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

GEOMETRY
(Common Core)

Friday, June 16, 2017 — 9:15 a.m. to 12:15 p.m., only

Student Name: ____

School Name: ____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

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.

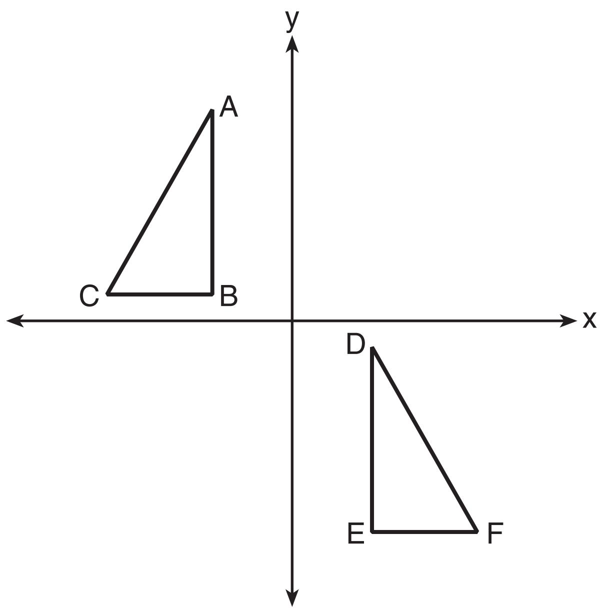
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

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]

Use this space for computations.

1 In the diagram below, $\triangle ABC \cong \triangle DEF$.



Which sequence of transformations maps $\triangle ABC$ onto $\triangle DEF$?

(1) a reflection over the x-axis followed by a translation

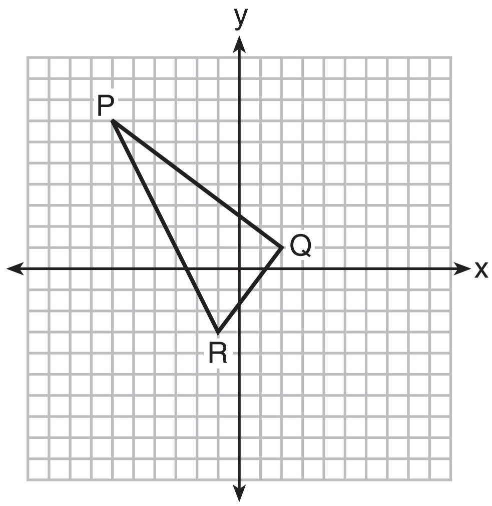
(2) a reflection over the y-axis followed by a translation

(3) a rotation of 180° about the origin followed by a translation

(4) a counterclockwise rotation of 90° about the origin followed by a translation

Use this space for computations.

2 On the set of axes below, the vertices of $\triangle PQR$ have coordinates $P(-6,7)$, $Q(2,1)$, and $R(-1,-3)$.



What is the area of $\triangle PQR$?

(1) 10 (3) 25

(2) 20 (4) 50

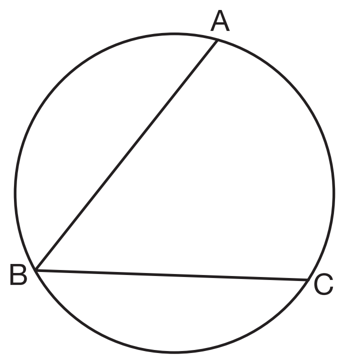
3 In right triangle ABC, $m\angle C = 90°$. If $\cos B = \frac{5}{13}$, which function also equals $\frac{5}{13}$?

(1) $\tan A$ (3) $\sin A$

(2) $\tan B$ (4) $\sin B$

Use this space for computations.

4 In the diagram below, $m\widehat{ABC} = 268°$.

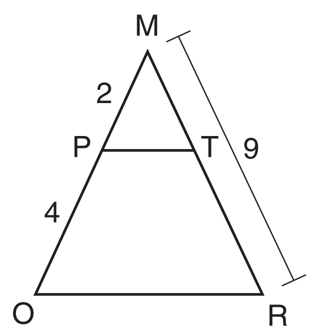


What is the number of degrees in the measure of $\angle ABC$?

(1) 134° (3) 68°

(2) 92° (4) 46°

5 Given $\triangle MRO$ shown below, with trapezoid $PTRO$, $MR = 9$, $MP = 2$, and $PO = 4$.



What is the length of $\overline{TR}$?

(1) 4.5 (3) 3

(2) 5 (4) 6

Use this space for computations.

6 A line segment is dilated by a scale factor of 2 centered at a point not on the line segment. Which statement regarding the relationship between the given line segment and its image is true?

(1) The line segments are perpendicular, and the image is one-half of the length of the given line segment.

(2) The line segments are perpendicular, and the image is twice the length of the given line segment.

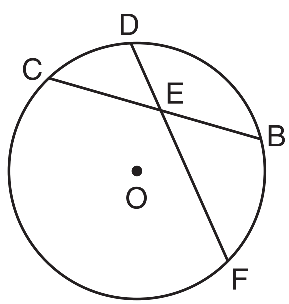
(3) The line segments are parallel, and the image is twice the length of the given line segment.

(4) The line segments are parallel, and the image is one-half of the length of the given line segment.

7 Which figure always has exactly four lines of reflection that map the figure onto itself?

(1) square
(2) rectangle
(3) regular octagon
(4) equilateral triangle

8 In the diagram below of circle O, chord $\overline{DF}$ bisects chord $\overline{BC}$ at E.

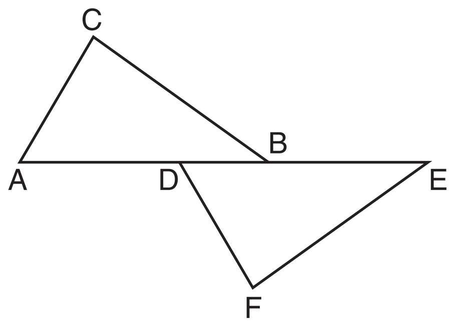


If $BC = 12$ and FE is 5 more than DE, then FE is

(1) 13
(2) 9
(3) 6
(4) 4

Use this space for computations.

9 Kelly is completing a proof based on the figure below.



She was given that $\angle A \cong \angle EDF$, and has already proven $\overline{AB} \cong \overline{DE}$. Which pair of corresponding parts and triangle congruency method would *not* prove $\triangle ABC \cong \triangle DEF$?

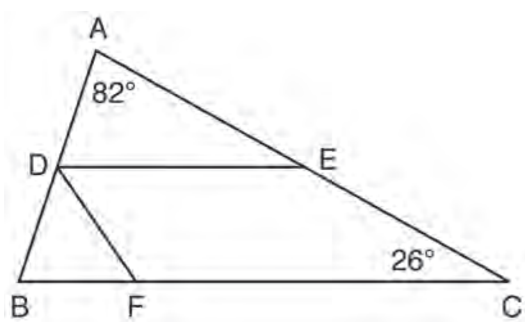
(1) $\overline{AC} \cong \overline{DF}$ and SAS

(2) $\overline{BC} \cong \overline{EF}$ and SAS

(3) $\angle C \cong \angle F$ and AAS

(4) $\angle CBA \cong \angle FED$ and ASA

10 In the diagram below, $\overline{DE}$ divides $\overline{AB}$ and $\overline{AC}$ proportionally, $m\angle C = 26°$, $m\angle A = 82°$, and $\overline{DF}$ bisects $\angle BDE$.



The measure of angle *DFB* is

(1) 36°

(2) 54°

(3) 72°

(4) 82°

Use this space for computations.

11 Which set of statements would describe a parallelogram that can always be classified as a rhombus?

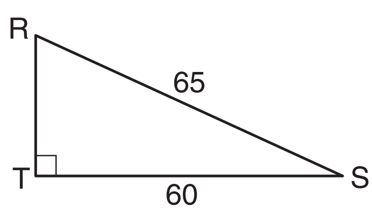
I. Diagonals are perpendicular bisectors of each other.
II. Diagonals bisect the angles from which they are drawn.
III. Diagonals form four congruent isosceles right triangles.

(1) I and II
(2) I and III
(3) II and III
(4) I, II, and III

12 The equation of a circle is $x^2 + y^2 - 12y + 20 = 0$. What are the coordinates of the center and the length of the radius of the circle?

(1) center (0,6) and radius 4
(2) center (0,−6) and radius 4
(3) center (0,6) and radius 16
(4) center (0,−6) and radius 16

13 In the diagram of $\triangle RST$ below, $m\angle T = 90°$, $RS = 65$, and $ST = 60$.



What is the measure of $\angle S$, to the *nearest degree*?

(1) 23°
(2) 43°
(3) 47°
(4) 67°

Use this space for computations.

14 Triangle $A'B'C'$ is the image of $\triangle ABC$ after a dilation followed by a translation.

Which statement(s) would always be true with respect to this sequence of transformations?

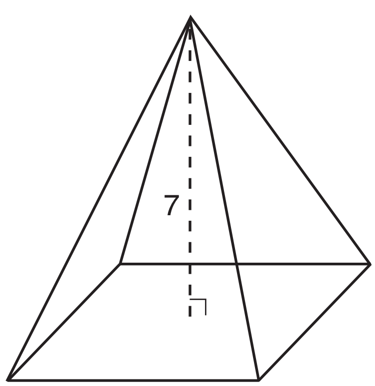
I. $\triangle ABC \cong \triangle A'B'C'$
II. $\triangle ABC \sim \triangle A'B'C'$
III. $\overline{AB} \parallel \overline{A'B'}$
IV. $AA' = BB'$

(1) II, only
(2) I and II
(3) II and III
(4) II, III, and IV

15 Line segment RW has endpoints $R(-4,5)$ and $W(6,20)$. Point P is on $\overline{RW}$ such that $RP:PW$ is 2:3. What are the coordinates of point P?

(1) (2,9)
(2) (0,11)
(3) (2,14)
(4) (10,2)

16 The pyramid shown below has a square base, a height of 7, and a volume of 84.

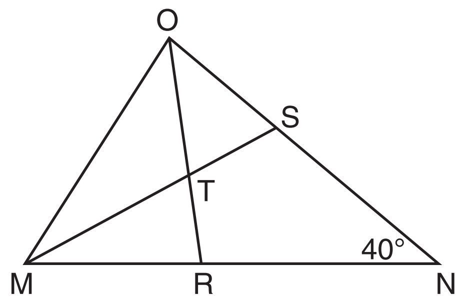


What is the length of the side of the base?

(1) 6
(2) 12
(3) 18
(4) 36

Use this space for computations.

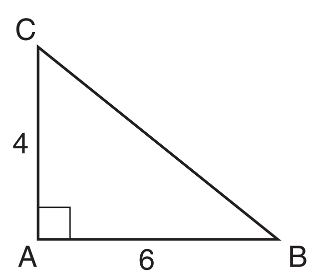
17 In the diagram below of triangle MNO, $\angle M$ and $\angle O$ are bisected by $\overline{MS}$ and $\overline{OR}$, respectively. Segments MS and OR intersect at T, and $m\angle N = 40°$.



If $m\angle TMR = 28°$, the measure of angle OTS is

(1) 40° (3) 60°
(2) 50° (4) 70°

18 In the diagram below, right triangle ABC has legs whose lengths are 4 and 6.



What is the volume of the three-dimensional object formed by continuously rotating the right triangle around $\overline{AB}$?

(1) 32π (3) 96π
(2) 48π (4) 144π

Use this space for computations.

19 What is an equation of a line that is perpendicular to the line whose equation is $2y = 3x - 10$ and passes through $(-6,1)$?

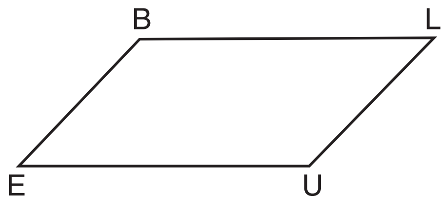
(1) $y = -\frac{2}{3}x - 5$

(2) $y = -\frac{2}{3}x - 3$

(3) $y = \frac{2}{3}x + 1$

(4) $y = \frac{2}{3}x + 10$

20 In quadrilateral *BLUE* shown below, $\overline{BE} \cong \overline{UL}$.



Which information would be sufficient to prove quadrilateral *BLUE* is a parallelogram?

(1) $\overline{BL} \parallel \overline{EU}$

(2) $\overline{LU} \parallel \overline{BE}$

(3) $\overline{BE} \cong \overline{BL}$

(4) $\overline{LU} \cong \overline{EU}$

21 A ladder 20 feet long leans against a building, forming an angle of 71° with the level ground. To the *nearest foot*, how high up the wall of the building does the ladder touch the building?

(1) 15

(2) 16

(3) 18

(4) 19

22 In the two distinct acute triangles *ABC* and *DEF*, $\angle B \cong \angle E$. Triangles *ABC* and *DEF* are congruent when there is a sequence of rigid motions that maps

(1) $\angle A$ onto $\angle D$, and $\angle C$ onto $\angle F$

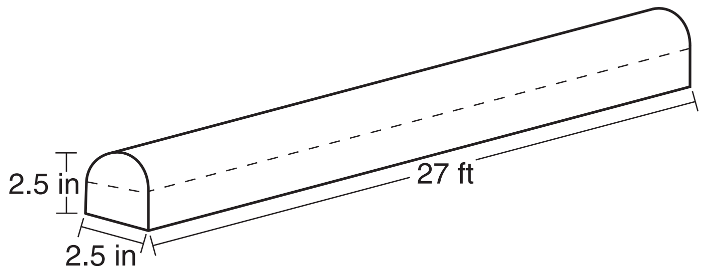
(2) $\overline{AC}$ onto $\overline{DF}$, and $\overline{BC}$ onto $\overline{EF}$

(3) $\angle C$ onto $\angle F$, and $\overline{BC}$ onto $\overline{EF}$

(4) point *A* onto point *D*, and $\overline{AB}$ onto $\overline{DE}$

Use this space for computations.

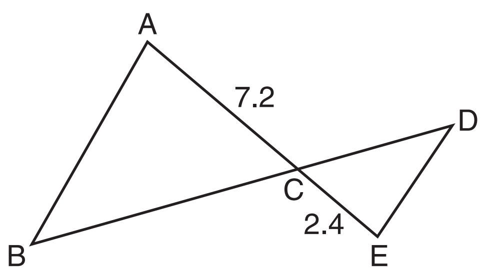
23 A fabricator is hired to make a 27-foot-long solid metal railing for the stairs at the local library. The railing is modeled by the diagram below. The railing is 2.5 inches high and 2.5 inches wide and is comprised of a rectangular prism and a half-cylinder.



How much metal, to the *nearest cubic inch*, will the railing contain?

