The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY (Common Core)

Wednesday, August 17, 2016 — 8:30 to 11:30 a.m., only

Student Name: _____

School Name: _____

Print your name and the name of your school on the lines above.

A separate answer sheet for Part I has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 36 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice…
A graphing calculator, a straightedge (ruler), and a compass must be available for you to use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

1 In the diagram below, lines ℓ, m, n, and p intersect line r.
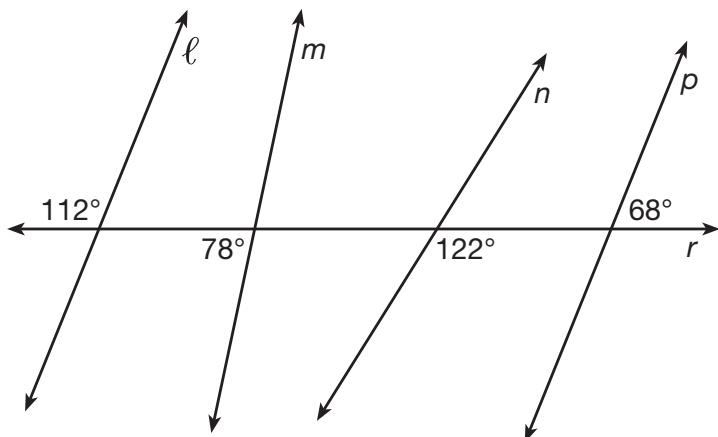
Which statement is true?

(1) $\ell \parallel n$ (3) $m \parallel p$

(2) $\ell \parallel p$ (4) $m \parallel n$

2 Which transformation would *not* always produce an image that would be congruent to the original figure?

(1) translation   (3) rotation

(2) dilation   (4) reflection

3 If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?

(1) cone   (3) prism

(2) pyramid   (4) sphere

4 In the diagram below, m∠*BDC* = 100°, m∠*A* = 50°, and m∠*DBC* = 30°.
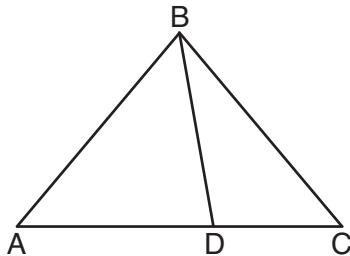
Which statement is true?

(1) △*ABD* is obtuse.

(3) m∠*ABD* = 80°

(2) △*ABC* is isosceles.

(4) △*ABD* is scalene.

5 Which point shown in the graph below is the image of point *P* after a counterclockwise rotation of 90° about the origin?

(1) *A*

(3) *C*

(2) *B*

(4) *D*
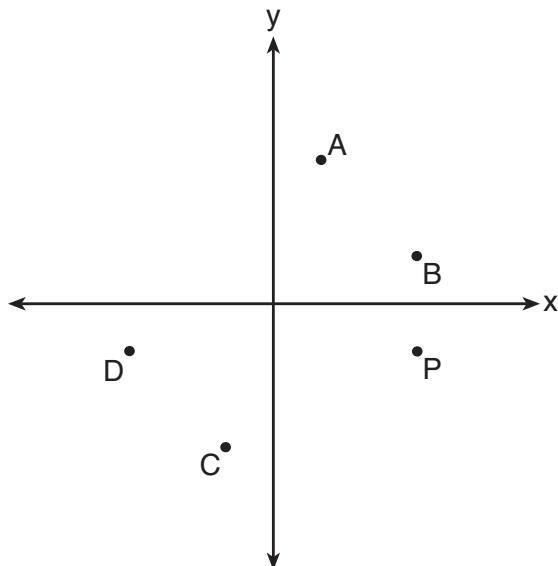
6 In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \dfrac{\sqrt{21}}{5}$. What is $\sin B$?

(1) $\dfrac{\sqrt{21}}{5}$ (3) $\dfrac{2}{5}$

(2) $\dfrac{\sqrt{21}}{2}$ (4) $\dfrac{5}{\sqrt{21}}$

7 Quadrilateral $ABCD$ with diagonals $\overline{AC}$ and $\overline{BD}$ is shown in the diagram below.
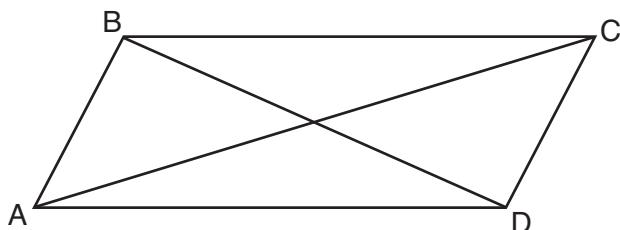
Which information is *not* enough to prove $ABCD$ is a parallelogram?

(1) $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{DC}$

(2) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$

(3) $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$

(4) $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$

8 An equilateral triangle has sides of length 20. To the *nearest tenth*, what is the height of the equilateral triangle?

(1) 10.0   (3) 17.3

(2) 11.5   (4) 23.1

9 Given: △*AEC*, △*DEF*, and $\overline{FE} \perp \overline{CE}$
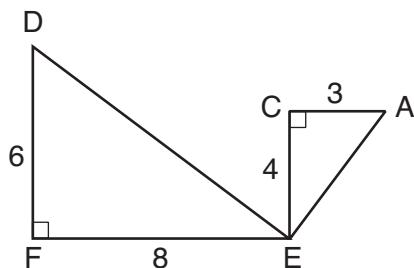
What is a correct sequence of similarity transformations that shows △*AEC* ~ △*DEF*?

(1) a rotation of 180 degrees about point *E* followed by a horizontal translation

(2) a counterclockwise rotation of 90 degrees about point *E* followed by a horizontal translation

(3) a rotation of 180 degrees about point *E* followed by a dilation with a scale factor of 2 centered at point *E*

(4) a counterclockwise rotation of 90 degrees about point *E* followed by a dilation with a scale factor of 2 centered at point *E*

10 In the diagram of right triangle *ABC*, $\overline{CD}$ intersects hypotenuse $\overline{AB}$ at *D*.
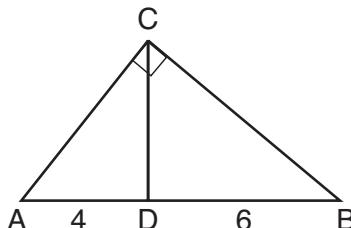
If *AD* = 4 and *DB* = 6, which length of $\overline{AC}$ makes $\overline{CD} \perp \overline{AB}$?

(1) $2\sqrt{6}$ (3) $2\sqrt{15}$

(2) $2\sqrt{10}$ (4) $4\sqrt{2}$

11 Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?

(1) $\overline{AD}, \overline{BD}$ (3) $\overline{AE}, \overline{BE}$

(2) $\overline{AC}, \overline{BC}$ (4) $\overline{DE}, \overline{CE}$

12 In triangle CHR, O is on $\overline{HR}$, and D is on $\overline{CR}$ so that $\angle H \cong \angle RDO$.
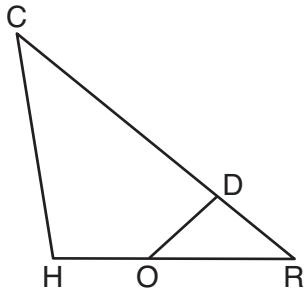
If $RD = 4$, $RO = 6$, and $OH = 4$, what is the length of $\overline{CD}$?

(1) $2\frac{2}{3}$ (3) 11

(2) $6\frac{2}{3}$ (4) 15

13 The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a

(1) circle   (3) triangle

(2) square   (4) rectangle

14 The diagonals of rhombus $TEAM$ intersect at $P(2,1)$. If the equation of the line that contains diagonal $\overline{TA}$ is $y = -x + 3$, what is the equation of a line that contains diagonal $\overline{EM}$?

(1) $y = x - 1$ (3) $y = -x - 1$

(2) $y = x - 3$ (4) $y = -x - 3$

15 The coordinates of vertices A and B of $\triangle ABC$ are $A(3,4)$ and $B(3,12)$. If the area of $\triangle ABC$ is 24 square units, what could be the coordinates of point C?

(1) $(3,6)$ (3) $(-3,8)$

(2) $(8,-3)$ (4) $(6,3)$

16 What are the coordinates of the center and the length of the radius of the circle represented by the equation $x^2 + y^2 - 4x + 8y + 11 = 0$?

(1) center $(2,-4)$ and radius 3

(2) center $(-2,4)$ and radius 3

(3) center $(2,-4)$ and radius 9

(4) center $(-2,4)$ and radius 9

17 The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters, what is the approximate number of kilograms of the trunk?

(1) 13   (3) 13,536

(2) 9694   (4) 30,456

18 Point P is on the directed line segment from point $X(-6,-2)$ to point $Y(6,7)$ and divides the segment in the ratio 1:5. What are the coordinates of point P?

(1) $(4,5\tfrac{1}{2})$ 　　　　　　　(3) $(-4\tfrac{1}{2},0)$

(2) $(-\tfrac{1}{2},-4)$ 　　　　　　(4) $(-4,-\tfrac{1}{2})$

19 In circle O, diameter $\overline{AB}$, chord $\overline{BC}$, and radius $\overline{OC}$ are drawn, and the measure of arc BC is 108°.
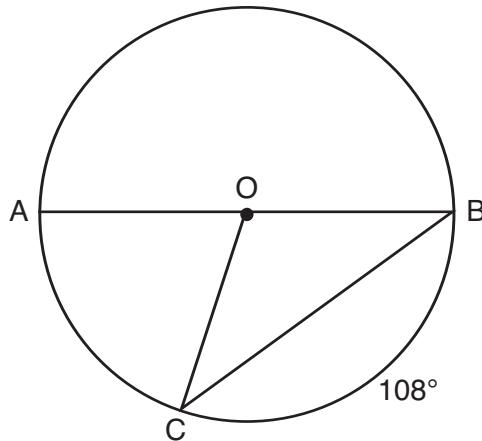
Some students wrote these formulas to find the area of sector COB:

Amy 　$\tfrac{3}{10} \cdot \pi \cdot (BC)^2$

Beth 　$\tfrac{108}{360} \cdot \pi \cdot (OC)^2$

Carl 　$\tfrac{3}{10} \cdot \pi \cdot (\tfrac{1}{2}AB)^2$

Dex 　$\tfrac{108}{360} \cdot \pi \cdot \tfrac{1}{2}(AB)^2$

Which students wrote correct formulas?

(1) Amy and Dex 　　　　　(3) Carl and Amy
(2) Beth and Carl 　　　　　(4) Dex and Beth

20 Tennis balls are sold in cylindrical cans with the balls stacked one on top of the other. A tennis ball has a diameter of 6.7 cm. To the *nearest cubic centimeter*, what is the minimum volume of the can that holds a stack of 4 tennis balls?

(1) 236   (3) 564

(2) 282   (4) 945

21 Line segment $A'B'$, whose endpoints are $(4,-2)$ and $(16,14)$, is the image of $\overline{AB}$ after a dilation of $\frac{1}{2}$ centered at the origin. What is the length of $\overline{AB}$?

(1) 5   (3) 20

(2) 10   (4) 40

22 Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$
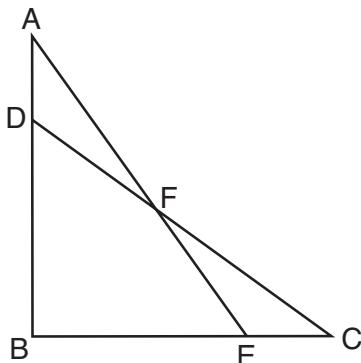

Which statement is needed to prove $\triangle ABE \cong \triangle CBD$ using only SAS $\cong$ SAS?

(1) $\angle CDB \cong \angle AEB$ (3) $\overline{AD} \cong \overline{CE}$

(2) $\angle AFD \cong \angle EFC$ (4) $\overline{AE} \cong \overline{CD}$

**23** In the diagram below, $\overline{BC}$ is the diameter of circle A.
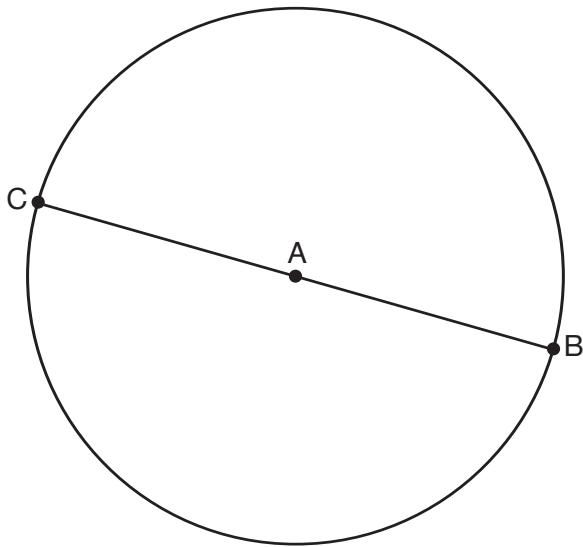
Point D, which is unique from points B and C, is plotted on circle A. Which statement must always be true?

(1) $\triangle BCD$ is a right triangle.

(2) $\triangle BCD$ is an isosceles triangle.

(3) $\triangle BAD$ and $\triangle CBD$ are similar triangles.

(4) $\triangle BAD$ and $\triangle CAD$ are congruent triangles.

24 In the diagram below, $ABCD$ is a parallelogram, $\overline{AB}$ is extended through B to E, and $\overline{CE}$ is drawn.
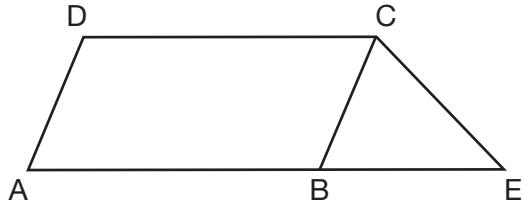

If $\overline{CE} \cong \overline{BE}$ and m$\angle D = 112°$, what is m$\angle E$?

