}$ & $\overline{BD}$ are diagonals	1. given
2. $\overline{DC} \cong \overline{DC}$	2. Reflexive Property
3. $\angle 1 \& \angle 2 \cong$ $\angle 3 \& 4 \cong$	3. alt interior $\angle$s are $\cong$
4. $\triangle ACD \cong \triangle BDC$	4. AAS $\cong$ AAS

Comment

Score: 1

The student has written only one correct relevant statement and reason.

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

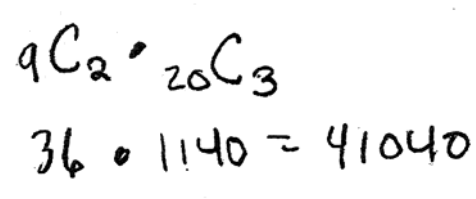
[1] ${}_9C_2 \bullet {}_{20}C_3$, but no further correct work is shown.

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

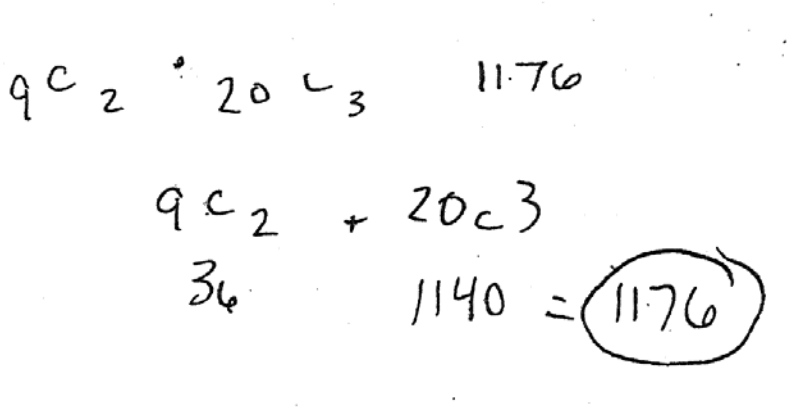


Comment

Score: 2

The student has a complete and correct response.

Student Response

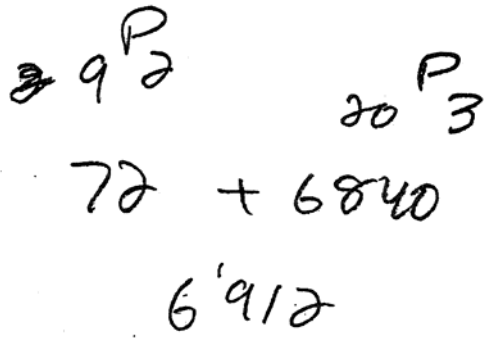


Comment

Score: 1

The student has made one conceptual error.

Student Response



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

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

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

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

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

$2x+1=0$ $\quad 2x=-1$ $\quad x=-\frac{1}{2}$

$2x+3=0$ $\quad 2x=-3$ $\quad x=-\frac{3}{2}$

$2x-3=0$ $\quad 2x=3$ $\quad x=\frac{3}{2}$

Comment

Score: 4

The student has a complete and correct response.

Student Response

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

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

$4x^2 - 9 = 0$ | $2x + 1 = 0$

$4x^2 = 9$ | $2x = -1$

$x^2 = \frac{9}{4}$ | $x = -\frac{1}{2}$

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

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

Comment

Score: 3

The student has made one computational error.

Student Response

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

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

$$4x^2 = 9$$

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

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

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

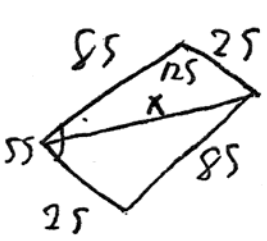
[1] A correct substitution is made into the Law of Cosines, but no further correct work is shown.

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



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

$x = 101.43$ [illegible]

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

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

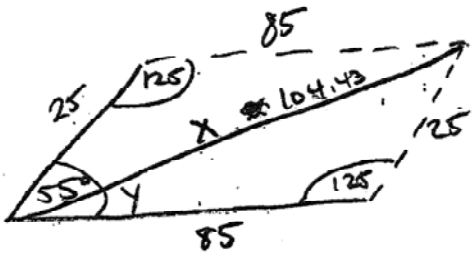
$x = 12^\circ$

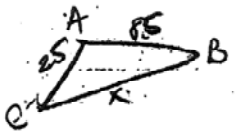
Comment

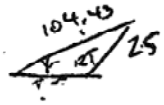
Score: 6

The student has a complete and correct response.

Student Response







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

$7225 = 10287.68\ldots \cos Y$

$X \approx 101.43$ Newtons

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

$\sin Y = .196007479$

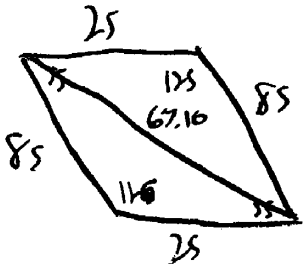
$Y \approx 11°$

Comment

Score: 5

The student has made one computational error.