(1) 151
(2) 795
(3) 1808
(4) 2025

24 In the diagram below, $AC = 7.2$ and $CE = 2.4$.



Which statement is *not* sufficient to prove $\triangle ABC \sim \triangle EDC$?

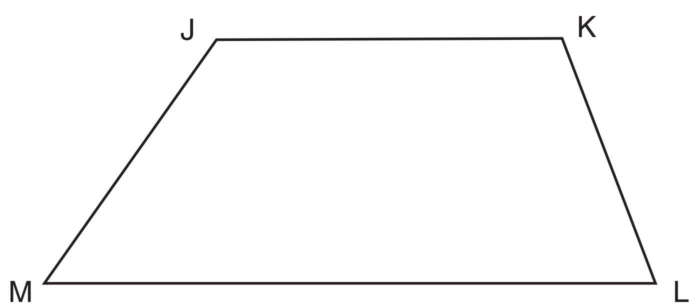
(1) $\overline{AB} \parallel \overline{ED}$
(2) $DE = 2.7$ and $AB = 8.1$
(3) $CD = 3.6$ and $BC = 10.8$
(4) $DE = 3.0$, $AB = 9.0$, $CD = 2.9$, and $BC = 8.7$

Part II

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]

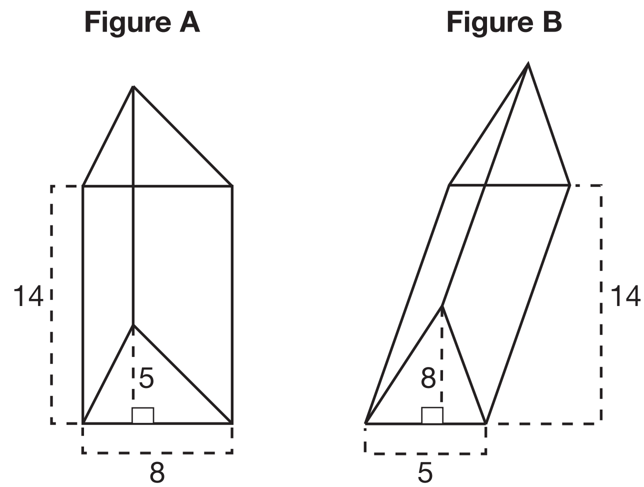
25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]



26 Determine and state, in terms of π, the area of a sector that intercepts a $40°$ arc of a circle with a radius of 4.5.

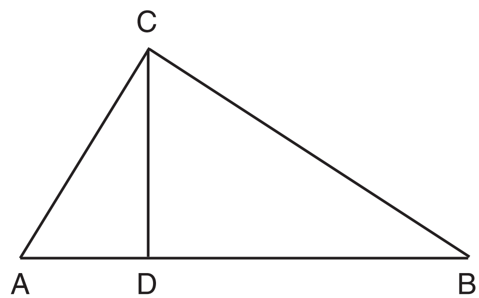
27 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.



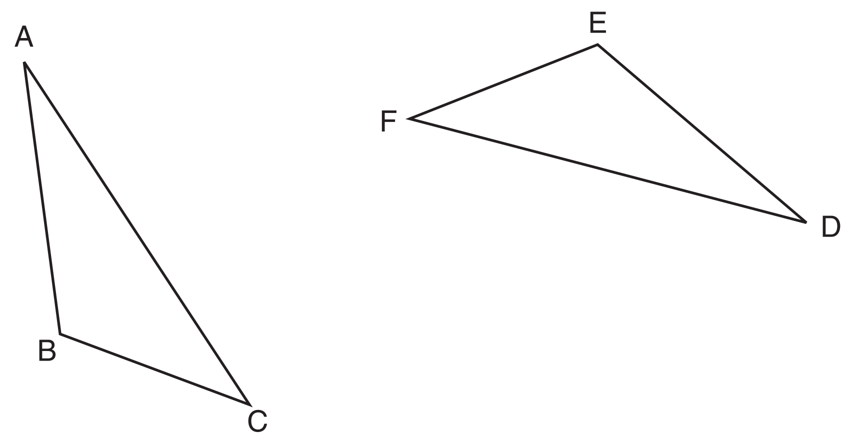
Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

28 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.



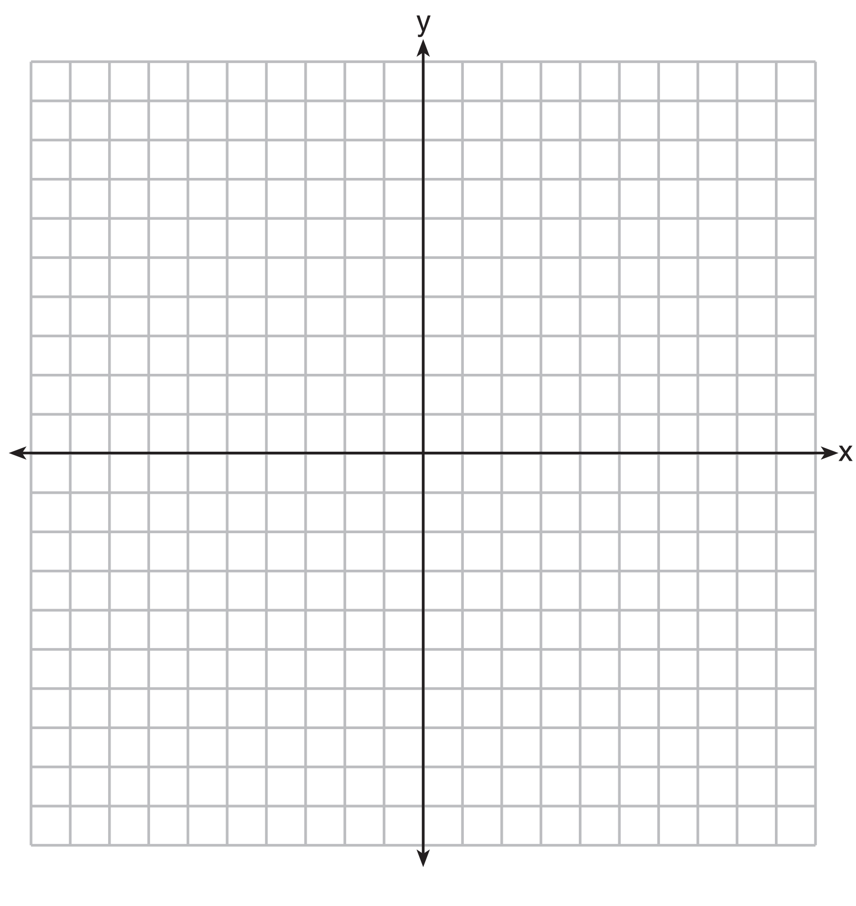
30 Triangle *ABC* and triangle *DEF* are drawn below.



If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.]

Explain your answer.



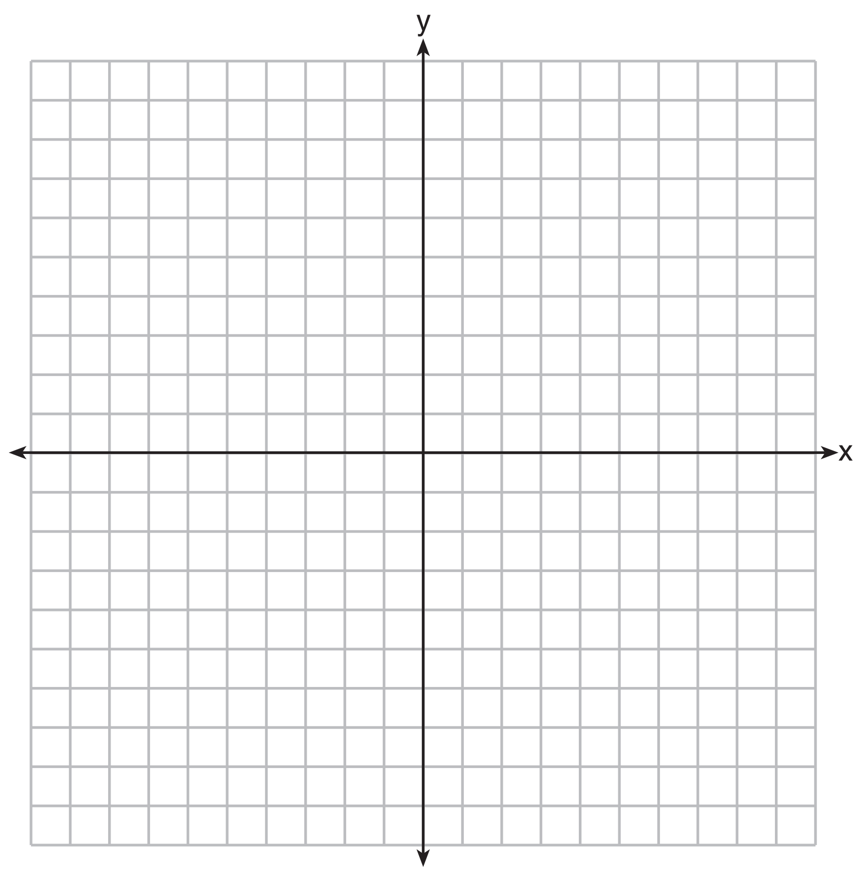
Part III

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]

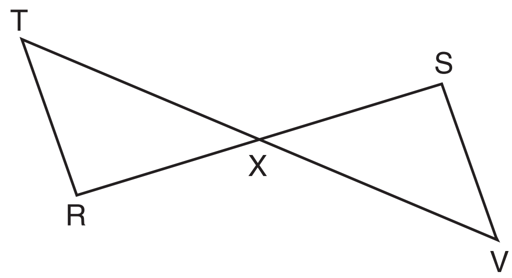
32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

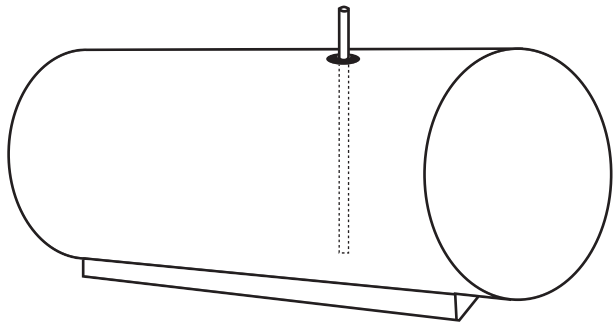


33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



Prove: $\overline{TR} \parallel \overline{SV}$

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

Part IV

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]

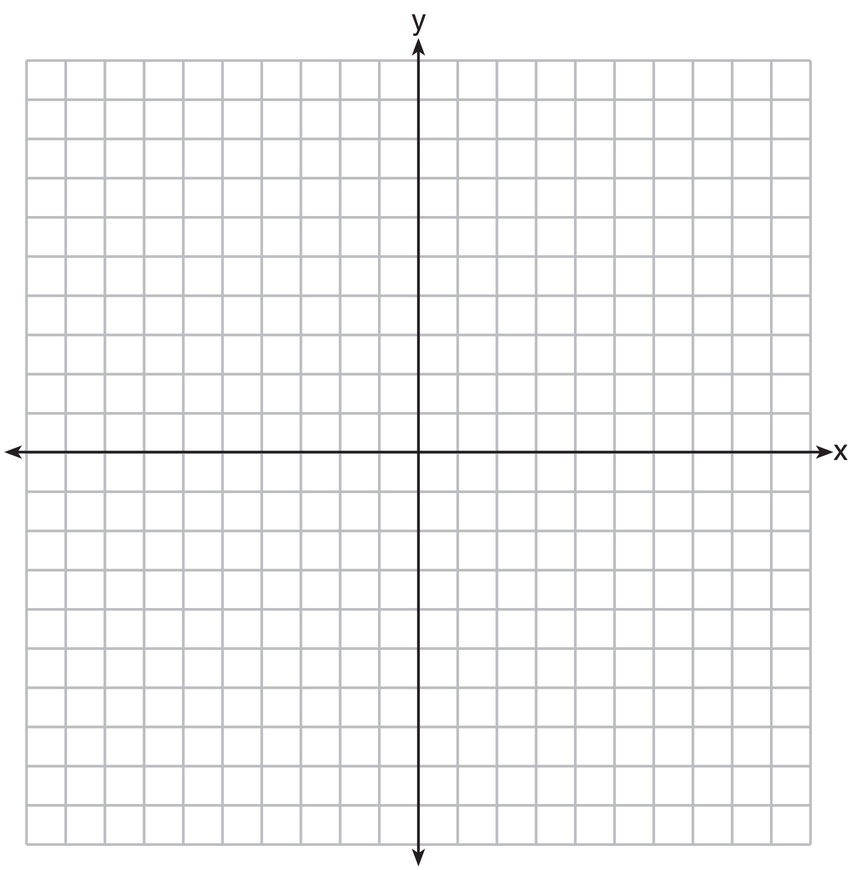
35 Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that *PQRS* is a rhombus.
[The use of the set of axes on the next page is optional.]

Question 35 is continued on the next page.

Question 35 continued.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]



36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

Determine and state the speed of the airplane, to the *nearest mile per hour*.

Tear Here

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	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Radians	1 radian $= \frac{180}{\pi}$ degrees
Degrees	1 degree $= \frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$

Tear Here

Tear Here

Tear Here

Tear Here

Tear Here

Scrap Graph Paper — This sheet will *not* be scored.

Scrap Graph Paper — This sheet will *not* be scored.

Tear Here

Tear Here

GEOMETRY (COMMON CORE)

Printed on Recycled Paper

GEOMETRY (COMMON CORE)

FOR TEACHERS ONLY

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

GEOMETRY (Common Core)

Friday, June 16, 2017 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Geometry (Common Core). More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Geometry (Common Core)*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the open-ended questions, use check marks to indicate student errors. Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the open-ended questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

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

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Friday, June 16, 2017. 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) 2	(17) . . . . . 4 . . . . .
(2) 3	(10) 2	(18) . . . . . 1 . . . . .
(3) 3	(11) 4	(19) . . . . . 2 . . . . .
(4) 4	(12) 1	(20) . . . . . 2 . . . . .
(5) 4	(13) 1	(21) . . . . . 4 . . . . .
(6) 3	(14) . . . . . *	(22) . . . . ** . . . .
(7) 1	(15) 2	(23) . . . . . 3 . . . . .
(8) 2	(16) 1	(24) . . . . . 2 . . . . .

* **Question 14** — When scoring this question, either choice 1 or choice 3 should be awarded credit.

****Question 22** — When scoring this question, all students should be awarded credit regard-less of the answer, if any, they record on the answer sheet for this question.

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]** A correct construction is drawn showing all appropriate arcs.