(1) 44°   (3) 68°

(2) 56°   (4) 112°

   **Answer all 7 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil.** [14]

25 Lines *AE* and *BD* are tangent to circles *O* and *P* at *A*, *E*, *B*, and *D*, as shown in the diagram below. If *AC*:*CE* = 5:3, and *BD* = 56, determine and state the length of $\overline{CD}$.
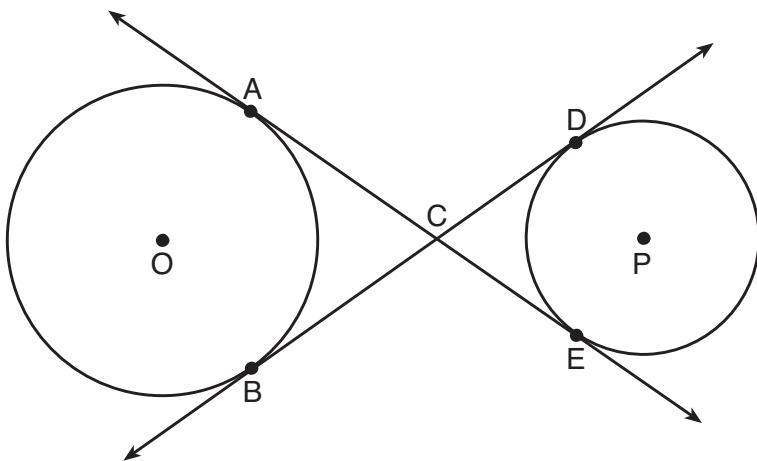
26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.
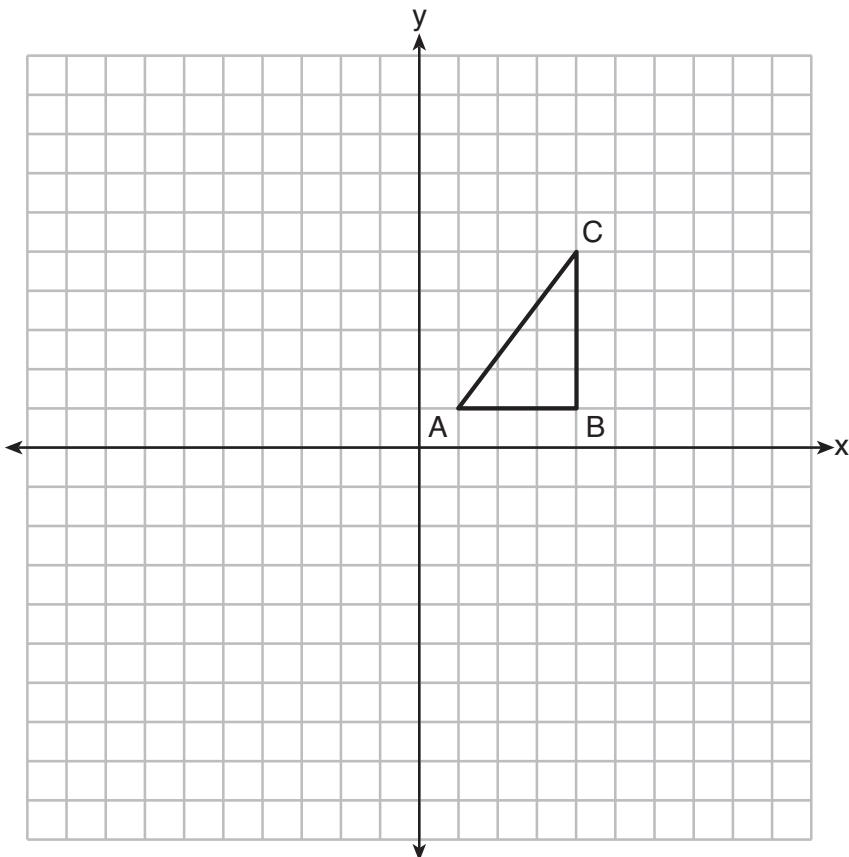
27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

28 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]
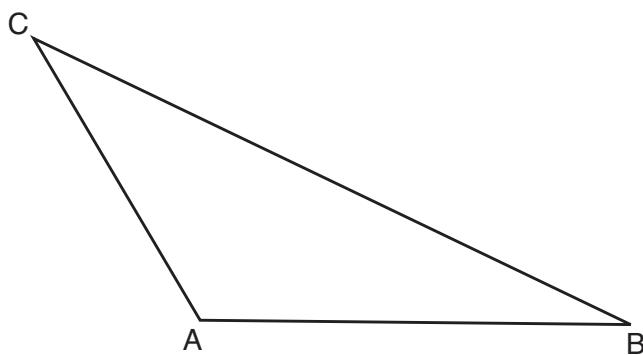
29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.
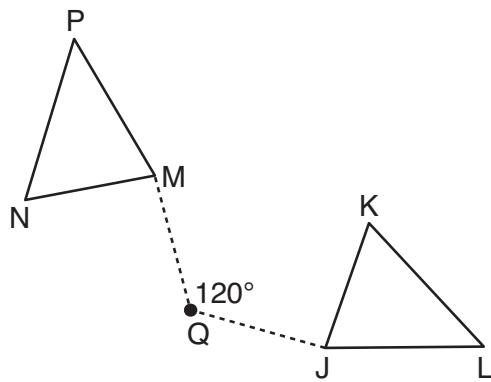
30 A circle has a center at (1,–2) and radius of 4. Does the point (3.4,1.2) lie on the circle? Justify your answer.

31 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.


15 ft

75°
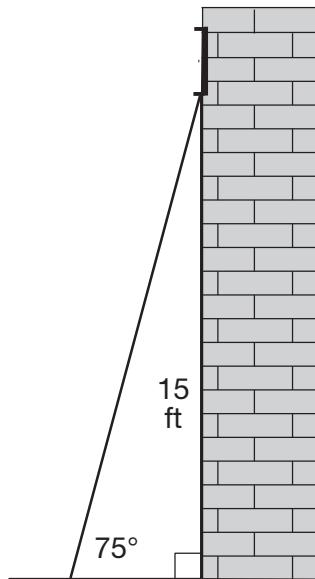
Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
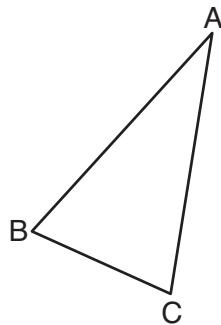
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

33 The grid below shows △*ABC* and △*DEF*.
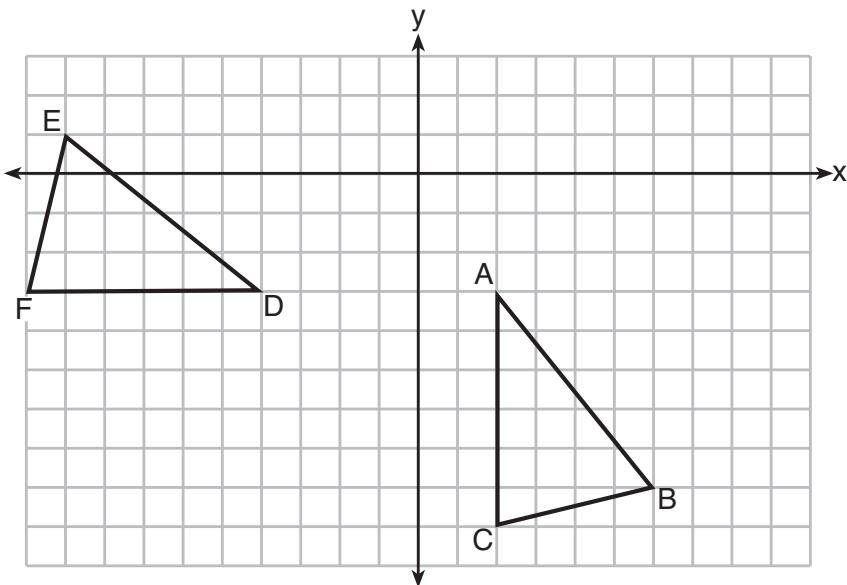
Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

Is △*DEF* congruent to △*A'B'C'*? Explain your answer.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
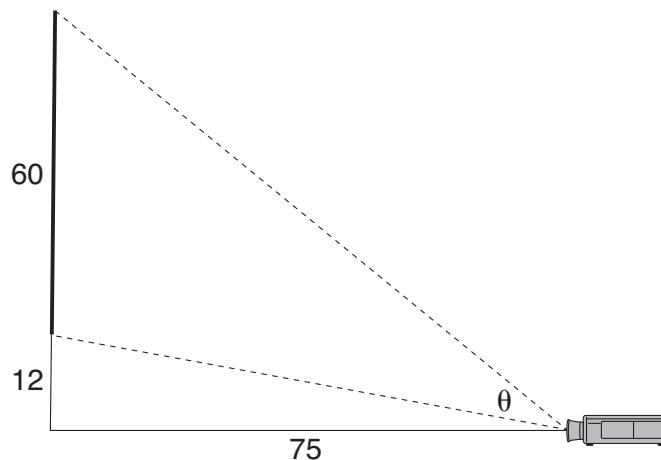

Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

Answer the 2 questions in this part. Each correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E
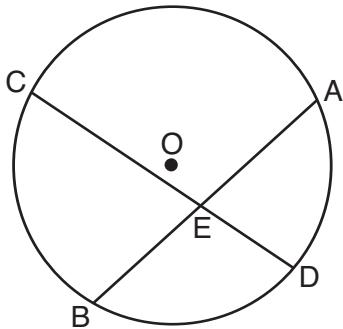
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm
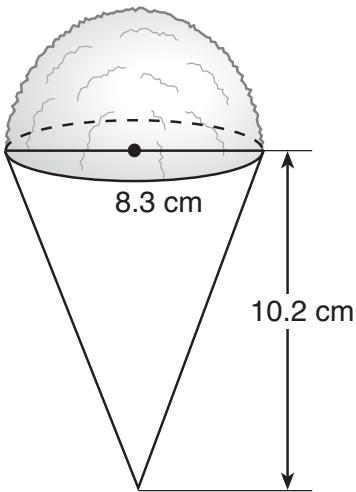
The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

High School Math Reference Sheet

1 inch = 2.54 centimeters   1 kilometer = 0.62 mile   1 cup = 8 fluid ounces
1 meter = 39.37 inches   1 pound = 16 ounces   1 pint = 2 cups
1 mile = 5280 feet   1 pound = 0.454 kilogram 1 quart = 2 pints
1 mile = 1760 yards   1 kilogram = 2.2 pounds   1 gallon = 4 quarts
1 mile = 1.609 kilometers   1 ton = 2000 pounds   1 gallon = 3.785 liters
                                                       1 liter = 0.264 gallon
                                                       1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$	Pythagorean Theorem	$a^2 + b^2 = c^2$
Parallelogram	$A = bh$	Quadratic Formula	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Circle	$A = \pi r^2$	Arithmetic Sequence	$a_n = a_1 + (n-1)d$
Circle	$C = \pi d$ or $C = 2\pi r$	Geometric Sequence	$a_n = a_1 r^{n-1}$
General Prisms	$V = Bh$	Geometric Series	$S_n = \dfrac{a_1 - a_1 r^n}{1-r}$ where $r \neq 1$
Cylinder	$V = \pi r^2 h$	Radians	1 radian = $\dfrac{180}{\pi}$ degrees
Sphere	$V = \frac{4}{3}\pi r^3$	Degrees	1 degree = $\dfrac{\pi}{180}$ radians
Cone	$V = \frac{1}{3}\pi r^2 h$	Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$
Pyramid	$V = \frac{1}{3}Bh$		

Tear Here

Tear Here
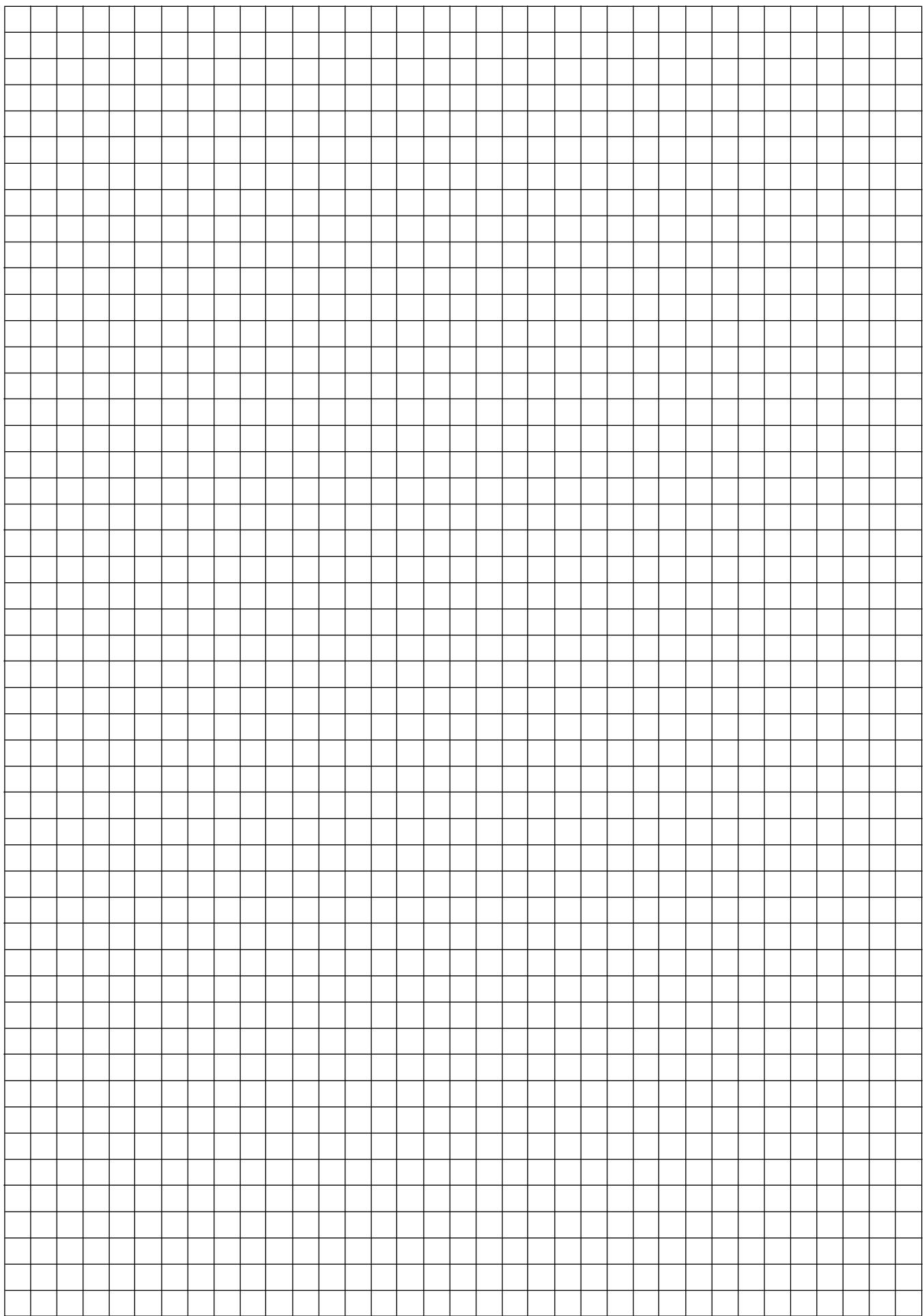
Scrap Graph Paper — This sheet will *not* be scored.
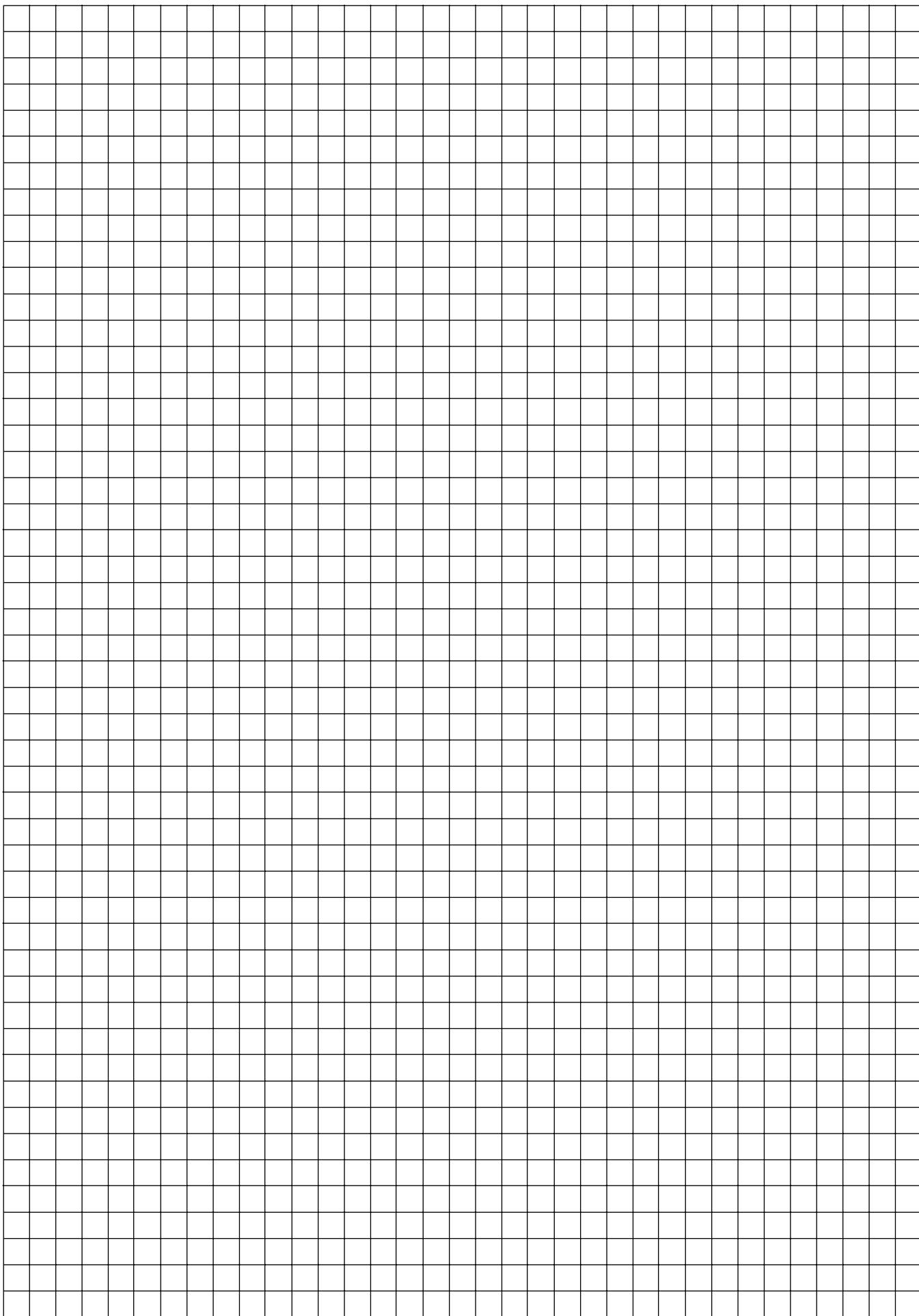
FOR TEACHERS ONLY