Student Response



$c^2 = 85^2 + 25^2 - 2(85)(25)\cos(115)$

$c^2 = 9502.21$

$c = 67.10N$

$\frac{\sin 115}{67.10} = \frac{\sin x}{25}$

$\sin x = .305$

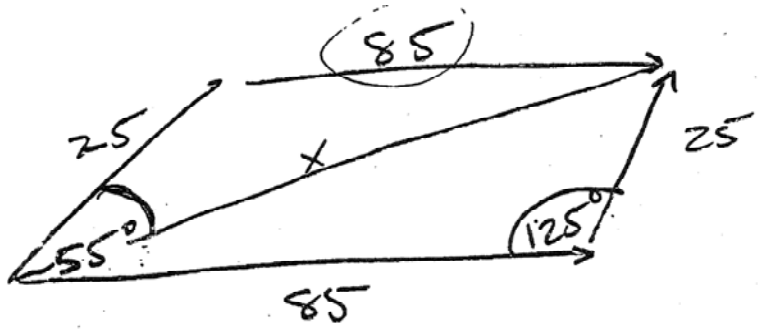
$x = 17.8°$

Comment

Score: 4

The student has made one computational and one rounding error.

Student Response



- 180
- 55
- 125

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

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

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

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

$(-.57)$

$a^2 = 7850 + 2422.5$

$a^2 = \sqrt{10272.5}$

$a = 101.353$

$a = 101.35$ Newtons

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

$.8191 \cdot 85 = 101.35x$

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

$\sin X = .687$

$x = 43.39$

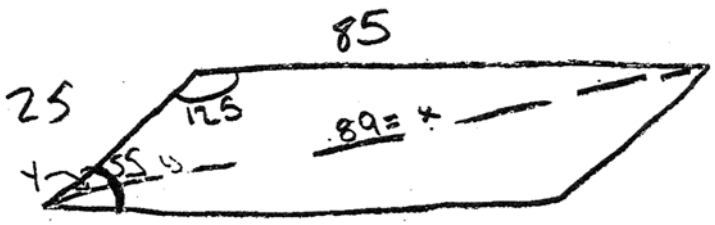
$X = 43°$

Comment

Score: 3

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

Student Response



85

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

$x^2 = 7878.678822$

$x = 88.8$

$x = 89$

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

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

$.7823362221 = \sin y$

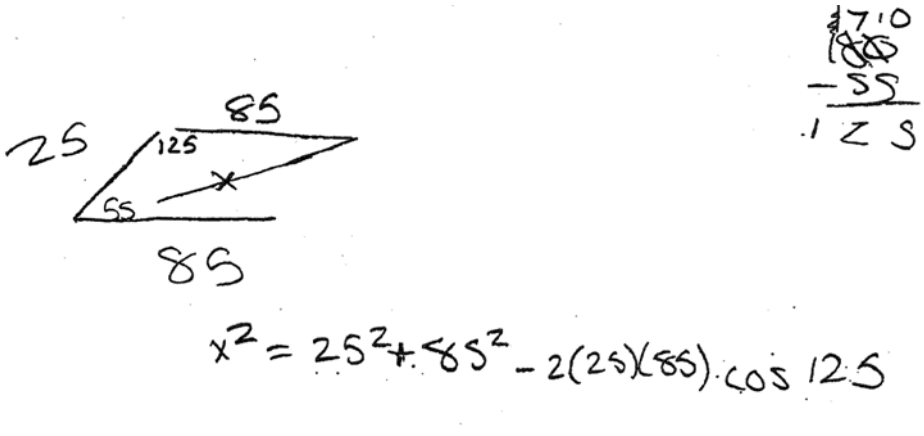
$51 = y$

Comment

Score: 2

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

Student Response

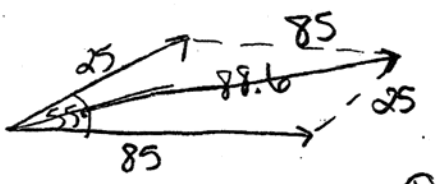


Comment

Score: 1

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

Student Response

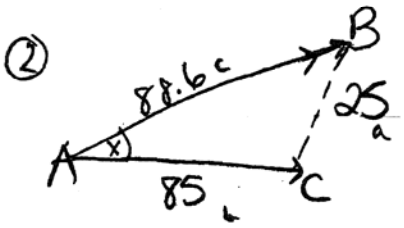


$25^2 + 85^2 = X^2$

$\sqrt{7850} = \sqrt{X^2}$

$X = 88.6$

① 88.6 newtons



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

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

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

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

$-.00000275 = \cos(x)$

$\cos(1.57) =$

$2°$

Comment

Score: 0

The student's response is completely incorrect.