[1] An appropriate construction is drawn showing all appropriate arcs, but an altitude is drawn from a vertex other than J.

or

[1] An appropriate construction is drawn showing all appropriate arcs, but the altitude is missing or incorrect.

[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.

(26) **[2]** 2.25π or an equivalent area in terms of pi is written, and appropriate work is shown.

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

or

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

or

[1] 2.25π, but no work is shown.

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

(27) **[2]** A complete and correct explanation is written.

[1] An appropriate explanation is written, but one conceptual error is made.

or

[1] An incomplete or partially correct explanation is written.

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

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

or

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

or

[1] 0.6, but no work is shown.

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

(29) **[2]** A complete and correct explanation is written.

[1] An explanation that contains one conceptual error is written.

or

[1] A correct explanation of why one pair of angles is congruent is written.

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

(30) **[2]** A correct sequence of transformations is written.

[1] An appropriate sequence of transformations is written, but one conceptual error is made.

or

[1] An appropriate sequence of transformations is written, but it is incomplete.

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

(31) **[2]** $y = -\frac{3}{4}x + 5$ or an equivalent equation is written, and a correct explanation is written.

[1] Appropriate work is shown, but one computational or graphing error is made. A correct explanation is written.

or

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

or

[1] $y = -\frac{3}{4}x + 5$ or an equivalent equation is written, but the explanation is incomplete or incorrect.

[0] The equation $3x + 4y = 20$ or an equivalent equation is written, 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.

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]** Triangles *ABC* and *DEF* are graphed and labeled correctly, a reflection over the correct line is stated, and a correct explanation is written.

[3] Appropriate work is shown, but one or more graphing or labeling errors are made. An appropriate line of reflection is stated, and an appropriate explanation is written.

or

[3] Appropriate work is shown, but the line of reflection is missing or incorrect. An appropriate explanation is written.

[2] Appropriate work is shown, but one or more graphing or labeling errors are made. An appropriate line of reflection is stated, but an incomplete or partially correct explanation is written.

or

[2] Appropriate work is shown to graph and label both triangles, and a correct line of reflection is stated. No further correct work is shown.

[1] Appropriate work is shown to graph and label both triangles, 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]** A complete and correct proof that includes a conclusion is written.

[3] 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.

[2] 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.

or

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

or

[2] A proof is written that shows $\triangle TXR \cong \triangle VXS$, but no further correct work is shown.

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

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

or

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

(34) **[4]** 10.9, 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 the radius of the cylinder, but no further correct work is shown.

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

or

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

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

or

[1] Appropriate work is shown to find the number of cubic feet in the tank, but no further correct work is shown.

or

[1] 10.9, 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 concluding statements that *PQRS* is a rhombus and *PQRS* is not a square is written.

[5] Appropriate work is shown, but one computational or graphing error is made. Appropriate concluding statements are written.

or

[5] Appropriate work is shown to prove *PQRS* is a rhombus, and work is shown to prove *PQRS* is not a square. One concluding statement is missing or incorrect.

[4] Appropriate work is shown, but two or more computational or graphing errors are made. Appropriate concluding statements are written.

or

[4] Appropriate work is shown, but one conceptual error is made. Appropriate concluding statements are written.

or

[4] Appropriate work is shown to prove *PQRS* is a rhombus and a concluding statement is written. No further correct work is shown.

[3] Appropriate work is shown, but one conceptual error and one computational or graphing error are made. Appropriate concluding statements are written.

or

[3] Appropriate work is shown to prove *PQRS* is a parallelogram and a concluding statement is written. No further correct work is shown.

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

or

[2] Appropriate work is shown, but one conceptual error and two or more computational or graphing errors are made. Appropriate concluding statements are written.

or

[2] Appropriate work is shown to prove two pairs of opposite sides are parallel. No further correct work is shown.

or

[2] Appropriate work is shown to find the lengths of all four sides. No further correct work is shown.

or

[2] Appropriate work is shown to prove the diagonals are perpendicular bisectors of each other. No further correct work is shown.

or

[2] Appropriate work is shown to prove *PQRS* is not a square and a concluding statement is written. No further correct work is shown.

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

or

[1] Appropriate work is shown to find the slopes of all four sides. No further correct work is shown.

or

[1] Appropriate work is shown to find the slopes and lengths of one pair of opposite sides. 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.

(36) **[6]** 18,442 and 210, 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 18,442, and the speed of the airplane in miles per minute or feet per hour, 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 distance the airplane has traveled, 18,442, but no further correct work is shown.

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

or

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

[2] Two correct trigonometric equations are written to determine how far the airplane has traveled, but no further correct work is shown.

or

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

or

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

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

or

[1] 18,442 and 210, 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)
June 2017

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

Regents Examination in Geometry (Common Core)

June 2017

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

The *Chart for Determining the Final Examination Score for the June 2017 Regents Examination in Geometry (Common Core)* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Friday, June 16, 2017. Conversion charts provided for previous administrations of the Regents Examination in Geometry (Common Core) must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.

2. Select the test title.

3. Complete the required demographic fields.

4. Complete each evaluation question and provide comments in the space provided.

5. Click the SUBMIT button at the bottom of the page to submit the completed form.

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

IMPORTANT NOTICE
Notice to Teachers

Regents Examination in Geometry (Common Core)
All Editions

Friday, June 16, 2017, 9:15 a.m.
Questions 14 and 22, Only

This notice applies to students who took the June 16, 2017 Regents Examination in Geometry (Common Core).

As a result of discrepancies in the wording, Questions 14 and 22 do not have only one clear and correct answer.

Question 14

When scoring this examination, either **choice 3**, the correct answer indicated in the Scoring Key, or **choice 1** should be accepted and awarded credit.

Question 22

When scoring this examination, all students should be awarded credit regardless of the answer, if any, they record on the answer sheet for this question.

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

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

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

GEOMETRY
(Common Core)

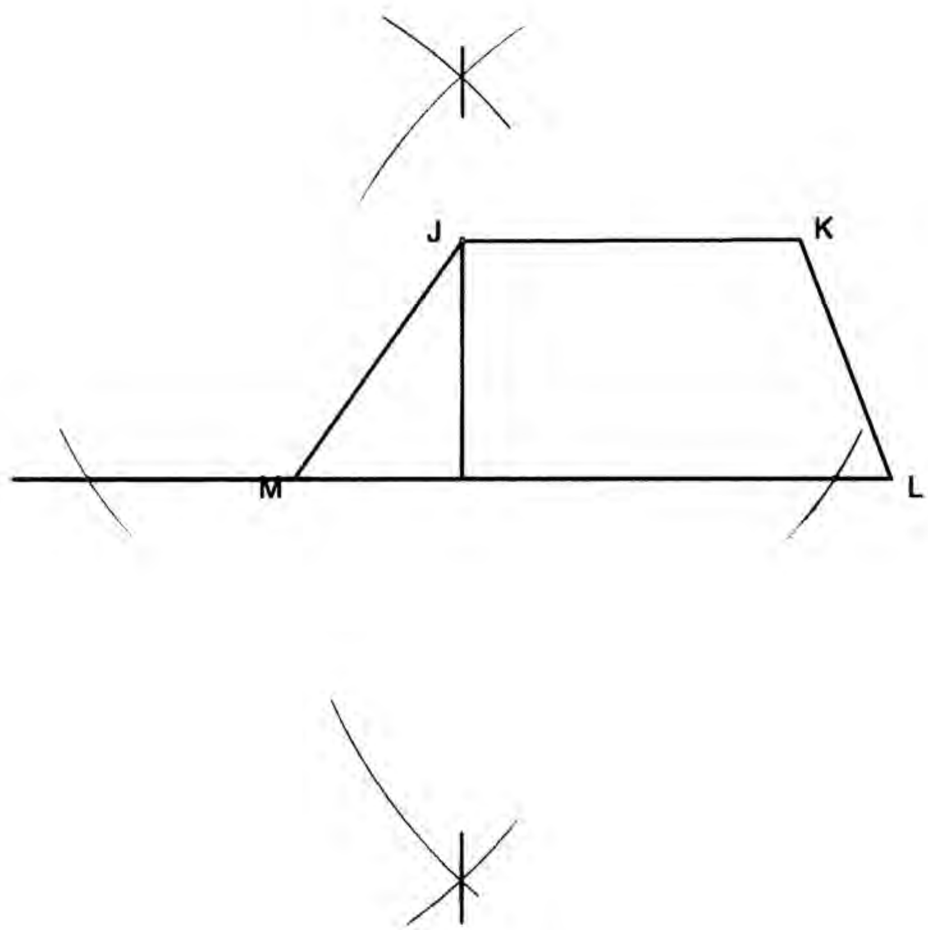
Friday, June 16, 2017 — 9:15 a.m. to 12:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

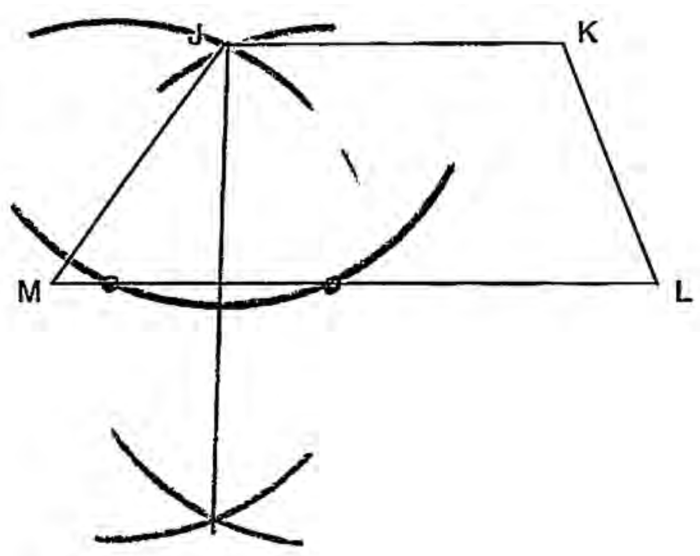
Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]



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

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]

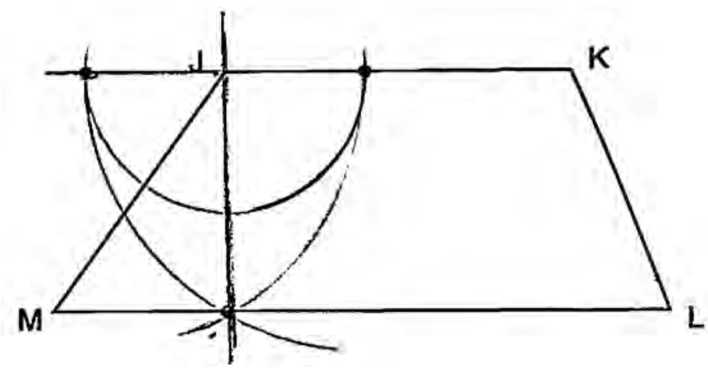


Score 2: The student gave a complete and correct response.

Question 25

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]

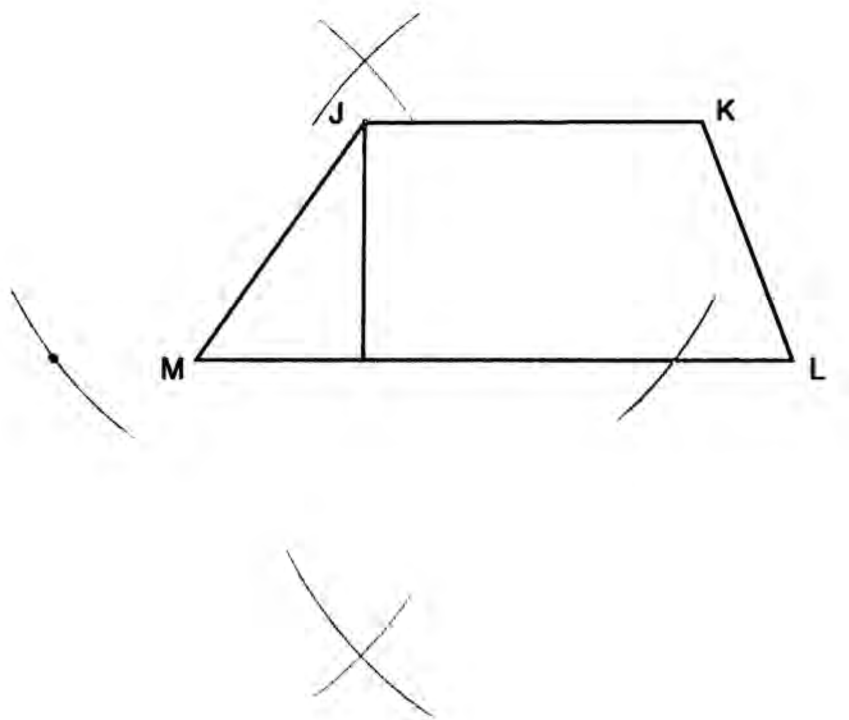


Score 2: The student gave a complete and correct response.

Question 25

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

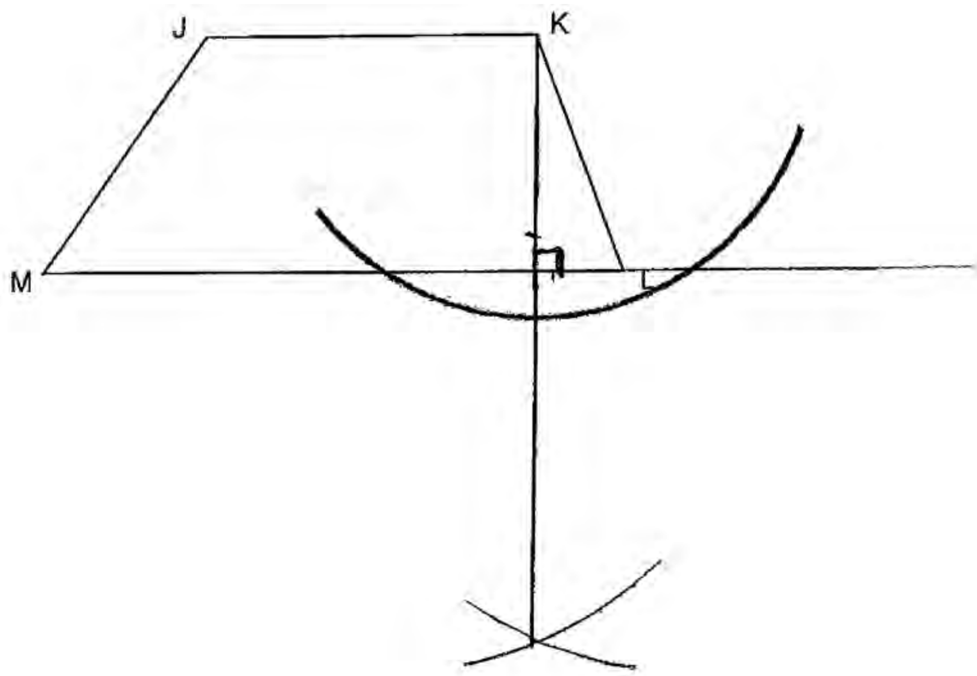
Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]



Score 1: The student did not extend side $\overline{ML}$ through vertex M to locate the intersection of the extension of $\overline{ML}$ and the arc drawn from vertex J.