GEOMETRY (COMMON CORE)

Wednesday, August 17, 2016 — 8:30 to 11:30 a.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 Wednesday, August 17, 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) 2	(9) 4	(17) . . . . . 2 . . . . .
(2) 2	(10) 2	(18) . . . . . 4 . . . . .
(3) 1	(11) 4	(19) . . . . . 2 . . . . .
(4) 2	(12) 3	(20) . . . . . 4 . . . . .
(5) 1	(13) 3	(21) . . . . . 4 . . . . .
(6) 1	(14) 1	(22) . . . . . 3 . . . . .
(7) 3	(15) 3	(23) . . . . . 1 . . . . .
(8) 3	(16) 1	(24) . . . . . 1 . . . . .

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]** 21, and correct work is shown.

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

<div align="center">

or

</div>

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

<div align="center">

or

</div>

       [1] An appropriate equation is written to find CD, but CD is not found or is found incorrectly.

<div align="center">

or

</div>

       [1] 21, but no work is shown.

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

(26)   **[2]** $\triangle A''B''C''$ is graphed and labeled correctly.

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

<div align="center">

or

</div>

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

       [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]** 60, 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] 60, but no work is shown.

        [0] 360, with correct or incorrect work shown, because any figure will map onto itself after a rotation of 360 about its center.

or

        [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]** A correct construction is drawn showing all appropriate arcs, and the median to $\overline{AB}$ is drawn.

        [1] A correct construction is drawn showing all appropriate arcs, but the median to $\overline{BC}$ or $\overline{AC}$ is drawn.

or

        [1] A correct construction is drawn showing all appropriate arcs, but the median to $\overline{AB}$ is not drawn.

        [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.

(29)   **[2]** 76, and a correct explanation is written.

          [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 explanation is missing or incorrect.

                            or

          [1] A correct explanation is written, but the angle measure is missing or incorrect.

                            or

          [1] 76, 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]** Yes, and a correct justification 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] $(x - 1)^2 + (y + 2)^2 = 16$ or an equivalent equation is written, but no further correct work is shown.

          [0] Yes, 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]** 15.5, 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, such as using an incorrect trigonometric function.

or

[1] Sin $75 = \frac{15}{x}$ or an equivalent equation is written, but no further correct work is shown.

or

[1] 15.5, 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 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(32)   **[4]** A correct construction is drawn showing all appropriate arcs, A' and C' are correctly labeled, and a relationship is stated such as $2 \cdot AC = A'C'$ or $AC = \frac{1}{2}A'C'$.

    [3] Appropriate work is shown, but one construction or labeling error is made. An appropriate geometric relationship is stated.

<p align="center">or</p>

    [3] Appropriate work is shown to construct and label the image of $\triangle ABC$. An appropriate geometric relationship between $\overline{AC}$ and $\overline{A'C'}$ is stated, but it does not describe the relationship of the lengths.

    [2] Appropriate work is shown, but two or more construction or labeling errors are made. An appropriate geometric relationship is stated.

<p align="center">or</p>

    [2] A correct geometric relationship is described, but no further correct work is shown.

<p align="center">or</p>

    [2] Appropriate work is shown to construct the image of $\triangle ABC$, but no further correct work is shown.

    [1] Appropriate work is shown to construct the locations of A' and C', but no further work is shown.

<p align="center">or</p>

    [1] An incomplete geometric relationship is described, 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.

(33)   **[4]** (7,1), and a correct explanation is written. Yes, and a correct explanation is written.

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

or

[3] (7,1), but the explanation is missing, incorrect, or incomplete. Yes, and a correct explanation is written.

or

[3] (7,1), and a correct explanation is written. Yes, but an incomplete explanation is written.

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

or

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

or

[2] (7,1), and a correct explanation is written, but no further correct work is shown.

or

[2] (7,1), but the explanation is missing, incorrect, or incomplete. Yes, but an incomplete or incorrect explanation is written.

or

[2] Yes, and a correct explanation is written, but no further correct work is shown.

[1] Yes, but an incomplete or incorrect explanation is written. No further correct work is shown.

or

[1] (7,1), but no further correct work is shown.

[0] Yes, but the explanation is missing.

or

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

(34) **[4]** 34.7, and correct work is shown.

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

or

[3] Correct work is shown to find both angles of elevation, but no further correct work is shown.

[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.

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

or

[1] Correct work is shown to find one angle of elevation, but no further correct work is shown.

or

[1] Two appropriate trigonometric equations are written, but no further correct work is shown.

or

[1] 34.7, 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.

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 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 and/or reason is missing or incorrect.

<div align="center">*or*</div>

        [5] A correct proportion is proven, but no further correct work is shown.

        [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.

<div align="center">*or*</div>

        [4] $\triangle ADE \sim \triangle CBE$ or $\triangle ACE \sim \triangle DBE$ is proven, but no further correct work is shown.

        [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.

<div align="center">*or*</div>

        [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 a method of proof, but one conceptual error is made, and one statement and/or reason is missing or incorrect.

<div align="center">*or*</div>

        [2] Only two correct relevant statements and reasons are written.

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

        [0] The "given" and/or the "prove" statements are written, but no further correct relevant statements are written.

<div align="center">*or*</div>

        [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]** 44.53, and correct work is shown.

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

or

[5] Correct work is shown to find the correct number of kilograms needed for fifty snow cones, but no further correct work is shown.

or

[5] Correct work is shown to find the cost of one snow cone, but no further correct work is shown.

[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] Correct work is shown to find the correct number of grams needed for one snow cone. 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.

or

[3] Correct work is shown to find the volume of fifty snow cones. No further correct work is shown.

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

or

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

or

[2] Correct work is shown to find the volume of the cone and the volume of the hemisphere. No further correct work is shown.

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

or

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

or

[1] Correct work is shown to find the volume of the cone or the volume of the hemisphere. No further correct work is shown.

or

[1] 44.53, 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 the Common Core Learning Standards
Geometry (Common Core)
August 2016

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

Regents Examination in Geometry (Common Core)
August 2016
Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scale Scores)

> **The *Chart for Determining the Final Examination Score for the August 2016 Regents Examination in Geometry (Common Core)* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Wednesday, August 17, 2016.**

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.

Table of Contents

25 Lines *AE* and *BD* are tangent to circles *O* and *P* at *A*, *E*, *B*, and *D*, as shown in the diagram below. If *AC*:*CE* = 5:3, and *BD* = 56, determine and state the length of $\overline{CD}$.

$$5x + 3x = 56$$

$$\frac{8x}{8} = \frac{56}{8}$$

$$x = 7$$

$$CE = 3(7) = 21$$

$$\boxed{CD = 21}$$

Score 2: The student had a complete and correct response.

25 Lines *AE* and *BD* are tangent to circles *O* and *P* at *A*, *E*, *B*, and *D*, as shown in the diagram below. If *AC:CE* = 5:3, and *BD* = 56, determine and state the length of $\overline{CD}$.
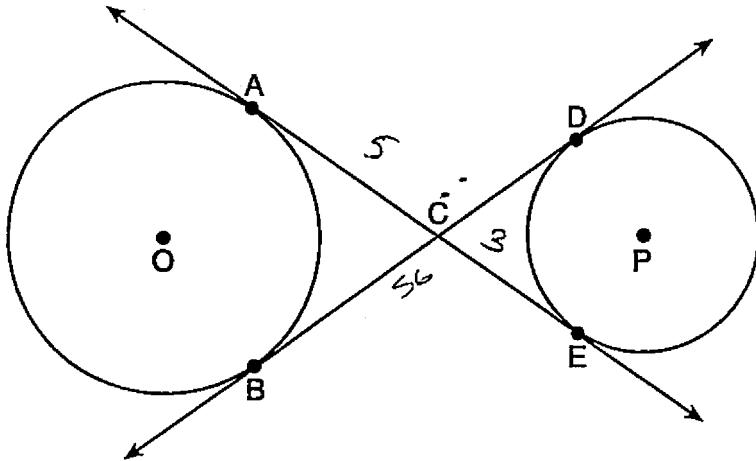
$$1 \text{ unit} = 56 \div (5+3)$$
$$= 56 \div 8$$
$$= 7$$

$$\therefore CD = 7(3)$$
$$= 21$$

Score 2: The student had a complete and correct response.

25 Lines *AE* and *BD* are tangent to circles *O* and *P* at *A*, *E*, *B*, and *D*, as shown in the diagram below. If *AC:CE* = 5:3, and *BD* = 56, determine and state the length of $\overline{CD}$.

$$5x + 3x = 56$$

$$8x = 56 \qquad x = 7$$
$$\frac{8x}{8} = \frac{56}{8}$$
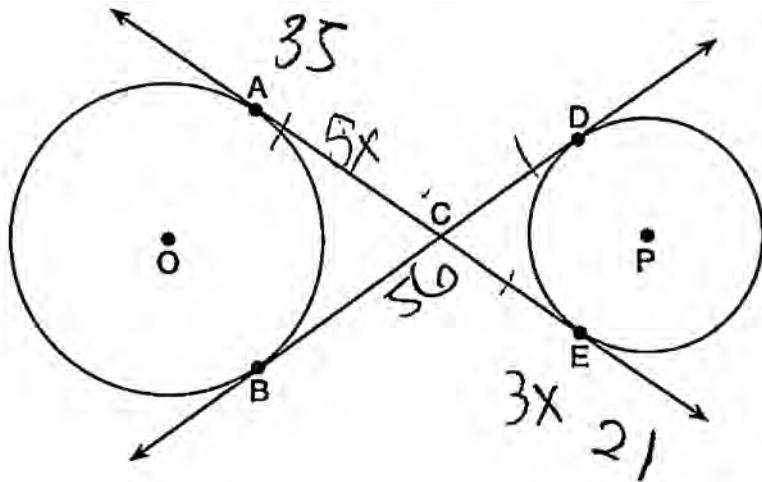
$$CD = 35$$

Score 1: The student substituted incorrectly and found the length of $\overline{CB}$.

25 Lines *AE* and *BD* are tangent to circles *O* and *P* at *A*, *E*, *B*, and *D*, as shown in the diagram below. If *AC*:*CE* = 5:3, and *BD* = 56, determine and state the length of $\overline{CD}$.
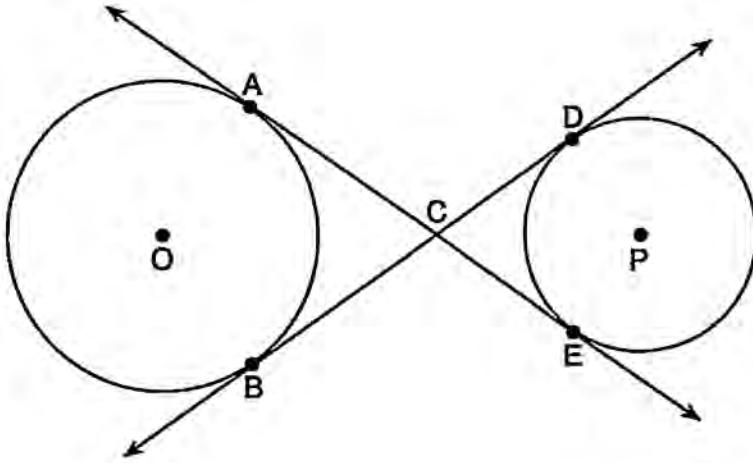
$$5x + 3x = 360$$

$$\frac{8x}{8} = \frac{360}{8}$$

$$\boxed{x = 45}$$

Score 0: The student did not show enough relevant correct work to receive any credit.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

Score 2: The student had a complete and correct response.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

Score 2: The student had a complete and correct response.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

$A''(6,1)$
$B''(9,1)$
$C''(9,-3)$

Score 1: The student made an error by graphing the reflection and then the translation.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.
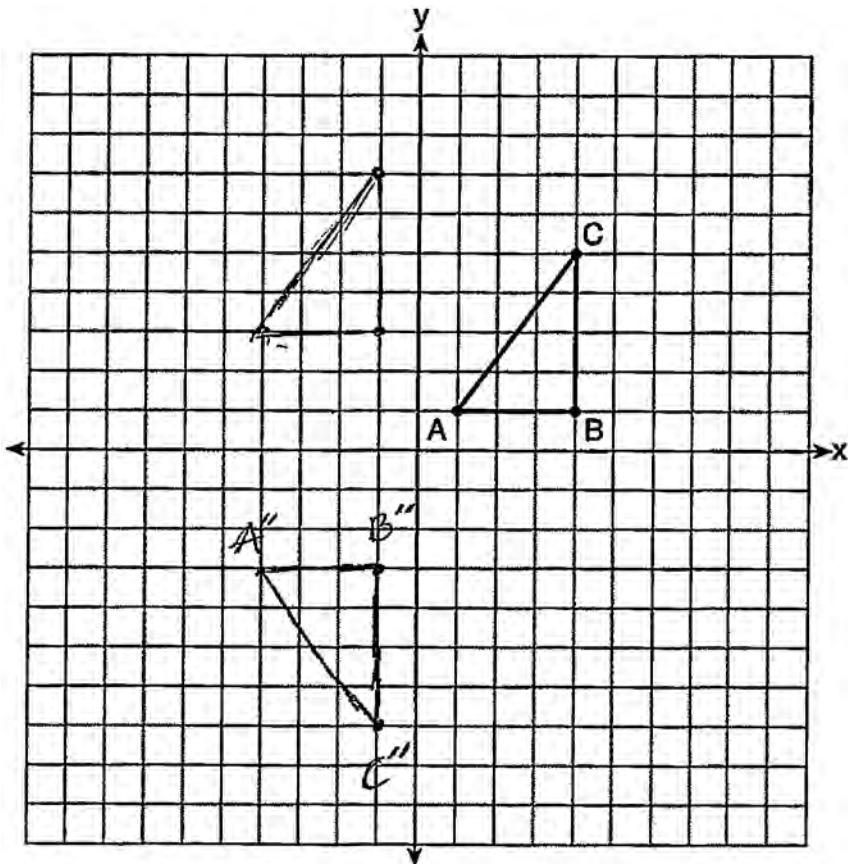
Score 1: The student made an error by translating five units to the left.