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]

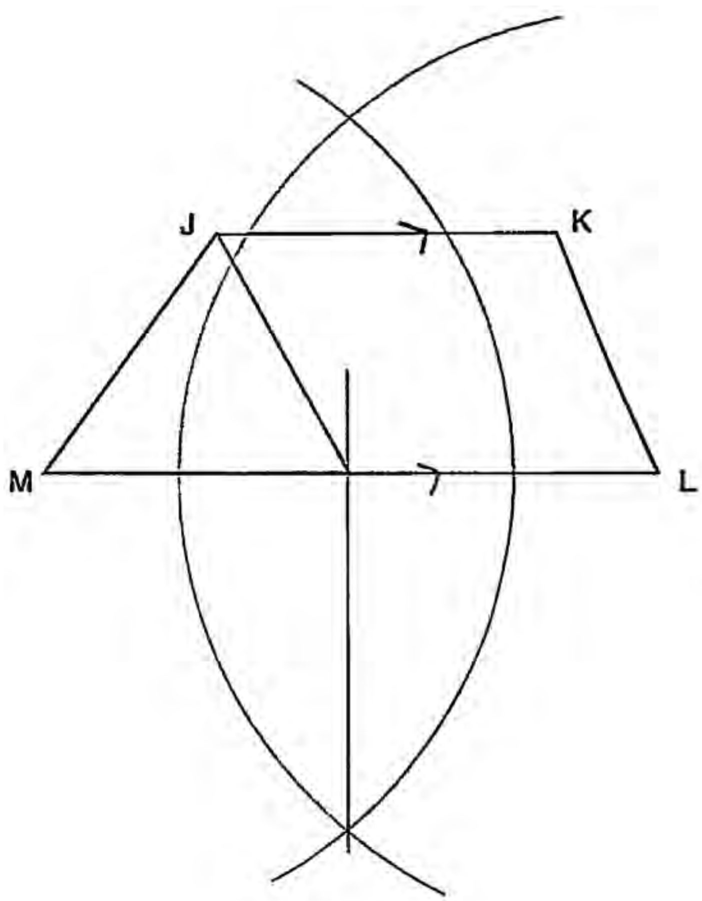


Score 1: The student constructed an altitude correctly, but constructed the altitude from vertex K.

Question 25

25 Given: Trapezoid $JKLM$ with $\overline{JK} \parallel \overline{ML}$

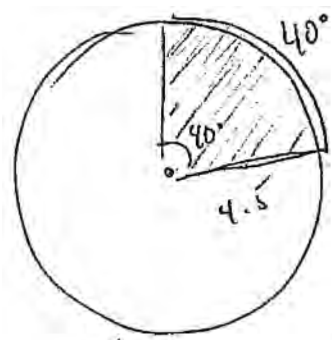
Using a compass and straightedge, construct the altitude from vertex J to $\overline{ML}$.
[Leave all construction marks.]



Score 0: The student had a completely incorrect response.

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.



$\overset{2}{\cancel{40}} \times \frac{\pi}{\underset{9}{\cancel{180}}}$ $\quad \frac{2\pi}{9}$

$20\frac{1}{4}$

$A = \frac{1}{2}\theta r^2$

$A = \frac{1}{2}\left(\frac{2\pi}{9}\right)\left(\frac{\overset{9}{\cancel{81}}}{4}\right)$

$A = \frac{1}{2}\left(\frac{9\pi}{2}\right)$

$A = \frac{9\pi}{4}$

$\boxed{\frac{9\pi}{4}}$

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

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

$A = \pi r^2$

$A = 4.5^2 \cdot \pi$

$A = 20.25\pi$

$\frac{\text{Angle}}{\text{area}} \quad \frac{40°}{x} = \frac{360}{20.25\pi}$

$\frac{360x}{360} = \frac{810\pi}{360}$

$\boxed{x = \frac{9\pi}{4}}$

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

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

$\frac{x°}{360} \cdot \pi r^2$

$\frac{40}{360} \cdot \pi \cdot (4.5)^2$

$\frac{1}{9} \cdot \frac{2025}{1} \pi$

2.25π

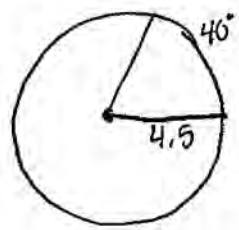
or

$\frac{9}{4}\pi$

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

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.



$\cancel{40} \cdot \frac{\pi}{\cancel{180}}$

4.5

$A = \frac{1}{2} \theta \cdot r^2$

$A = \frac{1}{2}\left(\frac{\pi}{4.5}\right)(4.5)^2$

$A = \frac{1}{2}\left(\frac{\pi}{4.5}\right)(20.25)$

$A = \left(\frac{\pi}{2.25}\right)(20.25)$

$A = \frac{20.25\pi}{2.25}$

$\boxed{A = 9\pi}$

Score 1: The student made one computational error when multiplying $\left(\frac{1}{2}\right)\left(\frac{\pi}{4.5}\right)$.

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

$a = \pi r^2$

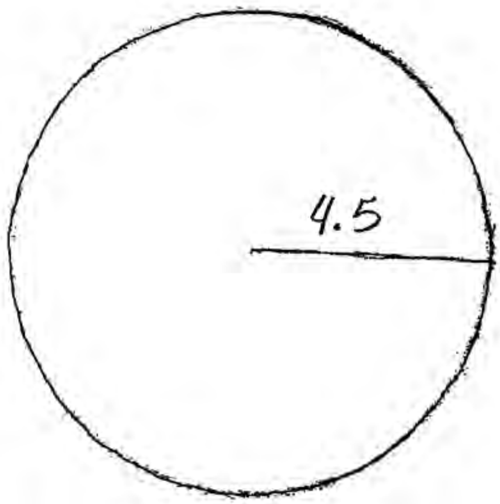
$a = \pi \cdot 4.5^2$

20.25π

$\frac{40}{360} = \frac{.11}{1}$

$.11 \cdot 20.25$

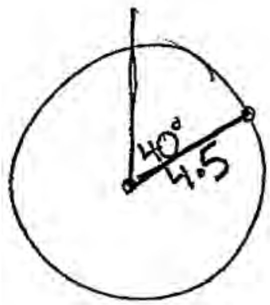
2.2275π



Score 1: The student made one rounding error.

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.



$$\frac{40}{360}(2\pi r)$$

$$\frac{40}{360}(2\pi 4.5)$$

$$9\pi$$

$$\frac{9}{4}\pi$$

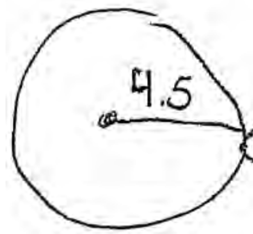
Score 0: The student had a correct answer with incorrect work.

Question 26

26 Determine and state, in terms of π, the area of a sector that intercepts a 40° arc of a circle with a radius of 4.5.

$A = \pi r^2$

$A = \pi \cdot 4.5^2$



$A = 20.25\pi$

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

Question 27

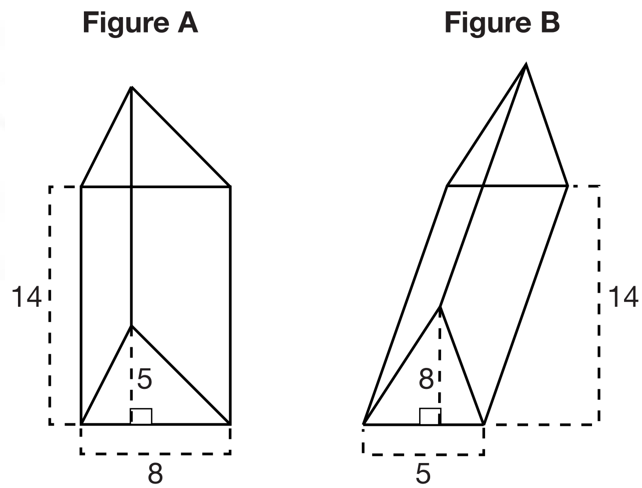
27 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.

$A = \frac{1}{2}bh$

$\frac{1}{2}(8)(5)$

$4(5)$

20



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

The volumes of these 2 triangular prisms are equal because of Cavalieri's principle which states that if the base area is the same in the 2 figures, in this case 20 units^2, the height is the same in the 2 figures, in this case 14, and the cross sections remain the same area as the base area, the volumes are the same

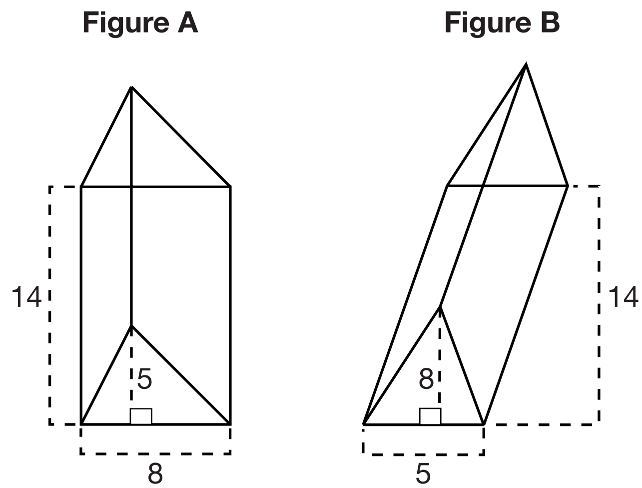
$20(14)$ $\quad\quad$ $14(20)$

280 $\quad\quad$ 280

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

Question 27

27 The diagram below shows two figures. Figure A is a right triangular prism and figure B is an oblique triangular prism. The base of figure A has a height of 5 and a length of 8 and the height of prism A is 14. The base of figure B has a height of 8 and a length of 5 and the height of prism B is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

V of Figure A $14\left(\frac{5\times 8}{2}\right) = 280$

V of Figure B $14\left(\frac{8\times 5}{2}\right) = 280$

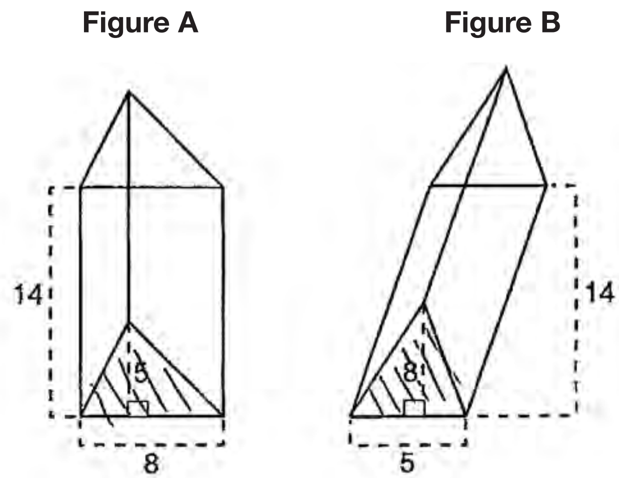
A and B have the same base area and height

So, their Volumes are equal.

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

Question 27

27 The diagram below shows two figures. Figure A is a right triangular prism and figure B is an oblique triangular prism. The base of figure A has a height of 5 and a length of 8 and the height of prism A is 14. The base of figure B has a height of 8 and a length of 5 and the height of prism B is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

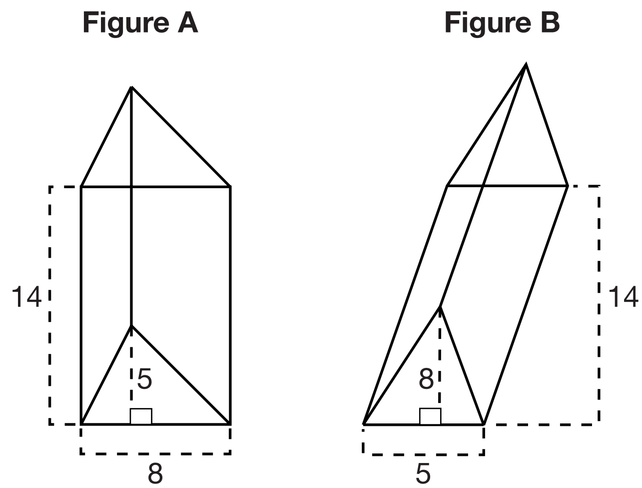
Figure A: $B = \frac{1}{2}(5)(8)$
$= 20$

Figure B: $B = \frac{1}{2}(8)(5)$
$= 20$

The base areas of the two figures are the same so the volumes of the prisms are equal.

Score 1: The student wrote an incomplete explanation.

27 The diagram below shows two figures. Figure A is a right triangular prism and figure B is an oblique triangular prism. The base of figure A has a height of 5 and a length of 8 and the height of prism A is 14. The base of figure B has a height of 8 and a length of 5 and the height of prism B is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

$V = \frac{1}{2} \cdot 8 \cdot 5 \cdot 14$

$V = \frac{1}{2} \cdot 40 \cdot 14$

$V = 280$

$V = \frac{1}{2} \cdot 5 \cdot 8 \cdot 14$

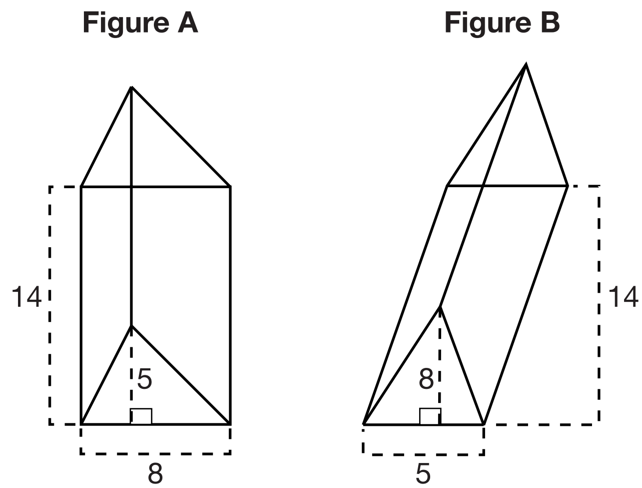
$V = \frac{1}{2} \cdot 40 \cdot 14$

$V = 280$

Score 1: The student showed algebraically that both prisms have equal volumes, but did not write an explanation using Cavalieri's Principle.