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26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.

$X+5 \qquad Y+2$
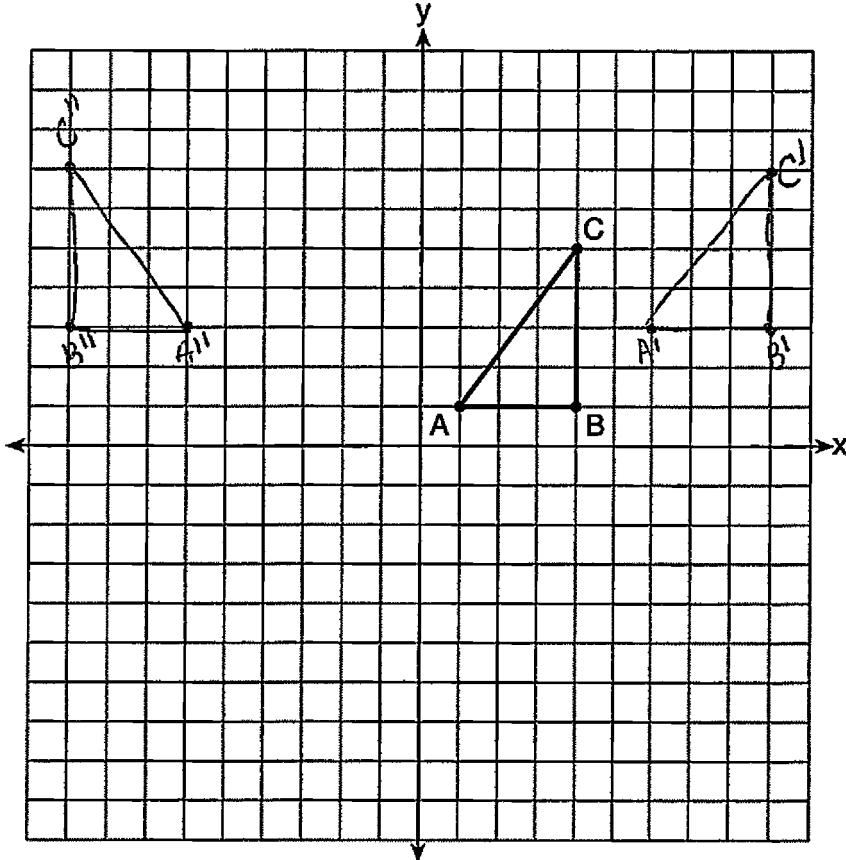
$$A(1,1) \rightarrow A'(6,3) \rightarrow A''(-6,3)$$
$$B(4,1) \rightarrow B'(9,3) \rightarrow B''(-9,3)$$
$$C(4,5) \rightarrow C'(9,7) \rightarrow C''(-9,7)$$

Score 1: The student made an error by reflecting over the y-axis.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up followed by the reflection over the line $y = 0$.
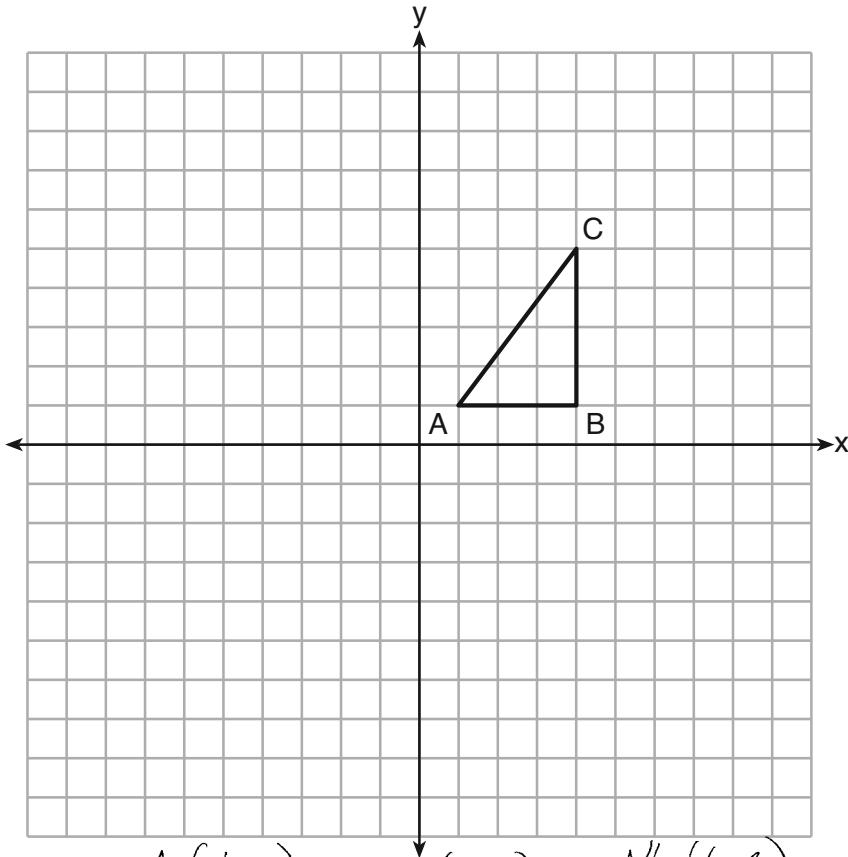
$$A(1,1) \longrightarrow (6,3) \rightarrow A''(6,-3)$$
$$B(4,1) \longrightarrow (9,3) \rightarrow B''(9,-3)$$
$$C(4,5) \longrightarrow (9,7) \longrightarrow C''(9,-7)$$

Score 1:   The student performed the sequence of transformations algebraically.

26 In the diagram below, $\triangle ABC$ has coordinates $A(1,1)$, $B(4,1)$, and $C(4,5)$. Graph and label $\triangle A''B''C''$, the image of $\triangle ABC$ after the translation five units to the right and two units up
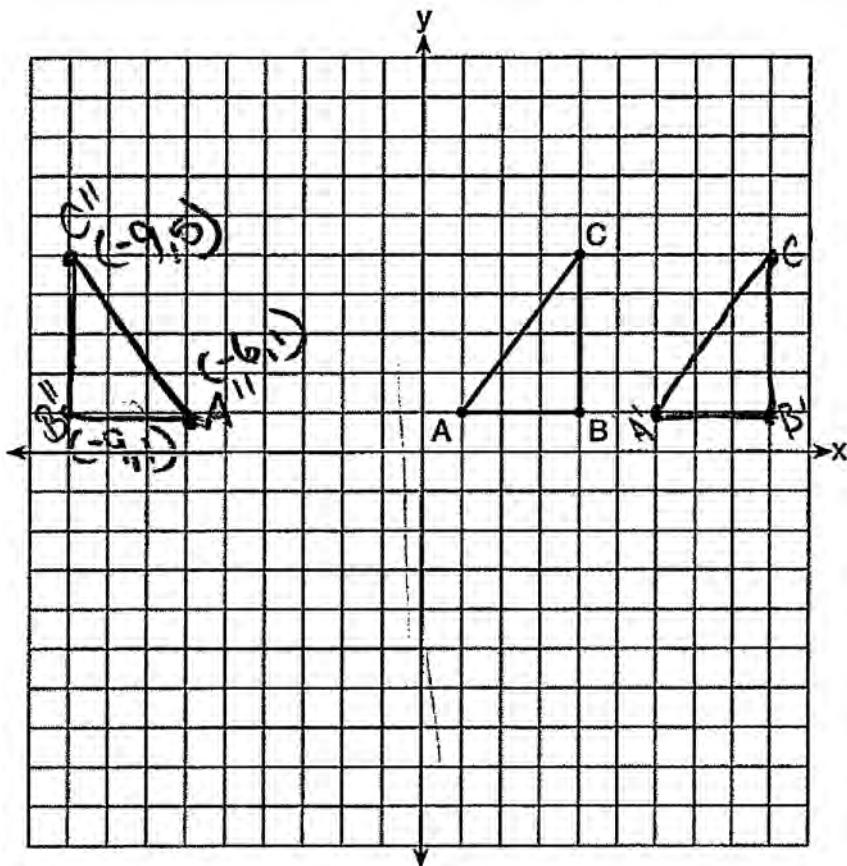
Score 0: The student graphed the sequence of transformations incorrectly.

27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.
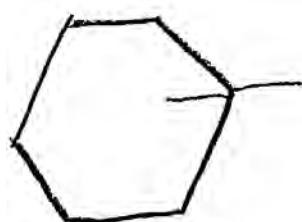
$$\frac{180(n-2)}{n} = \frac{180(6-2)}{6}$$

$$\frac{720}{6} = 120$$

$$\begin{array}{r} 180 \\ -120 \\ \hline \end{array}$$

$$\boxed{60°}$$

Score 2: The student had a complete and correct response.

27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

$$\frac{360}{6} = \boxed{60°}$$

Score 2: The student had a complete and correct response.

27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

60°

60 120

0
360 170

800 240
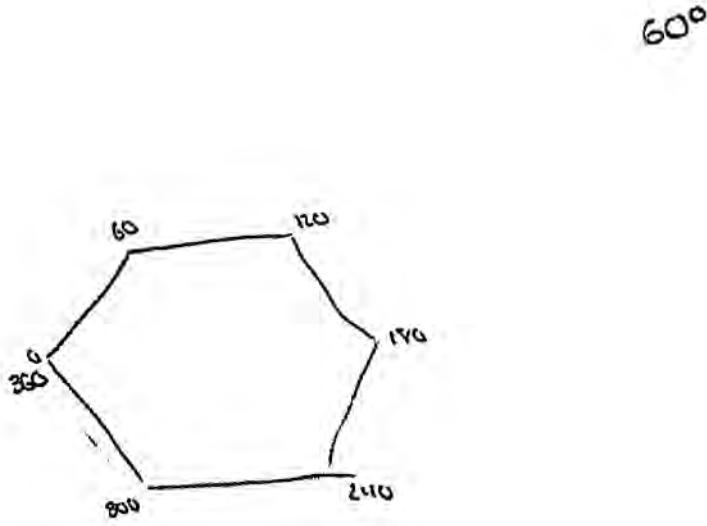
Score 2: The student had a complete and correct response.

27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.
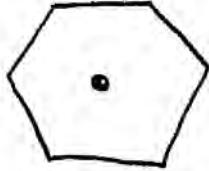
$$180(n-2)$$
$$180(6-2)$$
$$180(4)$$
$$720$$
$$\frac{720}{6} = \boxed{120°}$$

Score 1: The student found the measure of one interior angle of the hexagon.

27 A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.
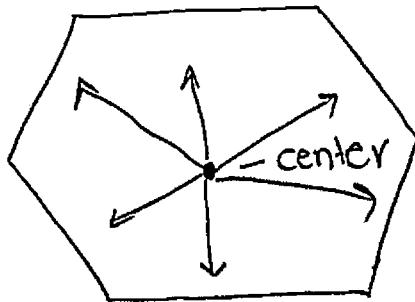
$$n + 6 = 180$$
$$n + 6 = 180$$
$$6 + 6 = 180$$
$$12 = 180$$
$$x = 15$$

Minimun number of degrees in a rotation is 15°

Score 0: The student had a completely incorrect response.

28 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]

Score 2: The student had a complete and correct response.

28 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]

Score 2: The student had a complete and correct response.

28 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]

Score 1: The student had a correct construction of a perpendicular bisector, but did not draw the median.

28 In the diagram of $\triangle ABC$ shown below, use a compass and straightedge to construct the median to $\overline{AB}$. [Leave all construction marks.]
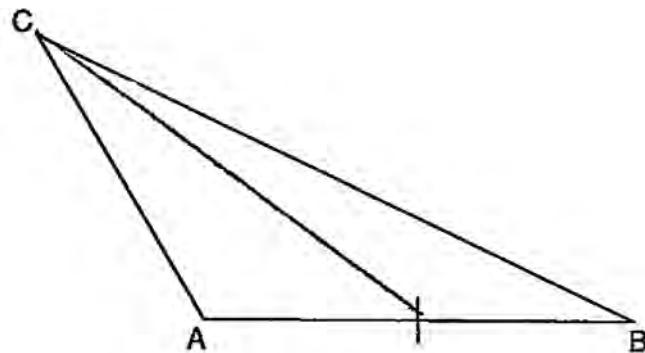
Score 0: The student made a drawing that was not a construction.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.
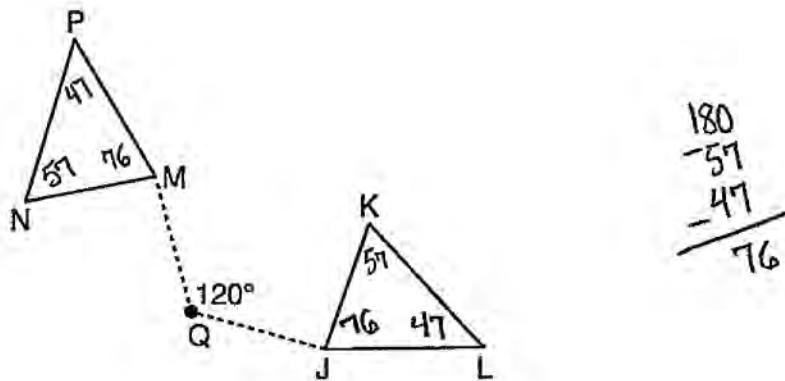
$m\angle M$ is. 76° because angle K is angle N after the rotation, and angle L becomes P and angle J becomes angle M. Rotation is a rigid motion, so their measures will be the same.
On △MNP m∠P=47° and m∠N=57°. A triangle is 180° so 180°-57°-47°=76°, the measure of ∠M.

Score 2: The student had a complete and correct response.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.

$$180$$
$$-47$$
$$-57$$
$$\boxed{76°}$$
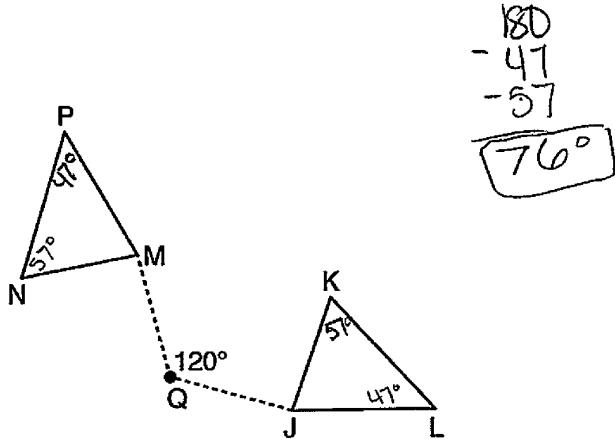
A rotation is an isometry, so the triangles must be congruent and have corresp. congruent angles. So that means ∠P≅∠L and ∠P= 47° by substitution. Then 47° and 57° can be subtracted from 180° to find ∠M= 76°

Score 2: The student had a complete and correct response.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.
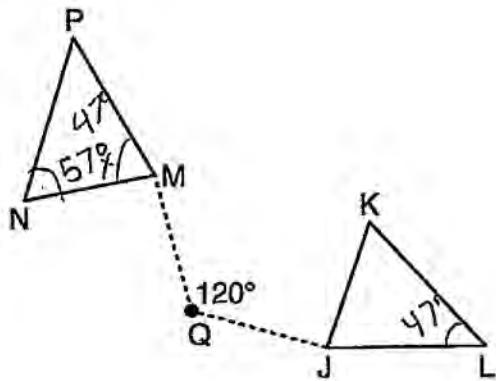
angle M = 47° because rotating the triangle doesn't change angle measurements.

Score 1: The student wrote a correct explanation, but the angle measure was incorrect.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.