Question 27

27 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

V of $\Delta = \frac{1}{2}bh$
$V = \frac{1}{2}(5)\cdot(8)$
$V = 20$

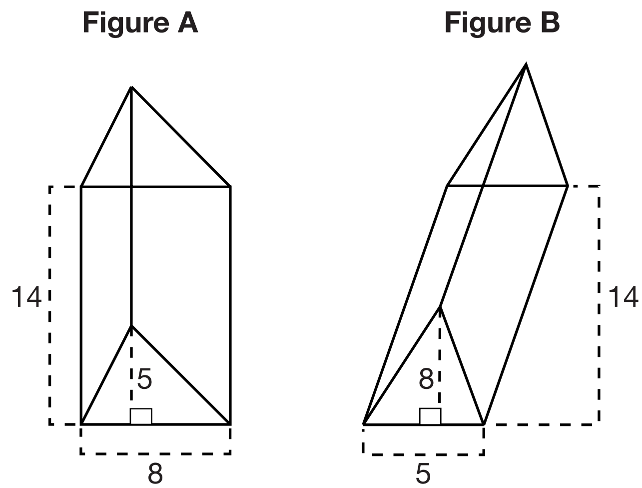
V of $\Delta = \frac{1}{2}bh$
V of $\Delta = \frac{1}{2}(8)(5)$
$V = 20$

The volume of the Δ will be the the same making the prisms equal because the base and height can be used interchangebly in the volume of a Δ formula. It is shown in the work above.

Score 0: The student wrote an incorrect explanation.

Question 27

27 The diagram below shows two figures. Figure *A* is a right triangular prism and figure *B* is an oblique triangular prism. The base of figure *A* has a height of 5 and a length of 8 and the height of prism *A* is 14. The base of figure *B* has a height of 8 and a length of 5 and the height of prism *B* is 14.



Use Cavalieri's Principle to explain why the volumes of these two triangular prisms are equal.

$V = \frac{1}{2}(8 \times 5)(14)$

$V = \frac{1}{2}(40)(14)$

$V = 1/2(40)(14)$

$V = 280$

Slant height

$V = \frac{1}{3}(5 \times 8)(14)$

$V = \frac{1}{3}(40)(14)$

$V = \frac{1}{3}(40)(14)$

$V = 187$

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

Question 28

28 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

$$\frac{180}{\frac{4}{3}} = \frac{\cancel{\frac{4}{3}}\pi r^3}{\cancel{\frac{4}{3}}}$$

$$\frac{135}{\pi} = \frac{\cancel{\pi} r^3}{\cancel{\pi}}$$

$$\sqrt[3]{42.97183463} = \sqrt[3]{r^3}$$

$$r = 3.502632975$$

$$\frac{294}{\frac{4}{3}} = \frac{\cancel{\frac{4}{3}}\pi r^3}{\cancel{\frac{4}{3}}}$$

$$\frac{220.5}{\pi} = \frac{\cancel{\pi} r^3}{\cancel{\pi}}$$

$$\sqrt{70.1873299} = \sqrt[3]{r^3}$$

$$r = 4.124958408$$

the radius increased 0.6 of an inch

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

Question 28

28 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

$3 \cdot 180 = \frac{4\pi r^3}{3} \cdot 3$

$\frac{540}{4\pi} = \frac{4\pi r^3}{4\pi}$

$\sqrt[3]{424.115} = \sqrt[3]{r^3}$

$r \approx 7.5$

$3 \cdot 294 = \frac{4\pi r^3}{3} \cdot 3$

$\frac{882}{4\pi} = \frac{4\pi r^3}{4\pi}$

$\sqrt[3]{692.721} = \sqrt[3]{r^3}$

$r \approx 8.8$

$8.8 - 7.5 = 1.3$

r increased 1.3 in when the volleyball is fully ~~infla~~ inflated

Score 1: The student made a computational error when dividing by 4π.

28 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

Partially Inflated

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

$\frac{3}{4}\left(180 = \frac{4}{3}\pi r^2\right)$

$135 = \pi r^2$

$r^2 = \frac{135}{\pi}$

$r_1 = 6.555290584$

Fully Inflated

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

$\frac{3}{4}\left(294 = \frac{4}{3}\pi r^2\right)$

$220.5 = \pi r^2$

$r^2 = \frac{220.5}{\pi}$

$r_2 = 8.377787888$

$r_2 - r_1 = 1.822497304$

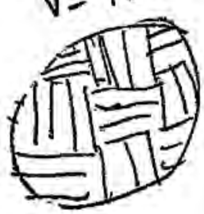
1.8

Score 1: The student calculated the square root in both equations rather than the cube root.

Question 28

28 When volleyballs are purchased, they are not fully inflated. A partially inflated volleyball can be modeled by a sphere whose volume is approximately 180 in^3. After being fully inflated, its volume is approximately 294 in^3. To the *nearest tenth of an inch*, how much does the radius increase when the volleyball is fully inflated?

$V = 180$



$V = \frac{4\pi r^3}{3}$

$180 = \frac{4\pi(r^3)}{3}$

$294 = \frac{4\pi r^3}{3}$

$98 = 4\pi r^3$

$94 = \pi r^3$

$-\pi \quad -\pi$

$\sqrt[3]{90.8\ldots} = r^3$

≈ 4.5

$176 \cdot \pi$

$58.67 \cdot \pi = r^3$

$55.5\ldots = r^3$

$r \approx 3.8$

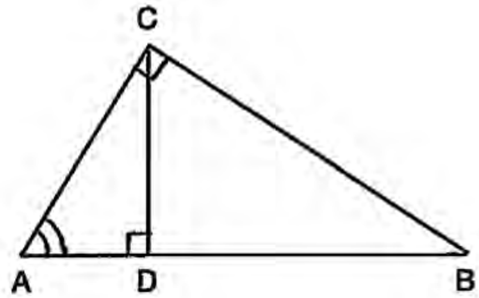
radous

The volleyball increased .7 inches

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

Question 29

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

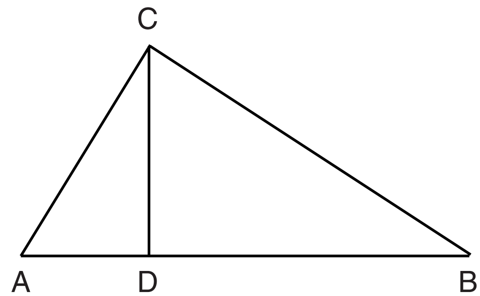


Since $\triangle ABC$ is a right triangle, $\measuredangle ACB$ is a right angle because right triangles contain right angles. This also means that $\measuredangle CDA$ is a right angle because altitude $\overline{CD}$ leaves a vertex and is perpendicular to the opposite side and perpendicular lines intersect to form right angles. All right angles are congruent so $\measuredangle ACB \cong \measuredangle CDA$. $\measuredangle A$ is a reflexive angle so $\measuredangle A \cong \measuredangle A$. So $\triangle ABC \sim \triangle ACD$ by AA

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

Question 29

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

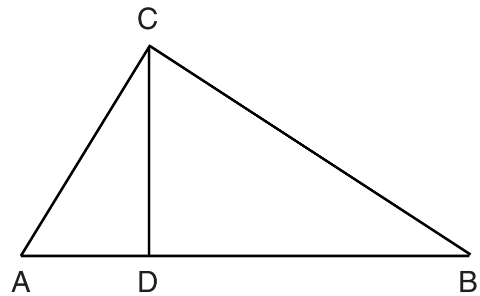


If an altitude is drawn to the hypotenuse of a right triangle, it divides the Δ into 2 right Δs each similar to each other and to the original right Δ.

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

Question 29

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$.
Explain why $\triangle ABC \sim \triangle ACD$.

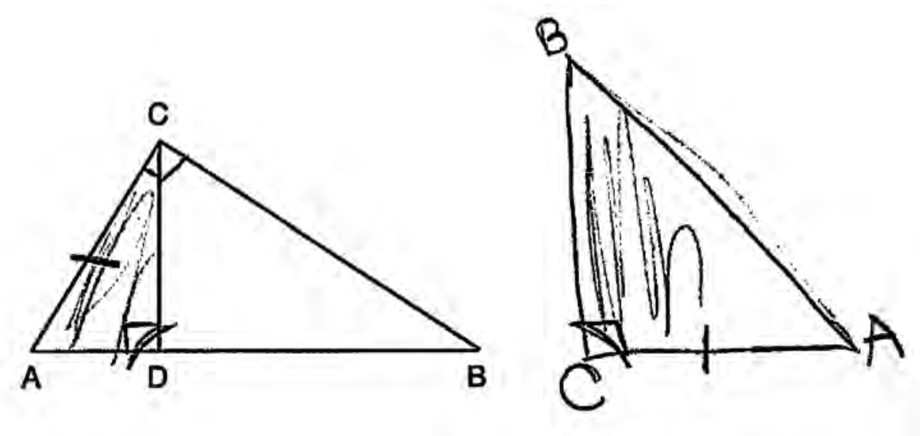


Both triangles share angle A and there are 2 right angles at D (altitude) and a right angle at C. So the triangles are similar by AA.

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

Question 29

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

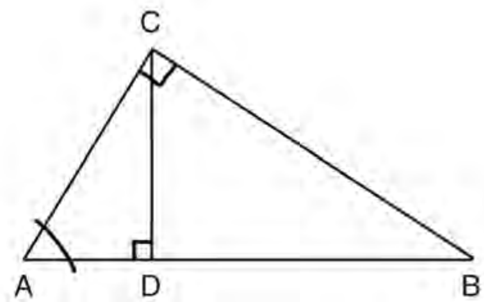


$\triangle ABC \sim \triangle ACD$ because they both share the side $\overline{CA}$, so its congruent. In triangle ABC, angle C is a right angle, in $\triangle ACD$, $\angle D$ is a right angle because $\overline{CD}$ is an altitude to $\overline{AB}$ so $\angle D$ is congruent to $\angle C$.

Score 1: The student explained correctly why one pair of angles is congruent.

Question 29

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

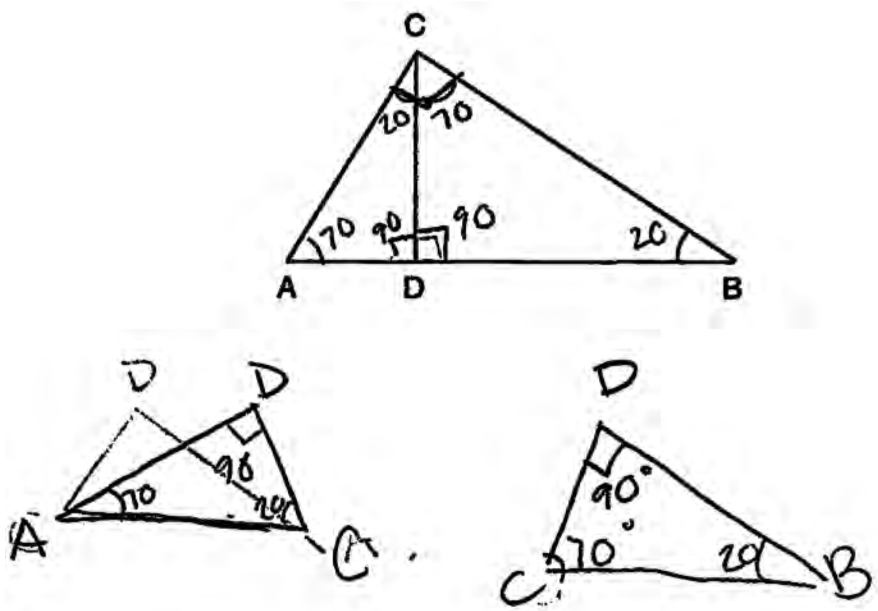


The triangles are similar, by AA because they have 2 pairs of $\cong \angle$'s.

Score 1: The student wrote an incomplete explanation.

Question 29

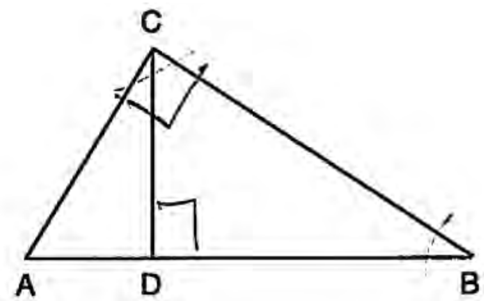
29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.



ΔABC is ~ to ΔACD because all ~~[illegible]~~ of their corresponding angles have the same measurement.

Score 1: The student used a specific example to make a general conclusion of triangle similarity.

29 In right triangle ABC shown below, altitude $\overline{CD}$ is drawn to hypotenuse $\overline{AB}$. Explain why $\triangle ABC \sim \triangle ACD$.

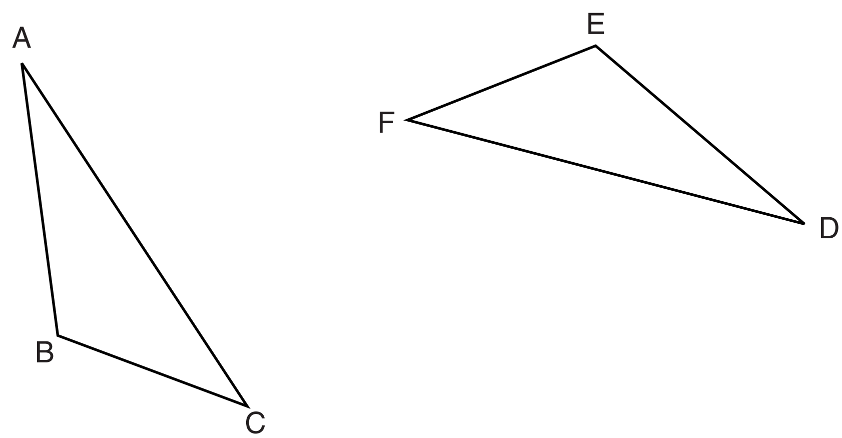


The altitude creates a perpendicular line. This makes right angles. Right angles means right triangles. Right triangles are similar.

Score 0: The student wrote an incorrect explanation.