$\angle P \cong \angle L$

P

57   X M

N

120°
Q

K

J   L   47
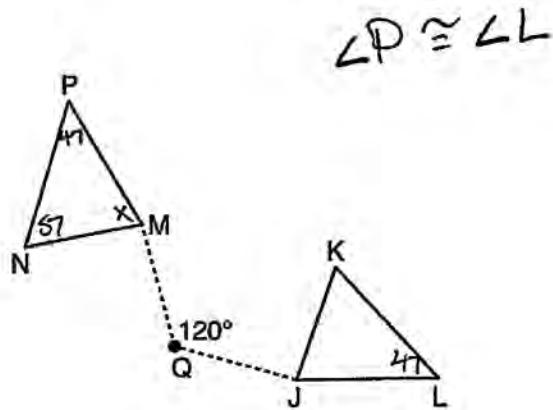
$\begin{array}{r} 47 \\ +57 \\ \hline 104 \end{array}$

$\begin{array}{r} 180 \\ -104 \\ \hline 76 \end{array}$

$\boxed{M = 76°}$

180° in a △

Score 1:   The student did not write an explanation.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.
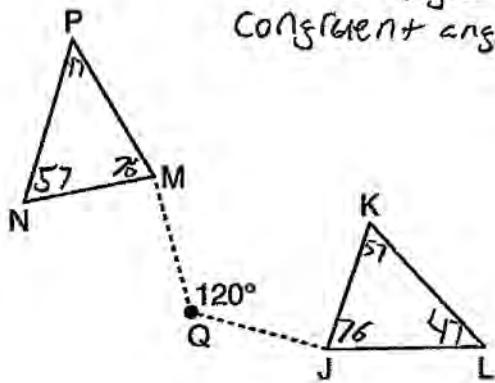
The measure of angle M is 76°
because angle J and angle M are
Congruent angle.

P

57   76 M

N

120°

Q

K

57

76   47

J   L

Score 1: The student had an incomplete explanation.

29 Triangle *MNP* is the image of triangle *JKL* after a 120° counterclockwise rotation about point *Q*. If the measure of angle *L* is 47° and the measure of angle *N* is 57°, determine the measure of angle *M*. Explain how you arrived at your answer.
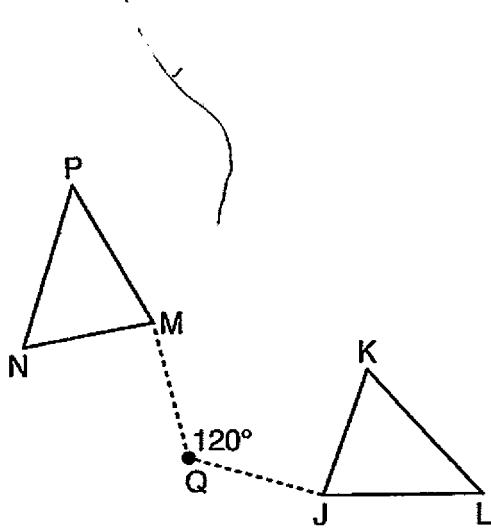
$$120 + 47 + 57 = 224$$

$$224 - 180 = 44°$$

Score 0: The student had a completely incorrect response.

30 A circle has a center at (1,–2) and radius of 4. Does the point $(3.\overset{X}{4},1.\overset{Y}{2})$ lie on the circle? Justify your answer.

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

$$(3.4-1)^2 + (1.2+2)^2 = 16$$

$$\downarrow$$

$$5.76 + 10.24 = 16$$

$$16 = 16 \checkmark$$

yes $\longrightarrow$ The point (3.4, 1.2) lie on the circle. By using the equation of the circle, $(x-1)^2 + (x+2)^2 = 4^2$, you plug in the X and the Y. First you get $(3.4-1)^2 + (1.2+2)^2 = 16$. When you solve + simplify everything, you get $16 = 16$.

Score 2: The student had a complete and correct response.

30 A circle has a center at (1,–2) and radius of 4. Does the point (3.4,1.2) lie on the circle? Justify your answer.

Yes.

$$r = \sqrt{(3.4-1)^2 + (1.2+2)^2}$$

$$r = \sqrt{5.76 + 6.24}$$

$$r = \sqrt{16} = 4$$

Score 2: The student had a complete and correct response.

30 A circle has a center at (1,–2) and radius of 4. Does the point (3.4,1.2) lie on the circle? Justify your answer.

$$(X+1)^2 + (y-2)^2 = 16$$

$$(3.4+1)^2 + (1.2-2)^2 = 16$$

$$19.36 + 0.64 \overset{?}{=} 16$$

$$20 \neq 16$$

no

Score 1: The student made a substitution error, but wrote an appropriate conclusion.

Question 30

30 A circle has a center at (1,–2) and radius of 4. Does the point (3.4,1.2) lie on the circle? Justify your answer.

No it does not.

(3.4,1.2)

Score 0: The student had a completely incorrect response.

31 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

$$\text{Sine}(75) = \frac{15}{x}$$

$$x = \frac{15}{\text{Sine}(75)}$$

$$\boxed{x = 15.5}$$

Score 2: The student had a complete and correct response.

31 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

C

15
ft

75°

a

$$a \cdot \tan(75) = \frac{15}{a} \cdot a$$

$$a = \frac{15}{\tan(75)}$$

$$a^2 + b^2 = c^2$$

$$\sqrt{\left(\frac{15}{\tan(75)}\right)^2 + 2\sqrt{15}} = \sqrt{c^2}$$

$$15.5 = c$$

Score 2: The student had a complete and correct response.

31 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

$$\text{Sin}(75) = \frac{15}{n}$$

$$n = 15 \cdot \text{sin}(75)$$

$$n = 14.5$$

15 ft

n

75°

Score 1: The student had a correct equation, but solved it incorrectly.

31 In the diagram below, a window of a house is 15 feet above the ground. A ladder is placed against the house with its base at an angle of 75° with the ground. Determine and state the length of the ladder to the *nearest tenth of a foot*.

90 + 75 = 165
180 - 165 = 15
15/2 = 7.5

15 ft

106° / 75° 90
7.5
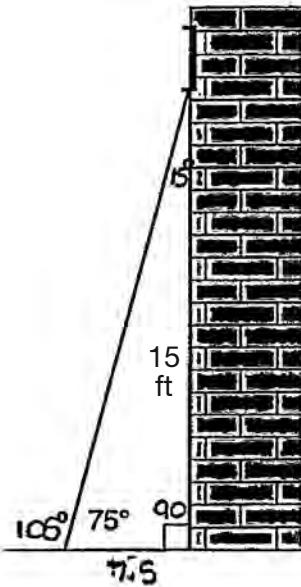
$a^2 + b^2 = c^2$
$(7.5)^2 + (15)^2 = c^2$
$56.25 + 225 = c^2$
$281.25 = c^2$
$\sqrt{281.25} = \sqrt{c^2}$
$16.77050983 = c$

Length of ladder = 16.8 ft.

Score 0:   The student did not show enough relevant correct work to receive any credit.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
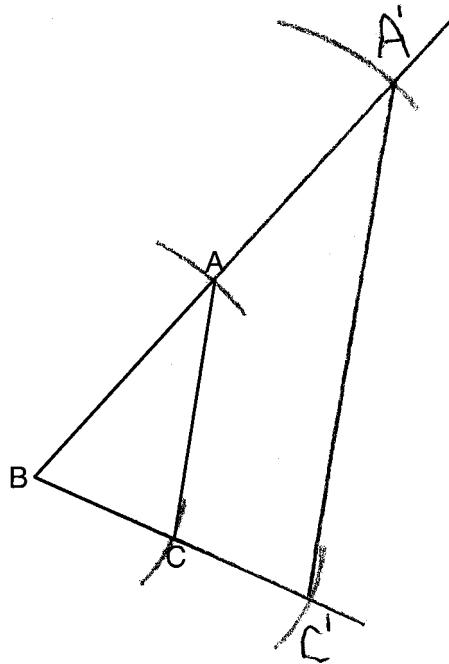
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

the length of $\overline{A'C'}$ is twice the length of $\overline{AC}$

Score 4: The student had a complete and correct response.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
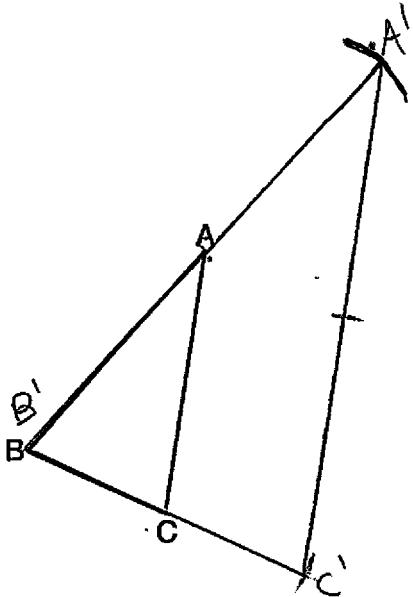
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

The ratio of the lengths of $\overline{A'C'}$ to $\overline{AC}$ is 2:1

Score 4: The student had a complete and correct response.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
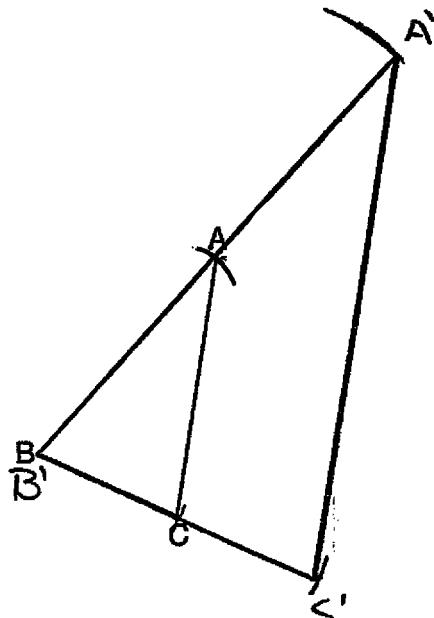

Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

$\overline{AC}$ and $\overline{A'C'}$ are both parallel to each other.

Score 3: The student had a correct construction, but the description was of a correct relationship other than length.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
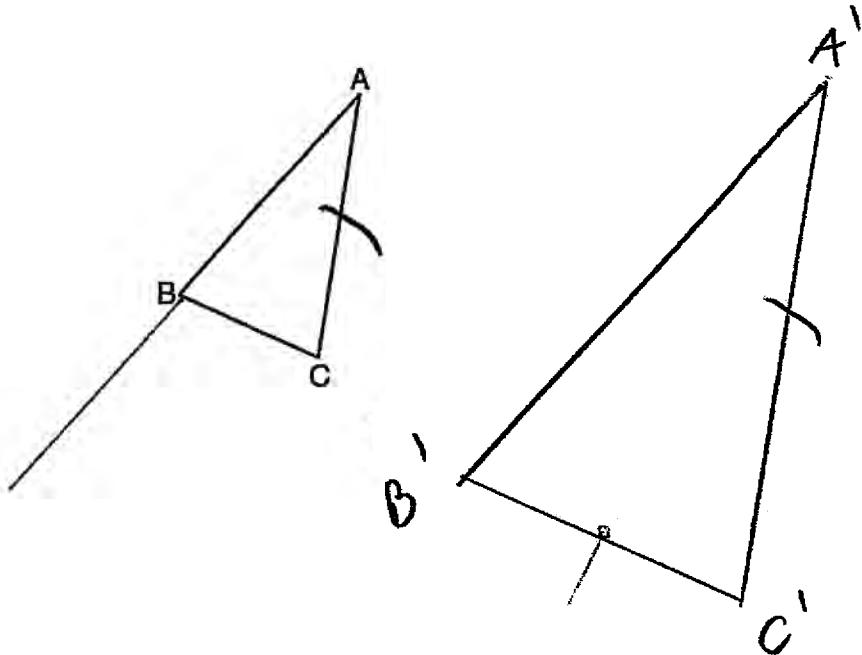

Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

AC is half A'C'

Score 2: The student had a correct description, but no further correct work was shown.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
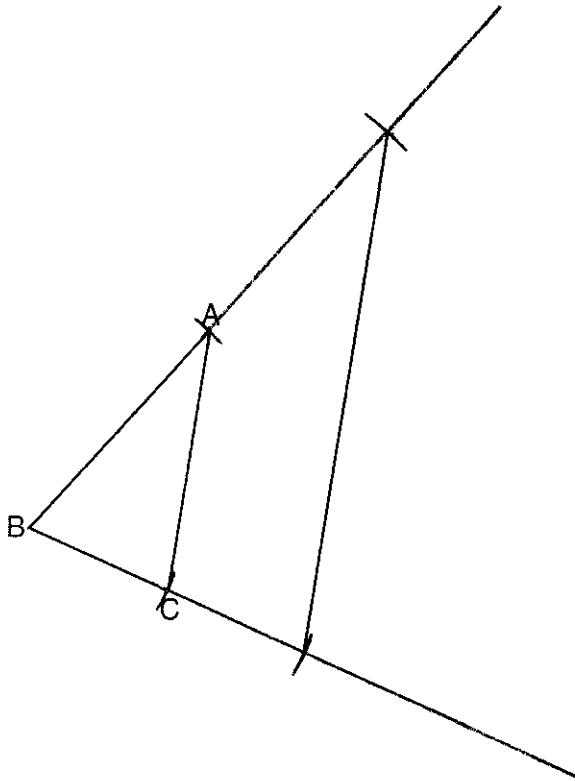
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

They are in a ratio of 2:1

Score 2: The student did not label A' and C' on the construction. The description was incomplete.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
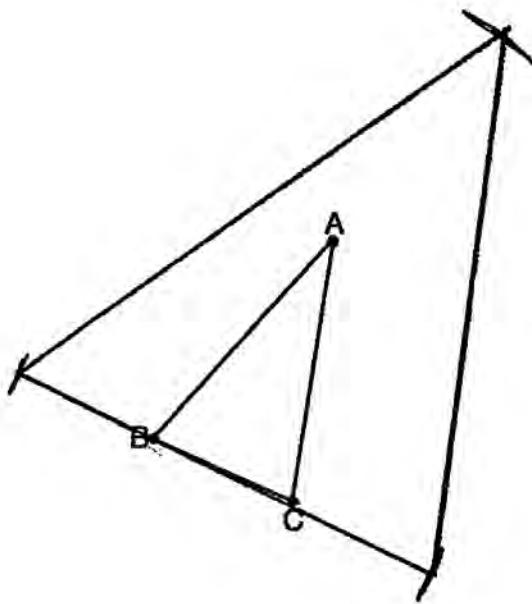

Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

it is doubled

Score 1: The student made an incorrect construction. The description was incomplete.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
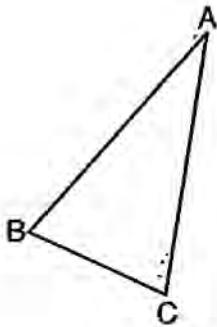
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

is 2x bigger.

Score 1: The student wrote an incomplete description and the construction was missing.

32 Using a compass and straightedge, construct and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a dilation with a scale factor of 2 and centered at B. [Leave all construction marks.]
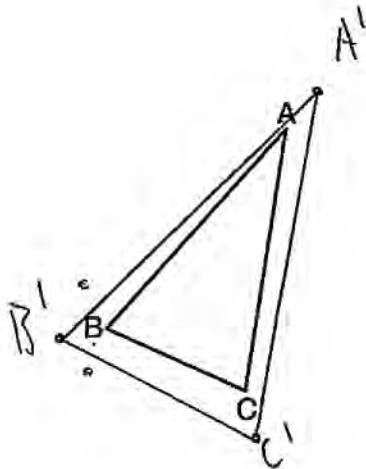
Describe the relationship between the lengths of $\overline{AC}$ and $\overline{A'C'}$.

A'C is a dialated line Segment of AC

Score 0: The construction and description were completely incorrect.
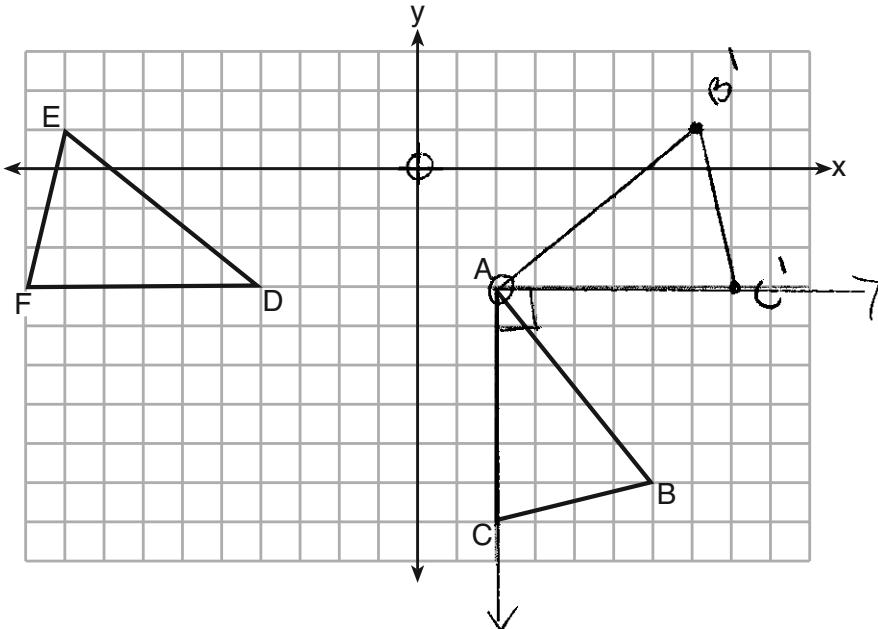
33 The grid below shows △*ABC* and △*DEF*.

Let △*A′B′C′* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B′* if the location of point *C′* is (8,–3). Explain your answer.

B′(7,1) The angle of Rotation that took C to C′ was 90° counter clockwise, so take B to B′ by finding the point using the same rotation about point A.

Is △*DEF* congruent to △*A′B′C′*? Explain your answer.

Yes, when △A′B′C′ is reflected over the line x = -1, it will map to △DEF. Since a reflection is a rigid motion that preserves distance, △DEF ≅ △A′B′C′

Score 4: The student had a complete and correct response.

33 The grid below shows △*ABC* and △*DEF*.

Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

Rotate B Counterclockwise 90° about A (2,-3)
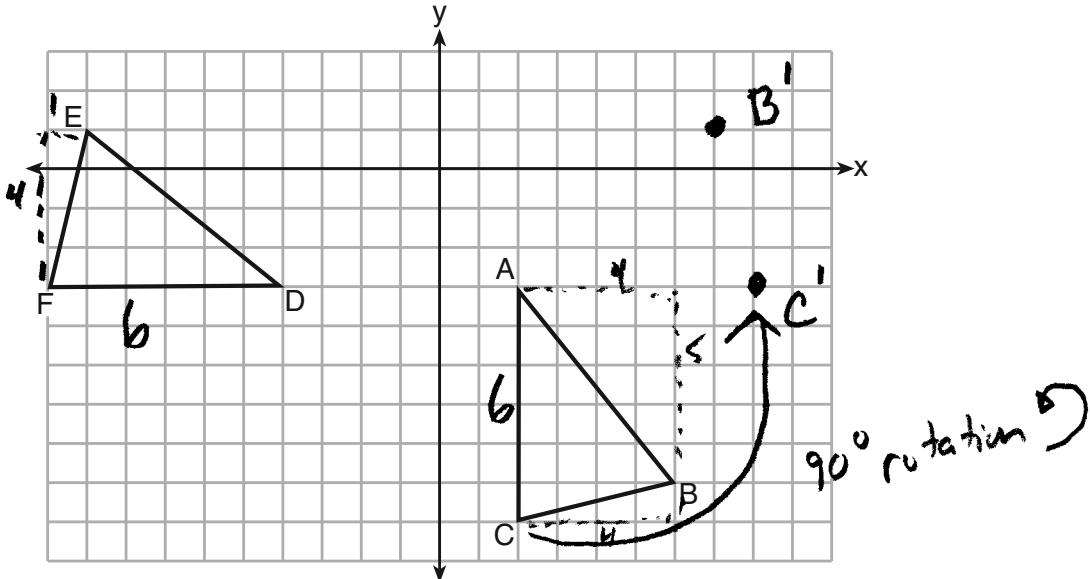
$$B(6,-8) \xrightarrow{\text{Subtract }(2,-3)} (4,-5) \xrightarrow{\text{Rotate}} (5,4) \xrightarrow{\text{Add }(2,-3)} B'(7,1)$$

B'(7,1), was found by applying the rotation algorithm from a NON-origin point.

Is △*DEF* congruent to △*A'B'C'*? Explain your answer. YES

$$AC = 6 \quad DF = 6 \quad \text{Counted}$$
$$BC = \sqrt{4^2+1^2} = \sqrt{17}, \quad EF = \sqrt{4^2+1^2} = \sqrt{17}$$
$$AB = \sqrt{5^2+4^2} = \sqrt{41}, \quad DE = \sqrt{5^2+4^2} = \sqrt{41}$$

△ABC ≅ △DEF by SSS

Since a rotation preserves distance, △ABC ≅ △A'B'C'
So by substitution △DEF ≅ △A'B'C'

Score 4: The student had a complete and correct response.

33 The grid below shows △*ABC* and △*DEF*.
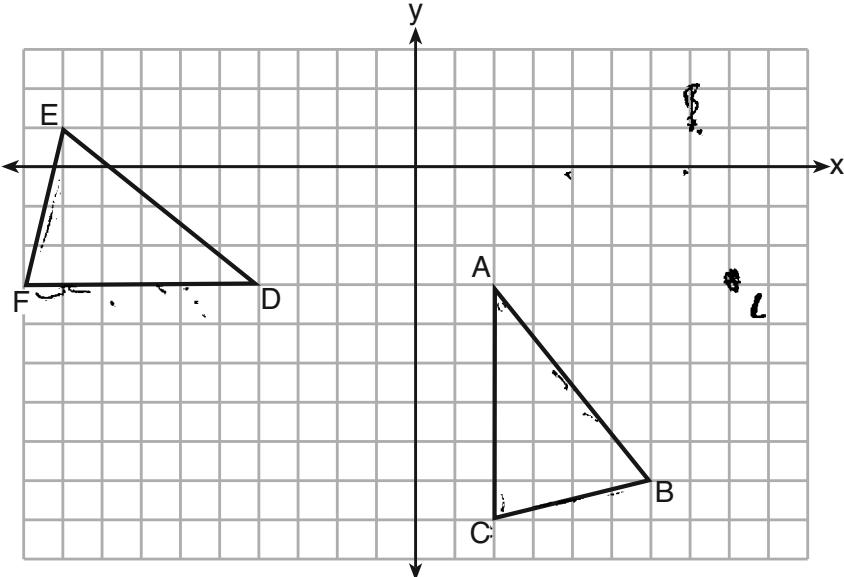
Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

It rotates 90° counter clockwise arnd A so
Point B' would be (7, 1)

Is △*DEF* congruent to △*A'B'C'*? Explain your answer.

△ DEF and △ ABC are congruent
by SSS so △ DEF is congruent to △ A'B'C'
by SSS.

Score 3: The student wrote an incomplete explanation for why △*DEF* is congruent to △*A'B'C'*.

33 The grid below shows △*ABC* and △*DEF*.
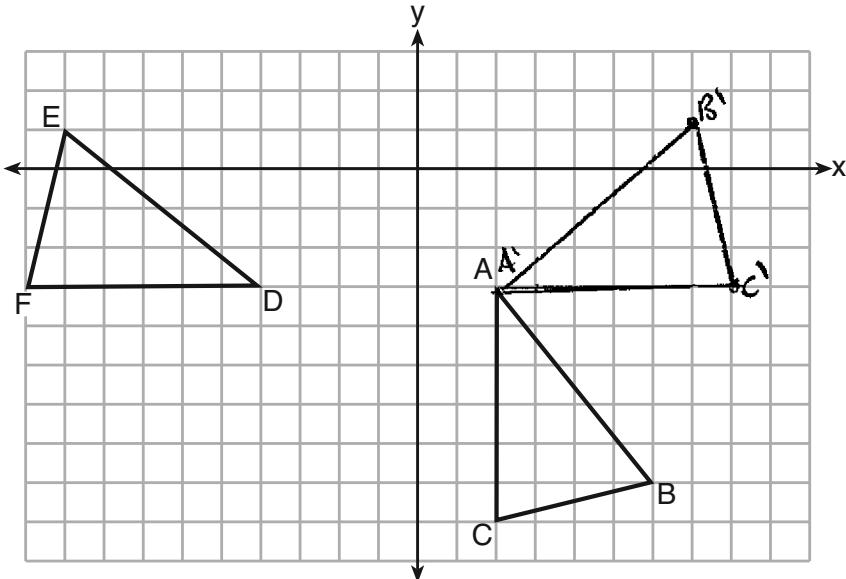
Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

B'(7,1)   C rotated 90° ,80 I rotated B 90°

Is △*DEF* congruent to △*A'B'C'*? Explain your answer.

Yes, if you reflect △A'B'C' over X=-1, it matches up perfectly, so △DEF is ≅ to △A'B'C'

Score 3: The student wrote an incomplete explanation for why △*DEF* is congruent to △*A'B'C'*.

33 The grid below shows △*ABC* and △*DEF*.
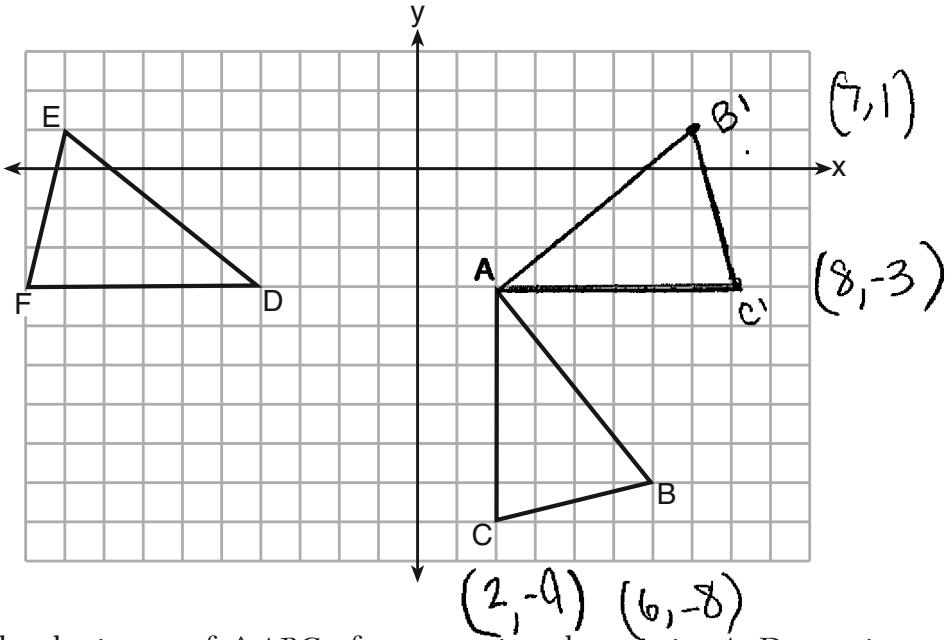
Let △*A′B′C′* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B′* if the location of point *C′* is (8,–3). Explain your answer.

(7,1)   B′ had to be the same distance away from C′, as B and C were from eachother.

Is △*DEF* congruent to △*A′B′C′*? Explain your answer.

Yes, each point is the same distance apart from one-another.

Score 2:   The student wrote two incomplete explanations.
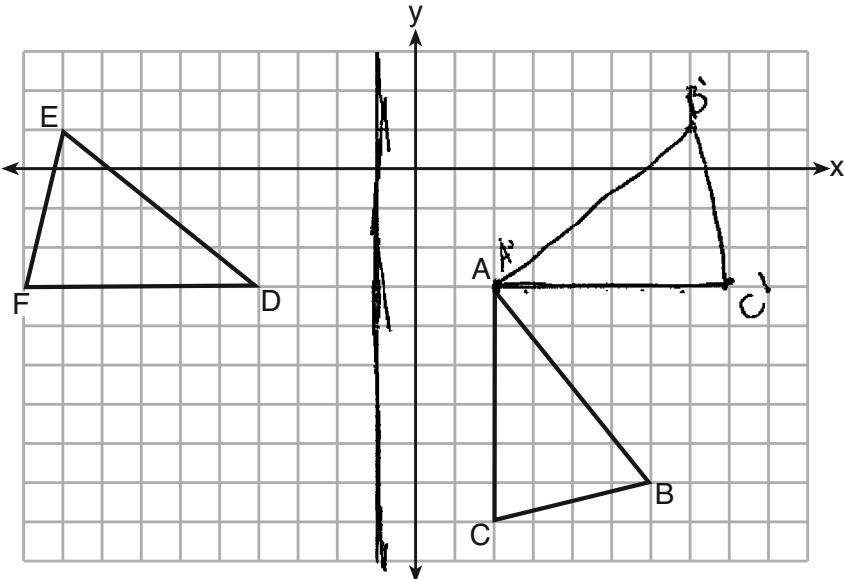
33 The grid below shows △*ABC* and △*DEF*.

Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

Counted the slopes and ploted points based on C¹'s location

Is △*DEF* congruent to △*A'B'C'*? Explain your answer.

Yes all the slopes are the same they just reflected over X = -1

Score 1: The student wrote yes, but the explanation was incorrect. No further correct work was shown.
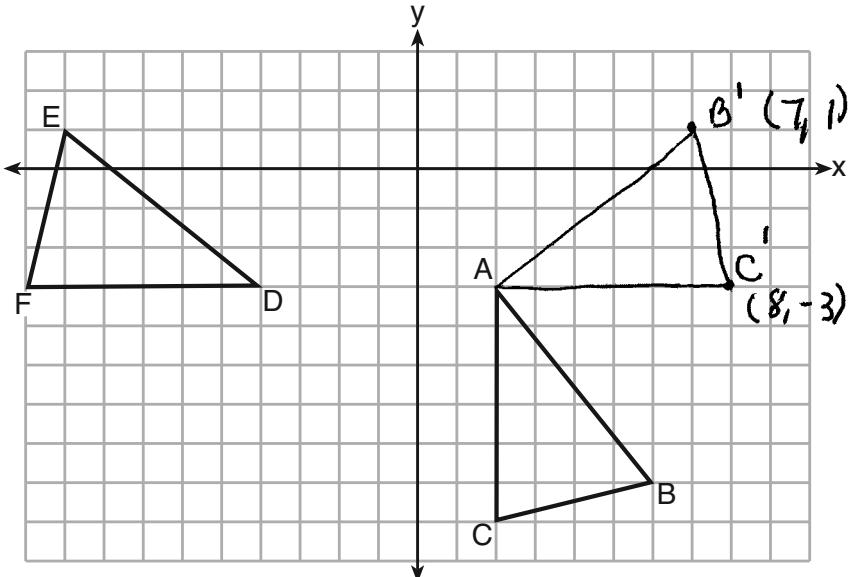
33 The grid below shows △*ABC* and △*DEF*.

Let △*A'B'C'* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B'* if the location of point *C'* is (8,–3). Explain your answer.

Is △*DEF* congruent to △*A'B'C'*? Explain your answer.

Yes

Score 1: The student showed work to find (7,1), and wrote yes, but did not write any explanations.