Question 30

30 Triangle *ABC* and triangle *DEF* are drawn below.



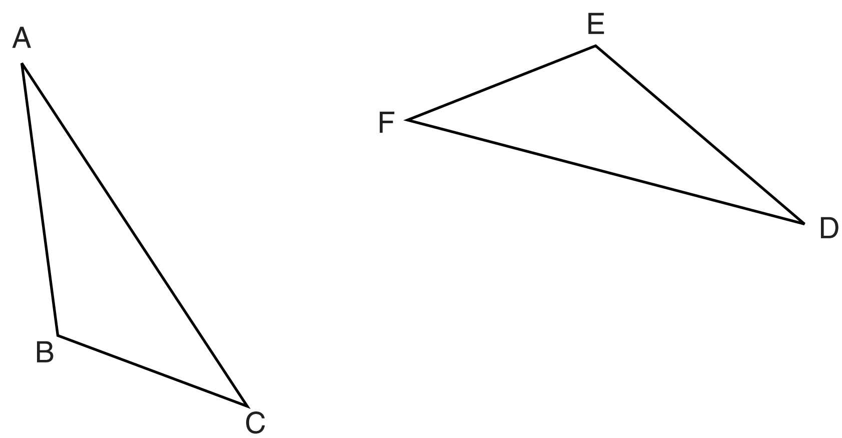
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

A translation along Vector $\overrightarrow{CF}$ so C maps onto F, followed by a Rotation about F that maps $\angle A$ to $\angle D$, $\overline{AB}$ to $\overline{DE}$, and $\overline{AC}$ to $\overline{DF}$.

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

Question 30

30 Triangle *ABC* and triangle *DEF* are drawn below.



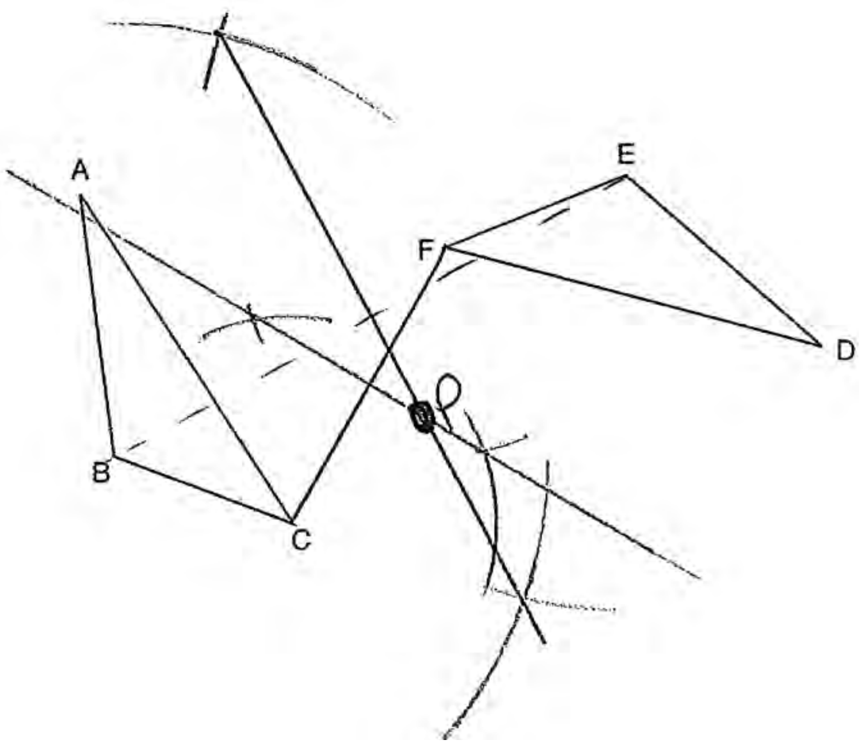
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

Rotate $\triangle ABC$ clockwise about point C until $\overline{DF} \parallel \overline{AC}$, then translate $\triangle ABC$ along $\overrightarrow{CF}$ so that $C \to F$, $B \to E$, and $A \to D$

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

Question 30

30 Triangle *ABC* and triangle *DEF* are drawn below.



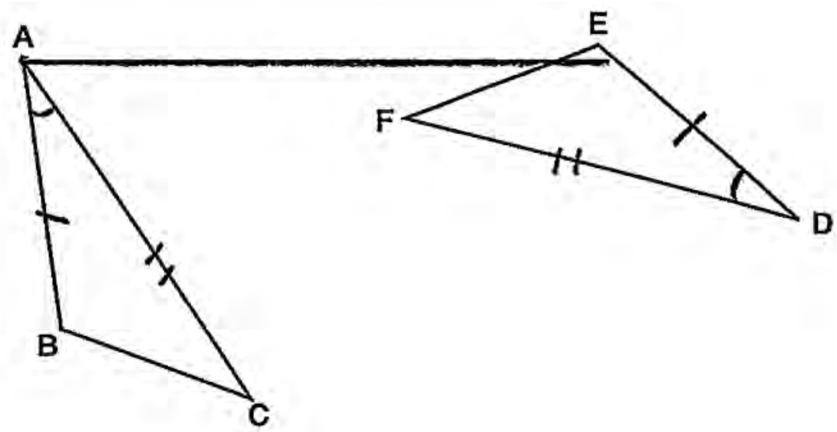
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

Rotation about point P until ∠A maps onto ∡D

Score 2: The student wrote a correct transformation based upon a correct construction to find the point of rotation, which is the point of intersection of the perpendicular bisectors of the segments whose endpoints are the corresponding vertices of the triangles.

Question 30

30 Triangle *ABC* and triangle *DEF* are drawn below.

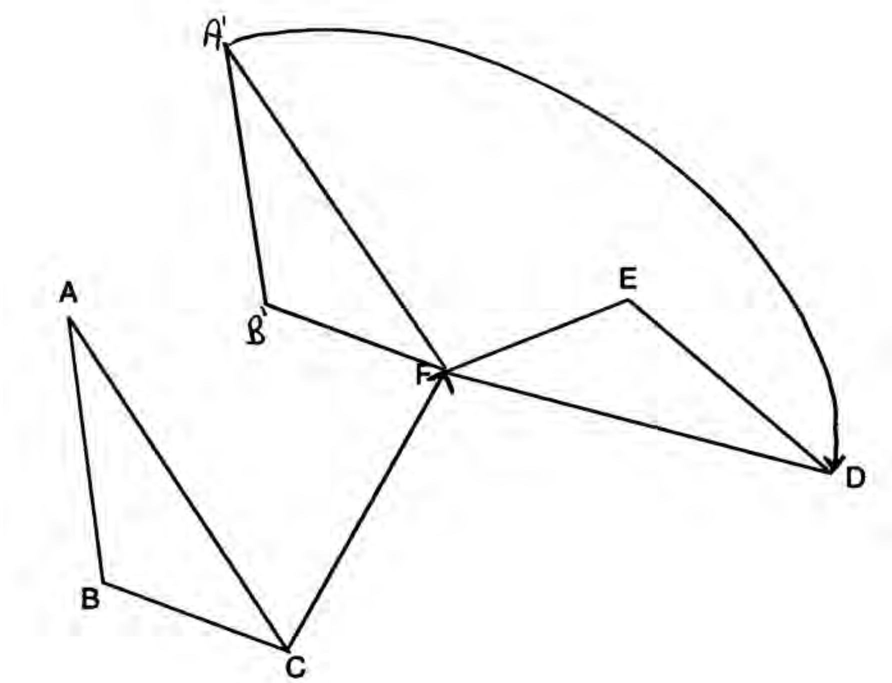


If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

First you would translate triangle ABC to the right. Next you would then translate triangle ABC up. Last you would rotate triangle ABC clockwise until ∡A matched up with ∡D.

Score 1: The student wrote an incomplete sequence of transformations.

30 Triangle *ABC* and triangle *DEF* are drawn below.



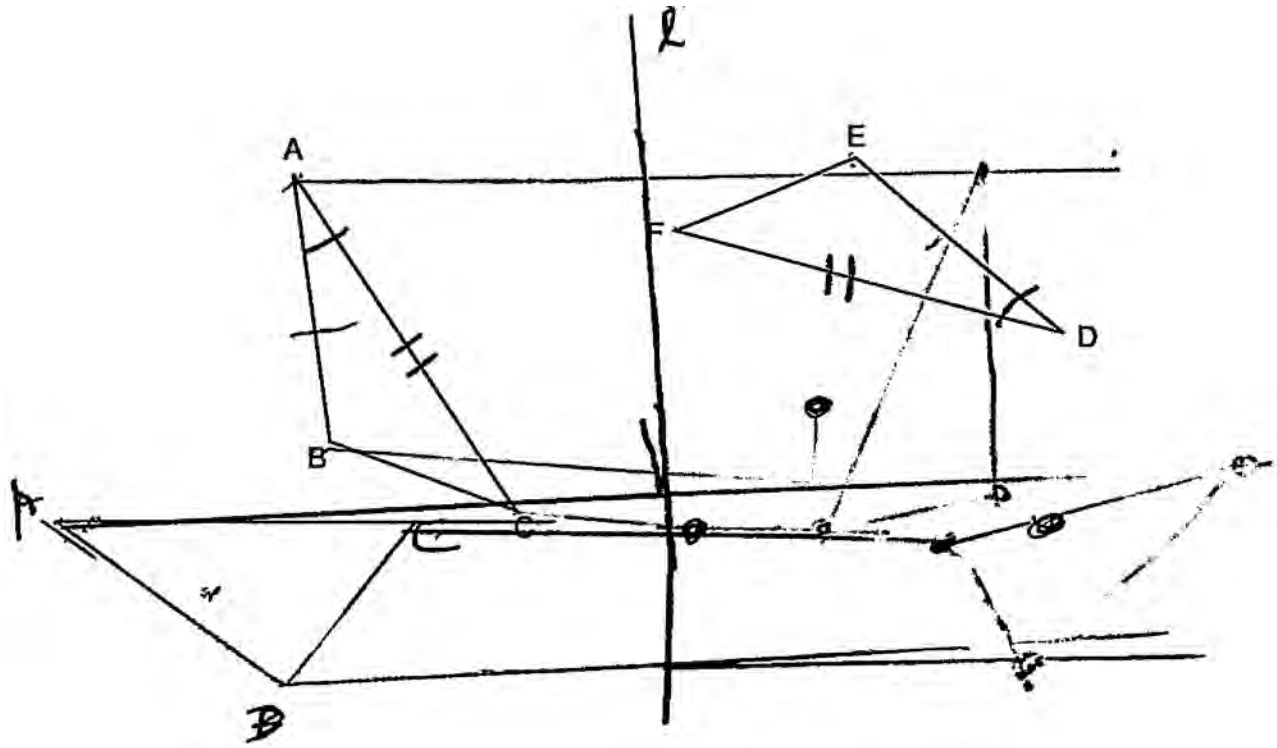
If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

Translate and Rotate

Score 1: The student demonstrated knowledge of the transformation, but the written sequence was incomplete.

Question 30

30 Triangle *ABC* and triangle *DEF* are drawn below.



If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $\angle A \cong \angle D$, write a sequence of transformations that maps triangle *ABC* onto triangle *DEF*.

rotated - by
reflected - over line ℓ
translated - by 3

Score 0: The student wrote an incorrect sequence of transformations.

Question 31

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.]

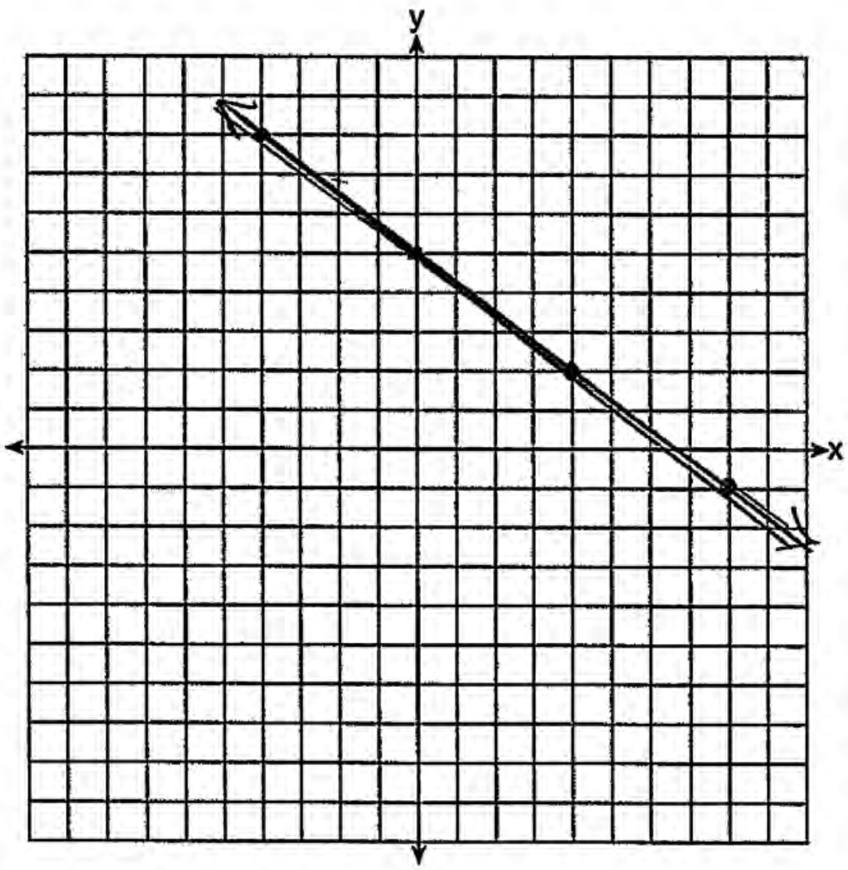
Explain your answer.

Line p

$3x+4y=20$

The line was on the center of dilation. Therefore the line remains invariant

$3x+4y=20$
$-3x \quad\quad -3x$
$\frac{4y}{4}=\frac{-3x}{4}+\frac{20}{4}$
$y=\frac{-3}{4}x+5$



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

Question 31

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.]