33 The grid below shows △*ABC* and △*DEF*.

$A = (2, -3)$
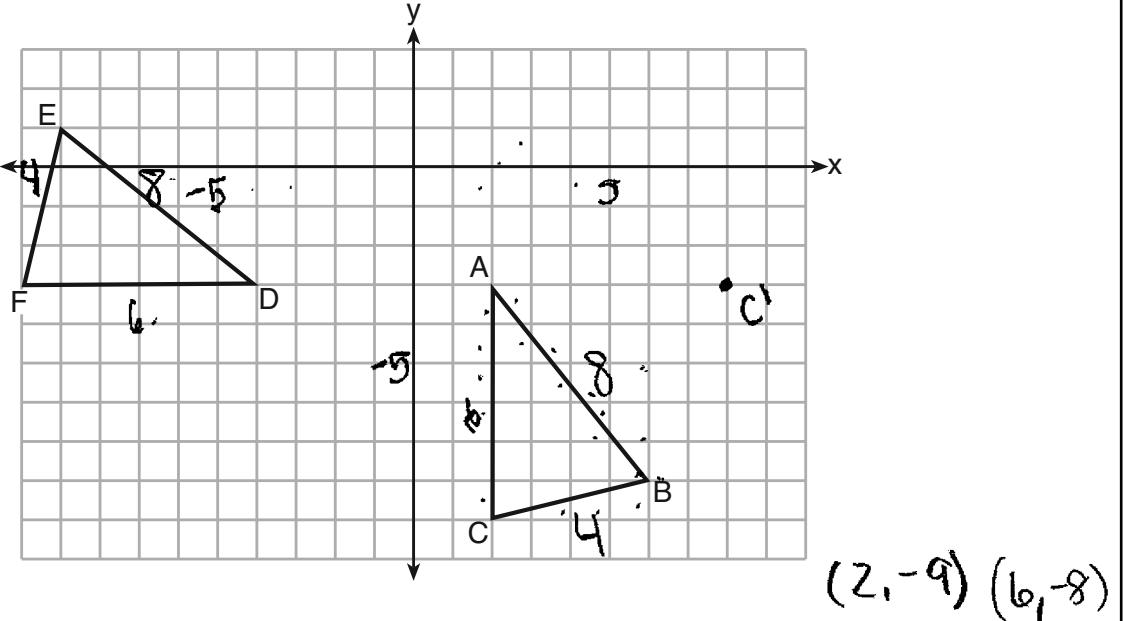
$B = (6, -8)$

$C = (2, -9)$

$D = (-4, -3)$

$E = (9, -1)$

$F = (10, -3)$

$(2, -9) \quad (6, -8)$

Let △*A′B′C′* be the image of △*ABC* after a rotation about point *A*. Determine and state the location of *B′* if the location of point *C′* is (8,–3). Explain your answer.

$+6, -6$

$\boxed{B' = (12, -14)}$ because to get C to C' you had to +6 to the x and -6 from they.

Is △*DEF* congruent to △*A′B′C′*? Explain your answer.

$$\overline{AB} = \sqrt{(6-2)^2 + (-8+3)^2} = \sqrt{16+25} = \sqrt{41}$$

$$\overline{ED} = \sqrt{(9+4)^2 + (-1+3)^2} = \sqrt{169+4} = \sqrt{173}$$

No, because not all of the sides are equal in measure.

Score 0: The student had a completely incorrect response.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.

Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$$\tan x = \frac{12}{75}$$

$$(\tan^{-1})\tan x = \frac{12}{75}(\tan^{-1})$$

$$x = 9.0903$$

SOHCAHTOA

$$\tan y = \frac{72}{75}$$

$$(\tan^{-1})\tan y = \frac{72}{75}(\tan^{-1})$$

$$y = 43.8308$$

$$\begin{array}{r} 43.8308 \\ -\ 9.0903 \\ \hline 34.7405 \end{array}$$

The measure of θ is 34.7°

Score 4: The student had a complete and correct response.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.

Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$$\theta = y - x$$

$$T = \frac{O}{A}$$

2ND Tan $\frac{72}{75}$ 2ND Tan $\frac{12}{75}$

$$\theta = 43.83 \quad - \quad 9.09$$

$$34.74$$

$$\boxed{34.7}$$

Score 4:   The student had a complete and correct response.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.


Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$$\text{Tan } B = \frac{12}{75}$$

$$\text{Tan}^{-1}\left(\frac{12}{17}\right) = 35.21759297$$

$$\frac{60}{+12}$$
$$\frac{}{72}$$

$$\text{Tan } x = \frac{72}{75}$$
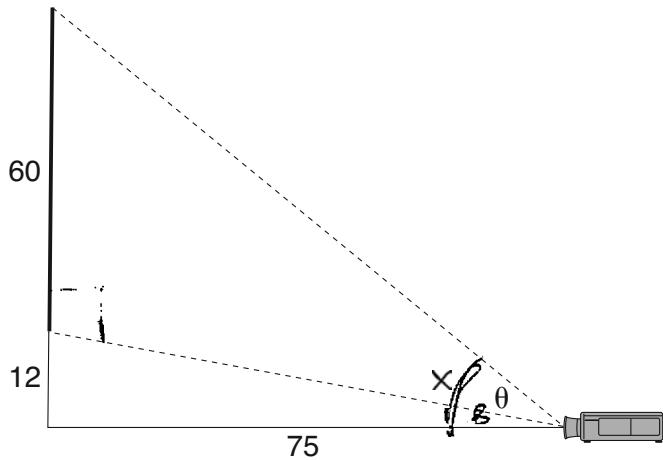
$$\text{Tan}^{-1}\left(\frac{72}{75}\right) = 43.8308607$$

$$43.8308607$$
$$-35.21759297$$
$$\overline{8.6132677}$$

The measure of θ is 8.6

Score 3: The student made a transcription error.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
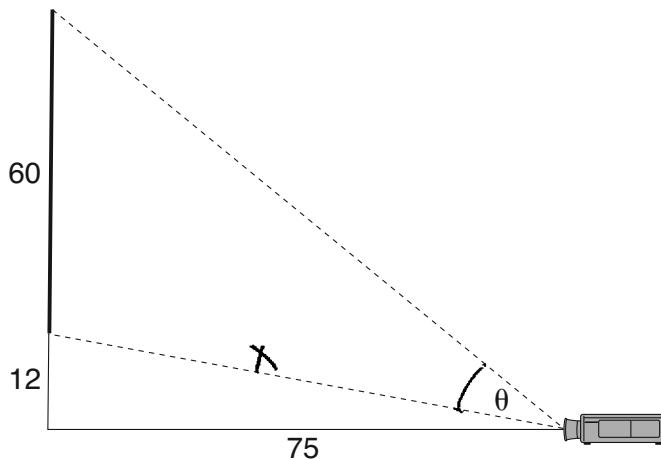
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$75^2 + 12^2 = x^2$

$5625 + 144 = x^2$

$\sqrt{5769} = \sqrt{x^2}$

$75.953... \approx x$

$\tan(\theta) = \dfrac{60}{\sqrt{5769}}$

$\tan^{-1}(\tan(\theta)) = \left(\dfrac{60}{\sqrt{5769}}\right)\tan^{-1}$

$\theta = 38.307...$

$\boxed{\theta \approx 38.3}$

Score 2:   The student made a conceptual error in using an obtuse triangle for right triangle trigonometry.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.
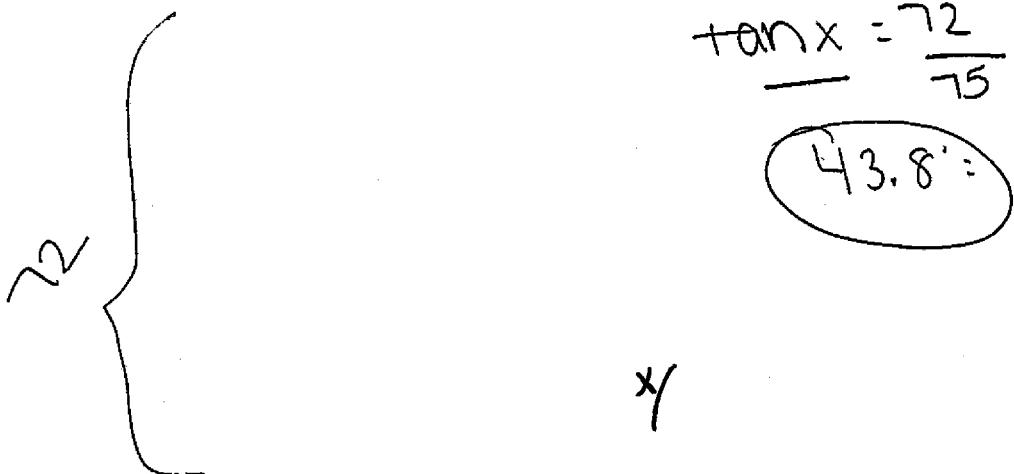
$$\tan x = \frac{72}{75}$$

$$43.8° =$$

Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$$43.8°$$

Score 1: The student determined only one angle of elevation.

34 As modeled below, a movie is projected onto a large outdoor screen. The bottom of the 60-foot-tall screen is 12 feet off the ground. The projector sits on the ground at a horizontal distance of 75 feet from the screen.

OPP 60

hyp

OPP 12

θ

75
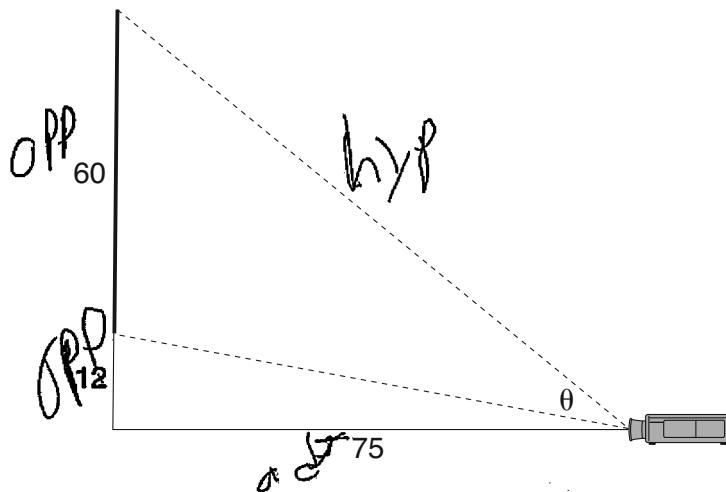
Determine and state, to the *nearest tenth of a degree*, the measure of θ, the projection angle.

$$tan^{-1}(72/75)$$

$$43.9$$

Score 0: The student did not show enough correct work to receive any credit.

35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E
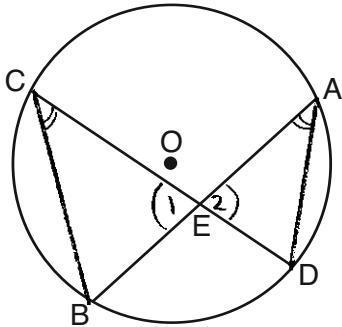
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

Statement	Reason
① Circle O, chords $\overline{AB}$ + $\overline{CD}$	① Given
② $\overline{CB}$ and $\overline{AD}$ are drawn	② auxiliary lines can be drawn
③ $\angle 1 \cong \angle 2$	③ Vertical $\angle$'s are $\cong$
④ $\angle C \cong \angle A$	④ Inscribed $\angle$'s that intercept the same arc are $\cong$
⑤ $\triangle BCE \sim \triangle DAE$	⑤ AA
⑥ $\dfrac{AE}{CE} = \dfrac{ED}{EB}$	⑥ Corresponding sides of similar $\triangle$'s are proportional
⑦ $AE \cdot EB = CE \cdot ED$	⑦ In a proportion, the product of the means equals the product of the extremes

Score 6:   The student had a complete and correct response.

35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E
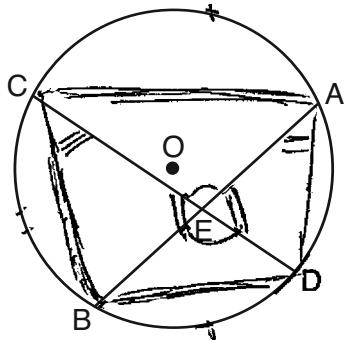
Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

6. $AE \cdot EB = CE \cdot ED$

| Statements	reasons
1. Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E	1. Given
2. $\angle CEA \cong \angle BED$ $\angle AED \cong \angle CEB$	2. vertical ∠'s $\cong$
3. $\angle BCE \cong \angle DAB$	3. Inscribed ∠'s that intercept the same arc are $\cong$
4. $\triangle ECB \sim \triangle EAD$	4. A A Sim Thm.
5. $\frac{AE}{CE} = \frac{ED}{EB}$	5. Corres. sides of $\sim$ △'s are in prop.

In a proportion,
6. The product of the means is equal to the product of the extremes

Score 5: The student did not include drawing chords $\overline{AC}$, $\overline{CB}$, $\overline{BD}$, and $\overline{AD}$ in the proof.
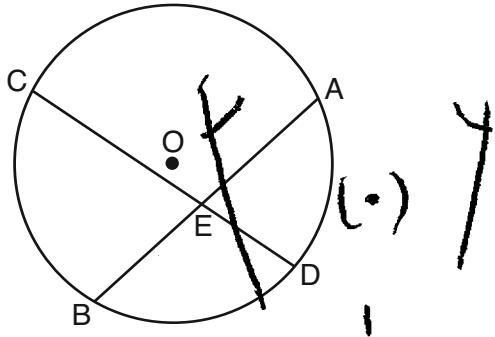
35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot \underline{EB} = \underline{CE} \cdot ED$.

$\triangle CBE \sim \triangle AED$

S	r
① Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E	① given
② ∠CEB and ∠AED are vertical angles	② intersecting lines form vertical angles
③ ∠CEB ≅ ∠AED	③ vertical angles are congruent
④ ∠C ≅ ∠A	④ inscribed angles of the same arc are congruent
⑤ △CBE ∼ △ADE	⑤ two angles in the triangles are congruent
⑥ $\frac{EB}{ED} = \frac{CE}{AE}$	⑥ In two similar triangles, corresponding sides are in proportion
⑦ $AE \cdot EB = CE \cdot ED$	⑦ In a proportion, product of means equals product of extremes

Score 4: The student omitted one statement and reason, and another reason was incomplete.

35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

1) $\overline{AB}$ and $\overline{CD}$ are chords in Circle O. Chords intersect at E	1) Given
2) Draw auxiliary lines $\overline{BC}$ and $\overline{AD}$	2) Between 2 pts there exists a line segment.
3) $\angle C \cong \angle A$ $\angle B \cong \angle D$	3) Angles inscribed in the same arc are $\cong$
4) $\triangle BCE \cong \triangle DAE$	4) AA $\sim$ Thm
5) $AE \cdot EB = CE \cdot ED$	5) CPCTC

Score 3: The student had three missing or incomplete statements.
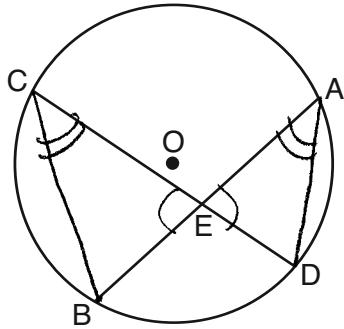
35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

Given circle O and chords $\overline{AB}$ and $\overline{CD}$ intersect at E. Since vertical angles are congruent, $\angle CEB \cong \angle AED$. $\angle C$ and $\angle A$ are inscribed in $\overarc{BD}$, so $\angle C \cong \angle A$. So $\triangle CEB \cong \triangle AED$. By the means extremes property, $AE \cdot EB = CE \cdot ED$.

Score 2: The student gave two correct relevant statements and reasons.