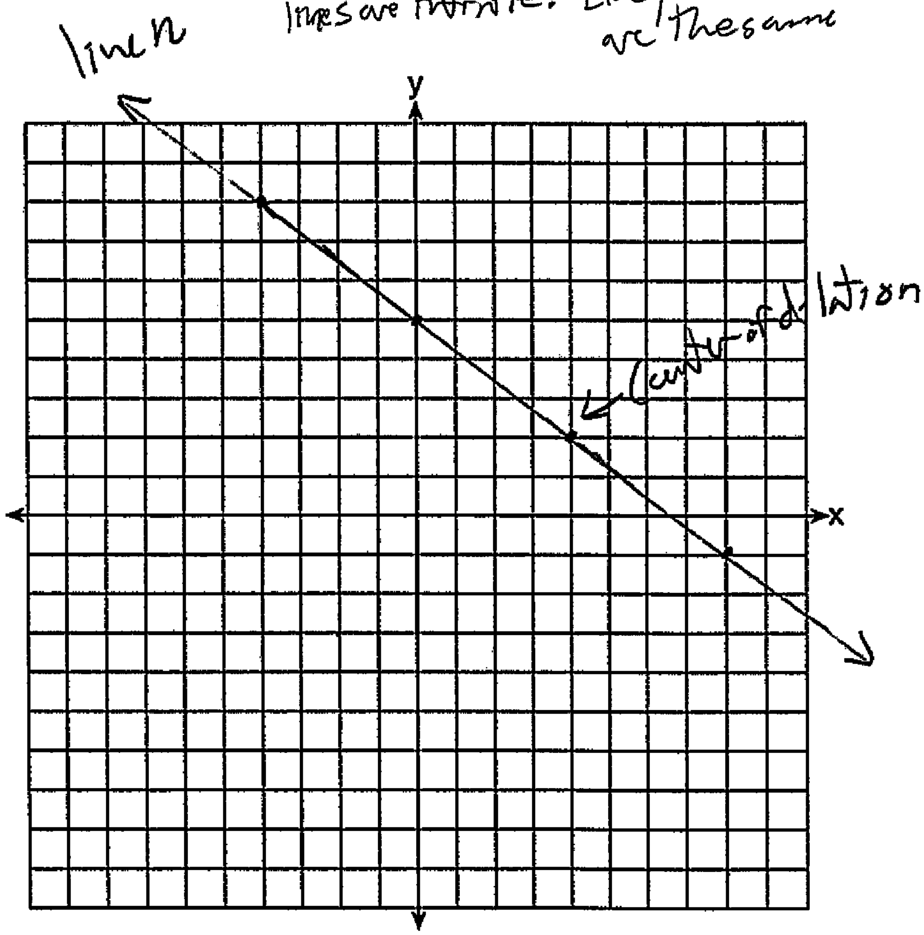
Explain your answer.

$$\left(4y=-3x+20\right)\frac{1}{4}$$

$$y=-\frac{3}{4}x+5$$

$$\boxed{\text{line } p = y=-\frac{3}{4}x+5}$$

The point the dilation is centered at is on the line so the location of the line would not change. The size of the line would not change either because lines are infinite. Line p and line n are the same



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

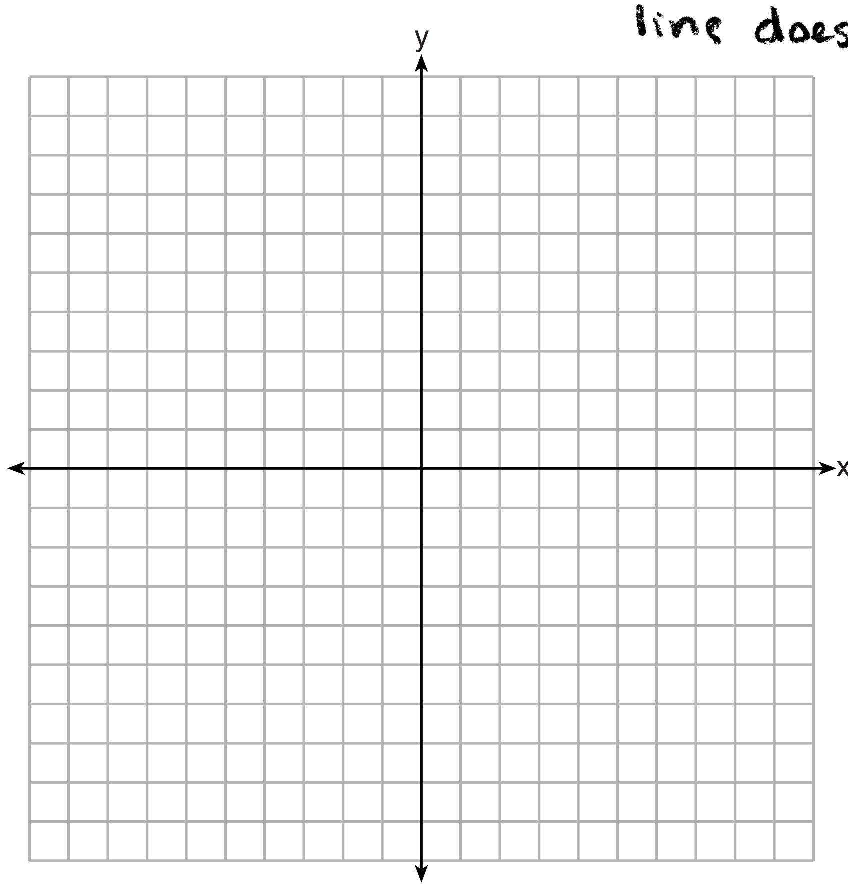
Question 31

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.]

Explain your answer.

$$3(4)+4(2)=20$$
$$20=20$$

The line is on the center of dilation so the line doesn't change.



Score 1: The student wrote a correct explanation, but did not write the equation of line p.

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2).
[The use of the set of axes below is optional.]

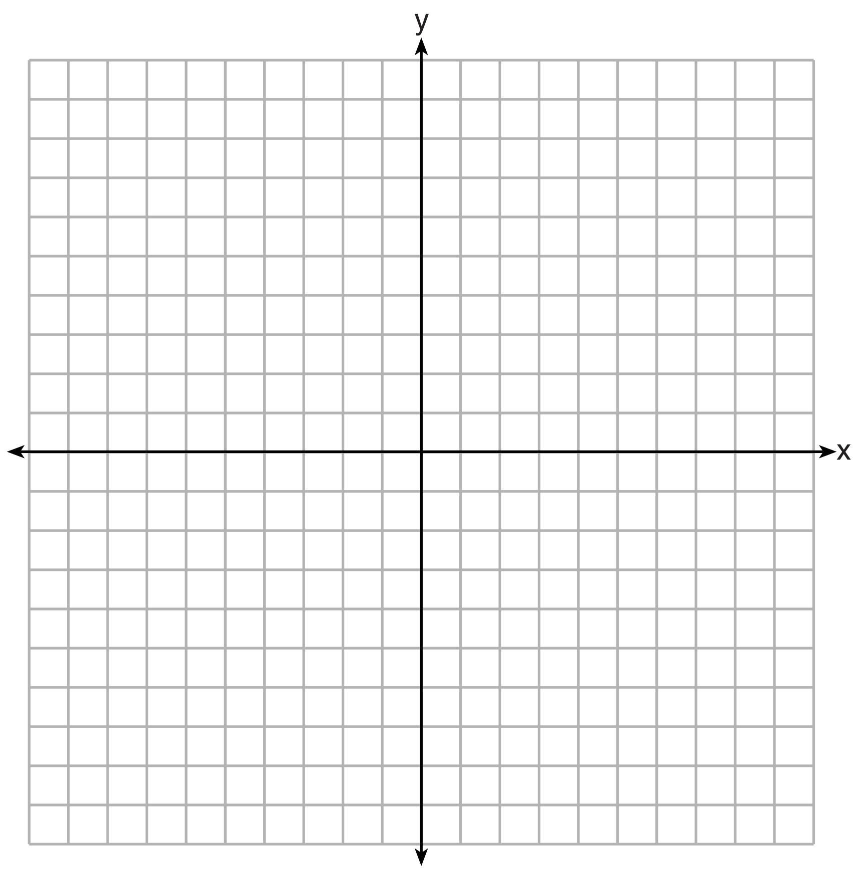
Explain your answer.

$$3x + 4y = 20$$
$$-3x \qquad -3x$$
$$\frac{4y}{4} = \frac{20}{4} \frac{-3x}{4}$$
$$y = 5 - \frac{3}{4}x$$

$$5 \times \frac{1}{3} = \frac{5}{3}$$

$$y = \frac{5}{3} - \frac{3}{4}x$$

The y intercept is dilated but the slope stays the same



Score 1: The student did not account for the center of dilation being on line n.

Question 31

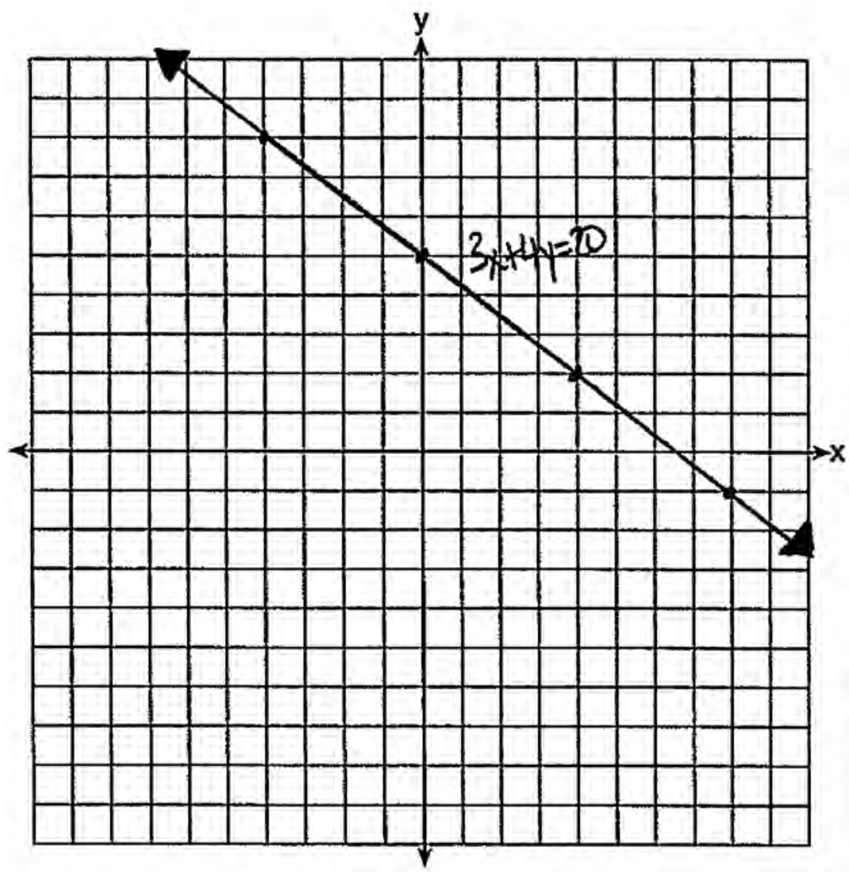
31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2).
[The use of the set of axes below is optional.]

Explain your answer.

$$3x + 4y = 20$$
$$-3x \qquad -3x$$
$$\frac{4y}{4} = \frac{-3x + 20}{4}$$
$$y = \frac{-3}{4}x + 5$$

$$2 = 4(x) + \frac{5}{3}$$
$$-\frac{5}{3} \qquad -\frac{5}{3}$$
$$\frac{1/3}{4} = \frac{4x}{4}$$
$$1/12 = x$$

$$y = 1/12x + \frac{5}{3}$$



Score 0: The student wrote an incorrect equation and did not write an explanation.

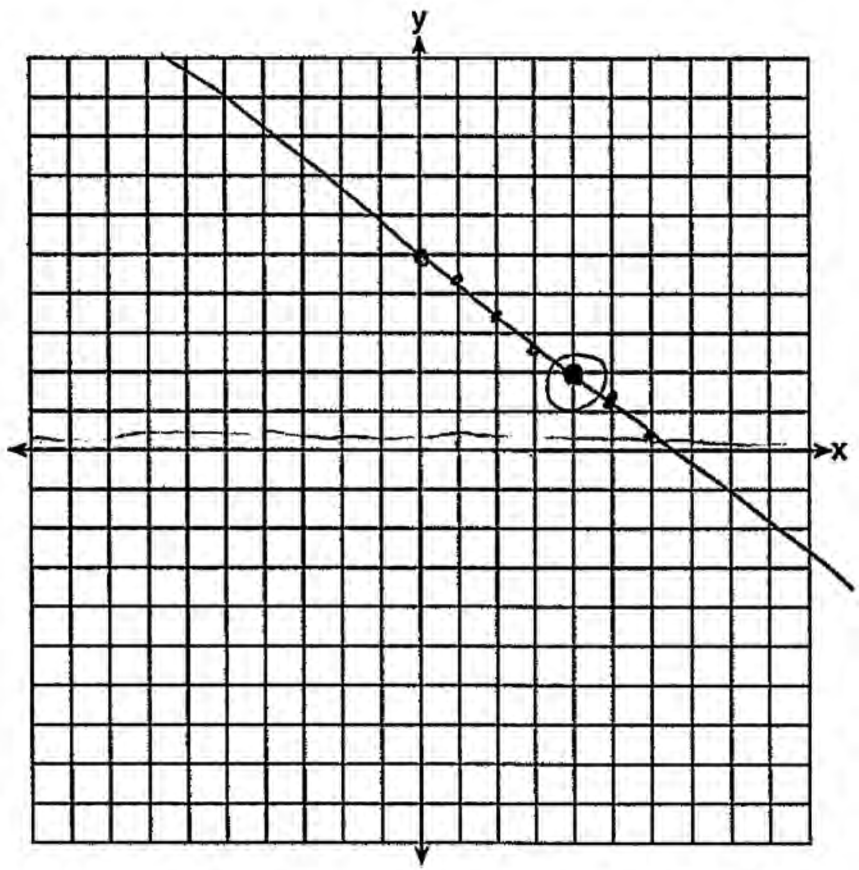
Question 31

31 Line n is represented by the equation $3x + 4y = 20$. Determine and state the equation of line p, the image of line n, after a dilation of scale factor $\frac{1}{3}$ centered at the point (4,2). [The use of the set of axes below is optional.]

Explain your answer.

$$\cancel{3x} + 4y = 20$$
$$-\cancel{3x} \qquad -3x$$
$$\frac{\cancel{4}y}{\cancel{4}} = \frac{20}{4} - \frac{3x}{4}$$
$$y = 5 - \tfrac{3}{4}x$$

X	Y
0	5
1	4.25
2	3.5
3	2.75
4	2



Score 0: The student rewrote the given equation to graph the line, but did not write an explanation.