35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

Statements	Reason
chords $\overline{AB}$ and $\overline{CD}$ intersect at E	Given
$\angle CEA \cong \angle BED$	vertical angles are congruent
$\angle CEB \cong \angle AED$	vertical angles are congruent
$AE \cdot EB = CE \cdot ED$	if two cords intersect in a circle the product of the lengths of the segments of one chod is equal to the product of the lengths of the segments of the other chord.

Score 1: The student correctly stated the vertical angles were congruent.
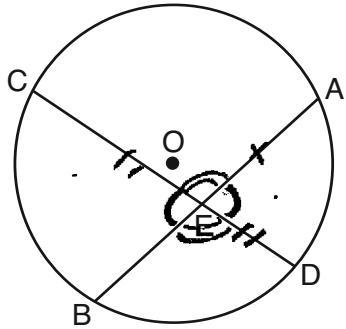
35 Given: Circle O, chords $\overline{AB}$ and $\overline{CD}$ intersect at E

Theorem: If two chords intersect in a circle, the product of the lengths of the segments of one chord is equal to the product of the lengths of the segments of the other chord.

Prove this theorem by proving $AE \cdot EB = CE \cdot ED$.

Statement	Reason
1. $\overline{AB}$ and $\overline{CD}$ intersect at E	1. Given
2. $\angle CEB \cong \angle AED$	3. opposite exterior angles are congruent
3. $\angle CEA \cong \angle BED$	3. " "
4. $\overline{CD}$ bisect $\overline{AB}$	4. $\overline{AB}$; $\overline{CD}$ intersf at E

Score 0: The student had a completely incorrect response.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm
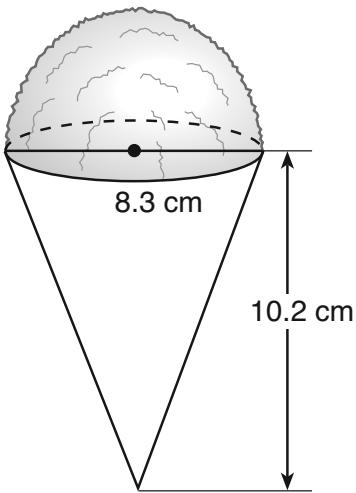
The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

Score 6: The student had a complete and correct response.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.


8.3 cm

10.2 cm
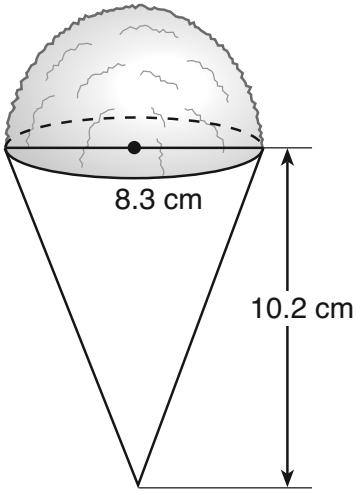
The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$$V_{cone} = \frac{1}{3}\pi r^2 h \qquad\qquad V_{sphere} = \frac{4}{3}\pi r^3$$

$$= \frac{1}{3}\pi (4.15)^2 (10.2) \qquad\qquad = \frac{4}{3}\pi (4.15)^3$$

$$= 58.5565\pi \qquad\qquad = 95.29783333\pi$$

$$V = 153.8543333\pi = \boxed{483.3476433 \text{ cm}^3}$$

$$M = (483.3476433)(.697) = 336.8933074 \text{ g}$$
$$\text{for 1 snow cone}$$

$$m = 16.84466537$$
$$\times\ 3.83$$

$$\times\ 50$$

$$\boxed{Cost = ^{\$}64.52}$$

$$16844.66537 \text{ g}$$

Score 5: The student found the volume of a sphere and not a hemisphere.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm

$$V \text{ of cone} = \frac{1}{3}\pi r^2 h$$
$$V = \frac{1}{3}\pi \, 4.15^2 \cdot 10.2$$
$$V = \frac{1}{3}\pi \, 17.2225 \cdot 10.2$$
$$V = 183.96$$

on

$$V \text{ of sphere} = \frac{\frac{4}{3}\pi r^3}{2}$$

$$V = \frac{\frac{4}{3}\pi \, 71.47333375}{2}$$
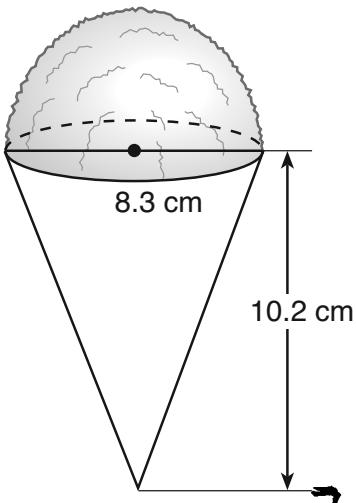
$$V = 149.69$$

total Volume = $333 \, cm^3$ .7

The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$$232.5889 \text{ grams per cone}$$
$$\times 50$$
$$\overline{\frac{11629.445 \text{ grams}}{1000}} = 11.63$$

Kilogram = 1000 grams

$ 44.54

Score 5: The student used an incorrectly rounded total volume of one snow cone when computing the mass.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm

$8.3 = d \quad 8.3/2 = 4.15 = r$
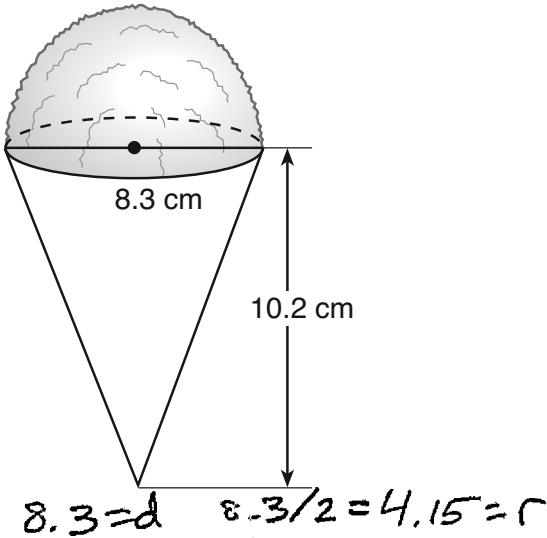
The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$V_{CONE} = \frac{1}{3}\pi r^2 h$

$V_{CONE} = \frac{1}{3}\pi * 4.15^2 * 10.2$

$V_{CONE} = \frac{1}{3} * \pi * 17.2225 * 10.2$

$V_{CONE} = 183.961 \ cm^3$

$\$3.83 \Rightarrow 1,000 \ g$

$0.00383 \rightarrow 1g$

$183.961 * 0.697 = 128.221 \ g/cm^3 \rightarrow 1 \ snow \ cone$

$128.221 * 50 = 6411.05$

$6411.05 * 0.00383 = 24.55$

$\boxed{\$24.55}$

Score 4: The student determined the cost of the cone without the hemisphere.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm
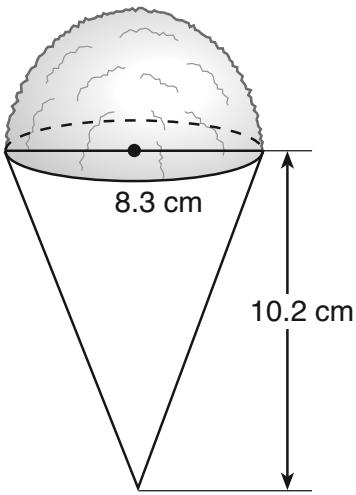
The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$Vol = \frac{1}{2} \cdot \frac{4}{3} \cdot \pi \cdot 4.15^3 = 149.693$

$Vol = \frac{1}{3} \cdot \pi \cdot 4.15^2 \cdot 10.2 = 183.961$

Total volume = 333.654

50 snow cones: $vol = 16682.7 \ cm^3$

$kg: \frac{16682.7}{697} = 23.935 \ kg$

cost: $23.935 \times 3.83 = 91.67105$

Score 3: The student found the volume of fifty snow cones, but no further correct work was shown.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

$r = 4.15$

8.3 cm

10.2 cm

$\frac{1}{3}\pi \cdot 4.15 \cdot 10.2 =$

44.32987234

Cone:

$V = \frac{1}{3}\pi r^2 h$

194

hemisphere:

$V = \frac{2}{3}\pi r^3$

$\frac{2}{3}\pi \cdot 4.15^3$

$\frac{2}{3}\pi \cdot 71.473375$

149.6934866
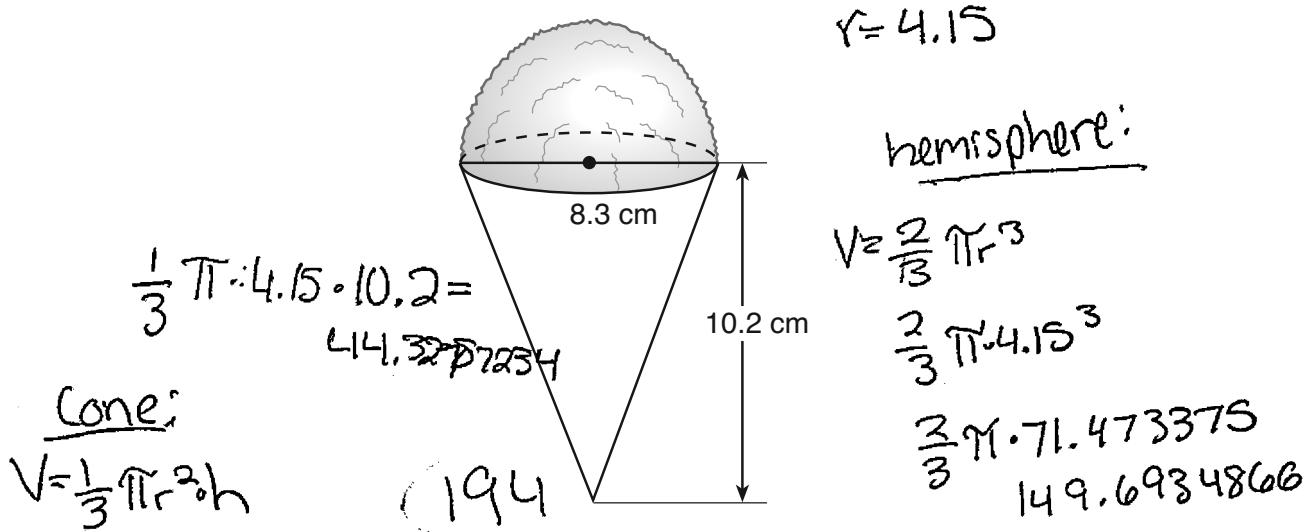
The desired density of the shaved ice is 0.697 g/cm^3, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$0.697 \cdot 194 = 135.218$

$\times 50$
6760.9

DIV

3.83
$\times 50$
191.5

$\frac{6760.9}{191.5} = 35.30$

$\$35.30$

Score 2: The student made an error in determining the volume of the cone, but found an appropriate mass of fifty snow cones. No further correct work was shown.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.

8.3 cm

10.2 cm

The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$$D = \frac{m}{V}$$
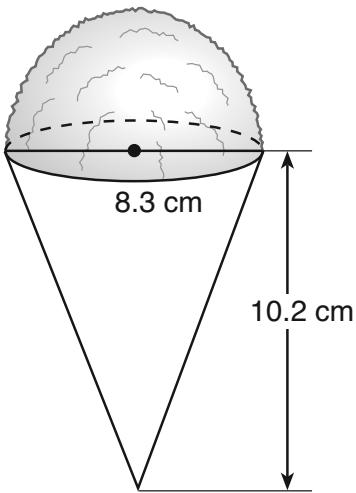
$$0.697 \, g/cm^3 \qquad V = \frac{1}{3}\pi r^2 h$$

$$\underline{50(3.83)} \qquad V = \frac{1}{3}\pi(4.15)^2 10.2$$

$$191.5 \qquad V = 183.9606702 \ cm^3$$

$$50 (183.9606702)$$

$$\boxed{\$ \ 9198.03 \text{ for } 50 \text{ snow cones}}$$

Score 1:   The student determined the volume of the cone.

36 A snow cone consists of a paper cone completely filled with shaved ice and topped with a hemisphere of shaved ice, as shown in the diagram below. The inside diameter of both the cone and the hemisphere is 8.3 centimeters. The height of the cone is 10.2 centimeters.


8.3 cm

10.2 cm
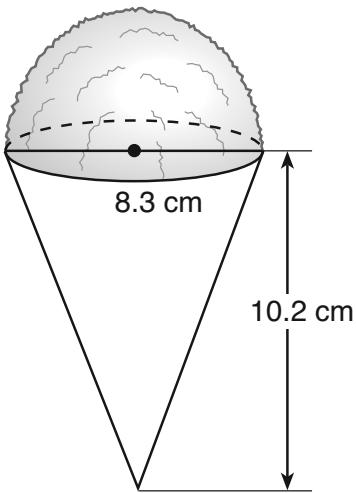
The desired density of the shaved ice is 0.697 g/cm³, and the cost, per kilogram, of ice is $3.83. Determine and state the cost of the ice needed to make 50 snow cones.

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi \cdot 4.15^2 \cdot 10.2$$

$$V = \frac{1}{3}\pi \cdot 17.22 \cdot 10.2$$

$$V = \frac{1}{3}\pi \cdot 175.644$$

$$V = 58.548$$

Score 0: The student did not show enough work to receive any credit.

IMPORTANT NOTICE
Notice to Teachers

Regents Examination in Geometry (Common Core)
Wednesday, August 17, 2016, 8:30 a.m.
Question 19

_____

This notice applies to students who are taking the August 17, 2016 Regents Examination in Geometry (Common Core).

If possible, please make the following announcement to all students taking this examination before the examination begins:

> "Due to a typographical error, Question 19 does not have a correct answer choice. Please note this in your test booklet. Please darken the answer circle for choice 1 for Question 19 on your answer sheet. All students will receive credit for Question 19."

When scoring this examination, all students should be awarded credit for Question 19.

Please photocopy this notice and provide a copy of it to each teacher administering and each teacher scoring the Regents Examination in Geometry (Common Core).

We apologize for any inconvenience this may cause, and we thank you for your hard work on behalf of the students in New York State.

Please note that the typographical error has been corrected on the posted version of the Examination and the Scoring Key has been updated to reflect the correct answer.

Regents Examination in Geometry (Common Core) – August 2016

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

(Use for the August 2016 exam only.)

Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level
86	100	5	57	79	3	28	59	2
85	99	5	56	78	3	27	58	2
84	97	5	55	78	3	26	57	2
83	96	5	54	77	3	25	55	2
82	95	5	53	77	3	24	54	1
81	94	5	52	77	3	23	53	1
80	93	5	51	76	3	22	51	1
79	92	5	50	76	3	21	49	1
78	91	5	49	75	3	20	48	1
77	91	5	48	75	3	19	46	1
76	90	5	47	74	3	18	44	1
75	89	5	46	74	3	17	43	1
74	88	5	45	73	3	16	41	1
73	87	5	44	72	3	15	39	1
72	87	5	43	72	3	14	37	1
71	86	5	42	71	3	13	35	1
70	86	5	41	71	3	12	32	1
69	85	5	40	70	3	11	30	1
68	84	4	39	69	3	10	28	1
67	84	4	38	69	3	9	25	1
66	83	4	37	68	3	8	23	1
65	83	4	36	67	3	7	20	1
64	82	4	35	66	3	6	18	1
63	82	4	34	65	3	5	15	1
62	81	4	33	64	2	4	12	1
61	81	4	32	63	2	3	9	1
60	80	4	31	62	2	2	6	1
59	80	4	30	61	2	1	3	1
58	79	3	29	60	2	0	0	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

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.

Because scale scores corresponding to raw scores in the conversion chart 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 chart above is usable only for this administration of the Regents Examination in Geometry (Common Core).