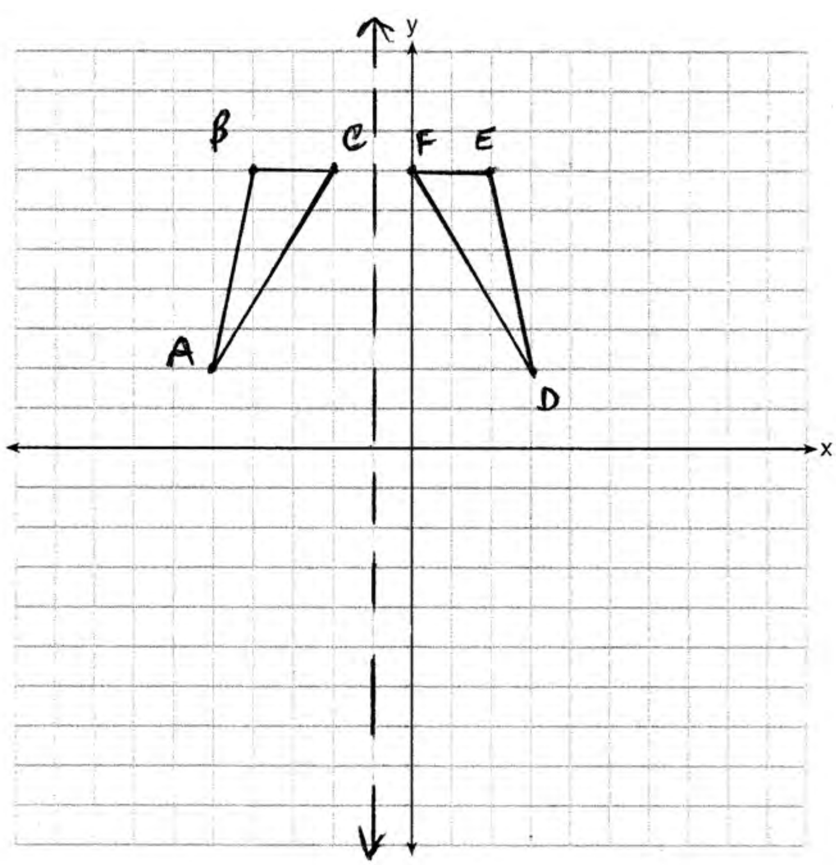
32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Reflect $\triangle ABC$ over the line $x = -1$

Reflections are rigid motions that preserve angle measures and side lengths, so $\triangle ABC \cong \triangle DEF$.



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

Question 32

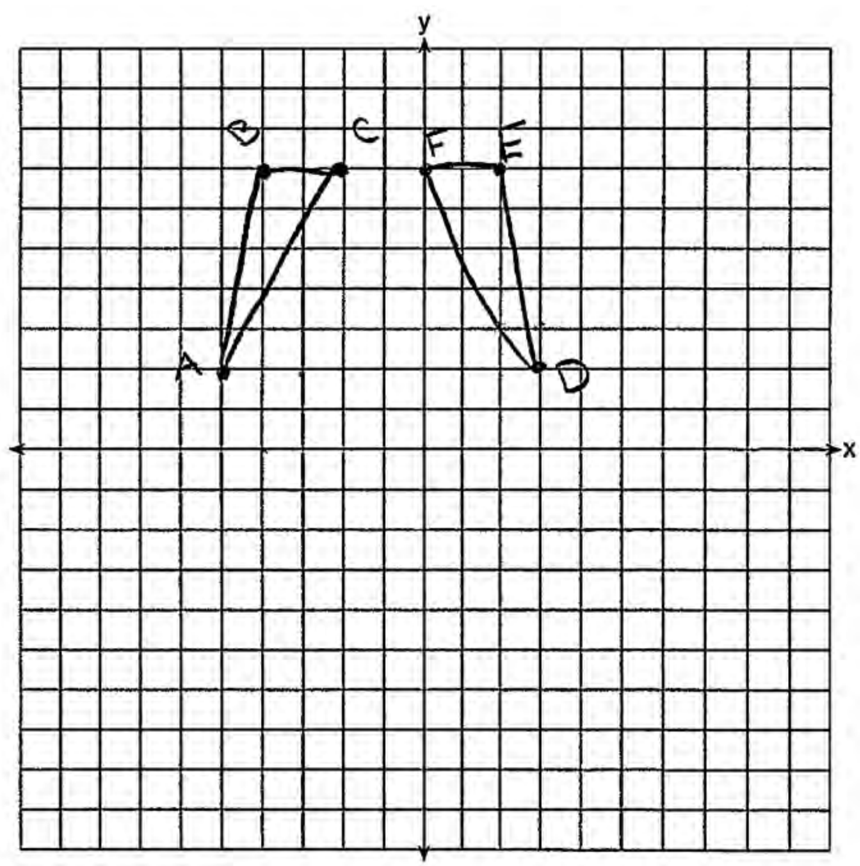
32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

- reflection over $x=-2$

- $\triangle ABC \cong \triangle DEF$ because reflections don't Change side or angle measures



Score 3: The student miscounted when writing the equation of the line of reflection.

Question 32

32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

△DEF was reflected over Line x = -1. I know because all the point are equidistant from that line that are the images.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

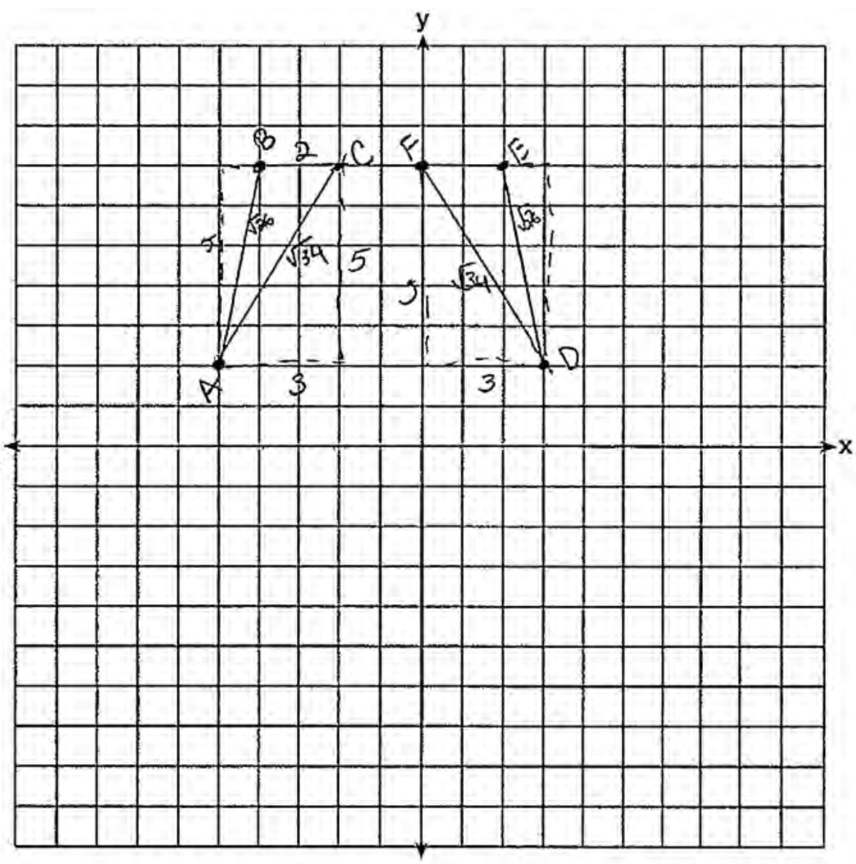
△ABC ≅ △DEF by SSS because all the sides are the same length because of pythagoreen theorem.

$\sqrt{26}$

$3^2 + 5^2 =$

$9 + 25 = 34$

$\sqrt{34}$



Score 3: The student gave an explanation for why the triangles are congruent, but did not use the transformation to explain why.

Question 32

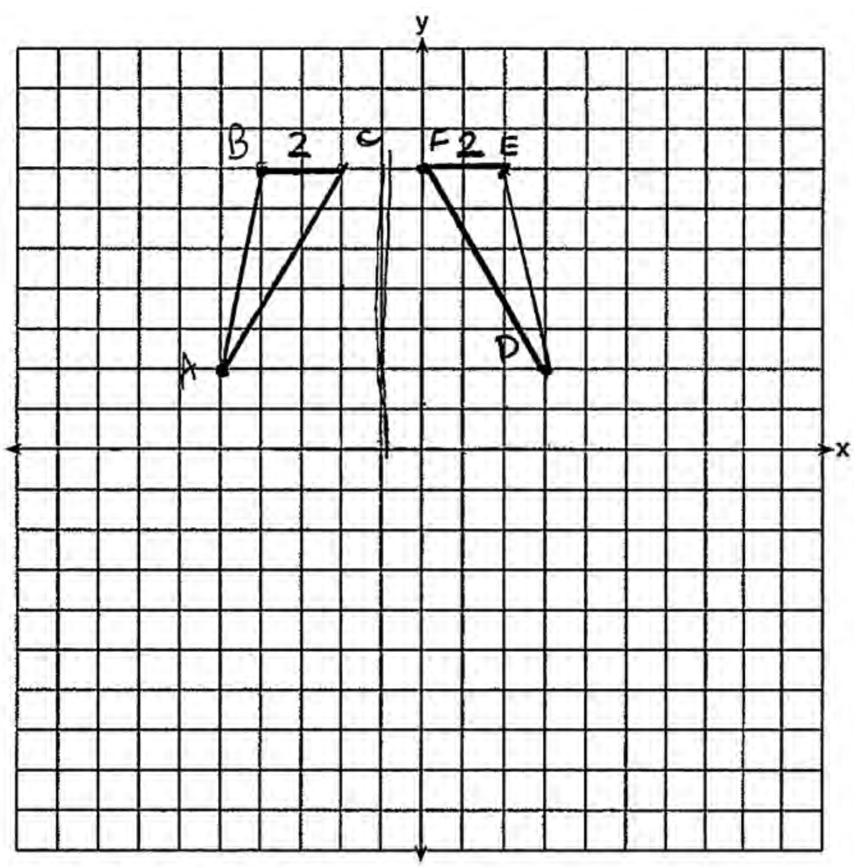
32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Reflection across $x=-1$

When reflected onto each other, the side lengths are the same as well as angle measures, therefore they are congruent through SSS similarity.



Score 3: The student wrote a partially correct explanation.

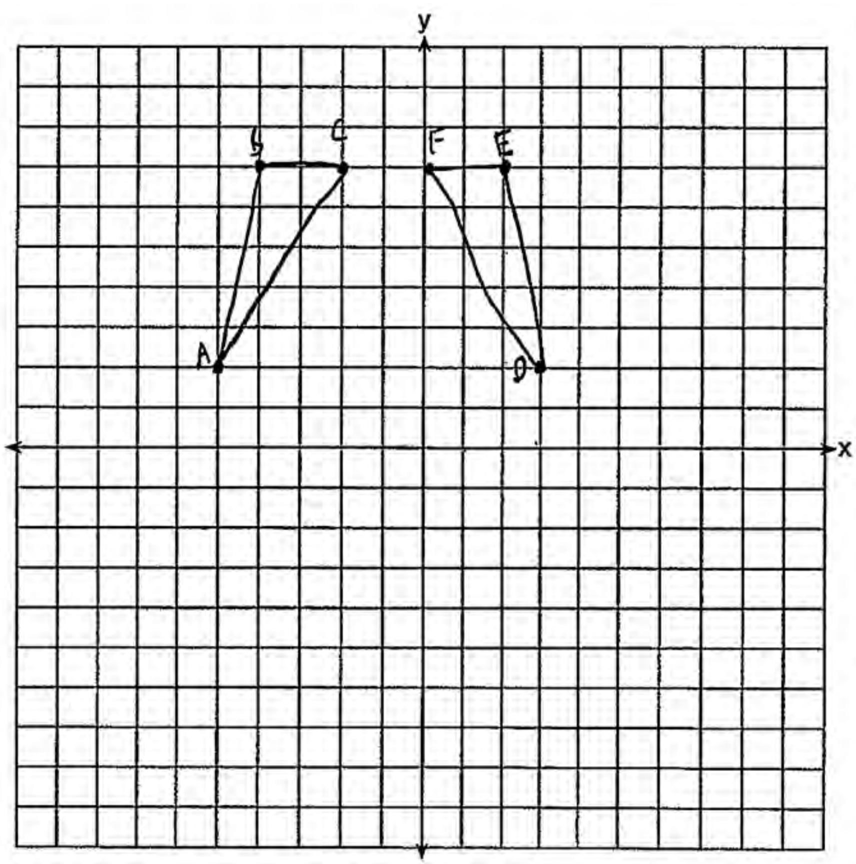
Question 32

32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Reflection over x=-1 the distance for each corresponding point is the same distance away from x=1



Score 2: The student graphed and labeled the triangles correctly and stated the correct line of reflection, but no further correct work was shown.

Question 32

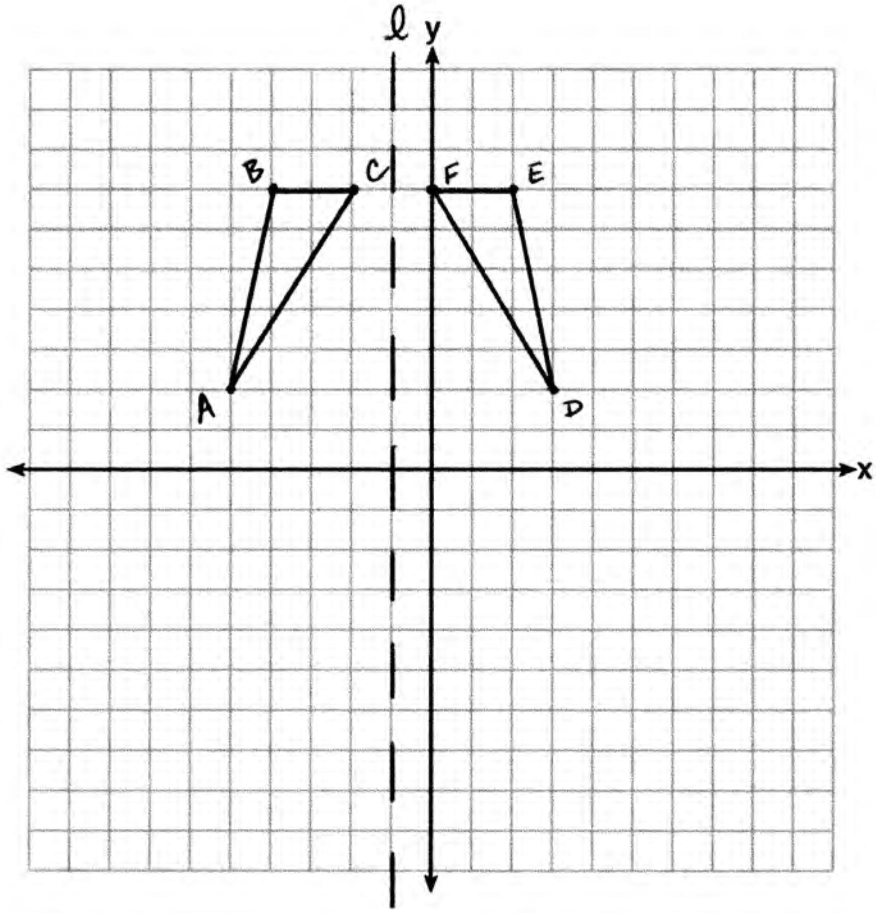
32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Reflect $\triangle ABC$ over ~~[illegible]~~ line ℓ onto $\triangle DEF$.

They are congruent because they are the same size.



Score 2: The triangles were graphed and labeled correctly and a correct transformation was written, but no further correct work was shown.

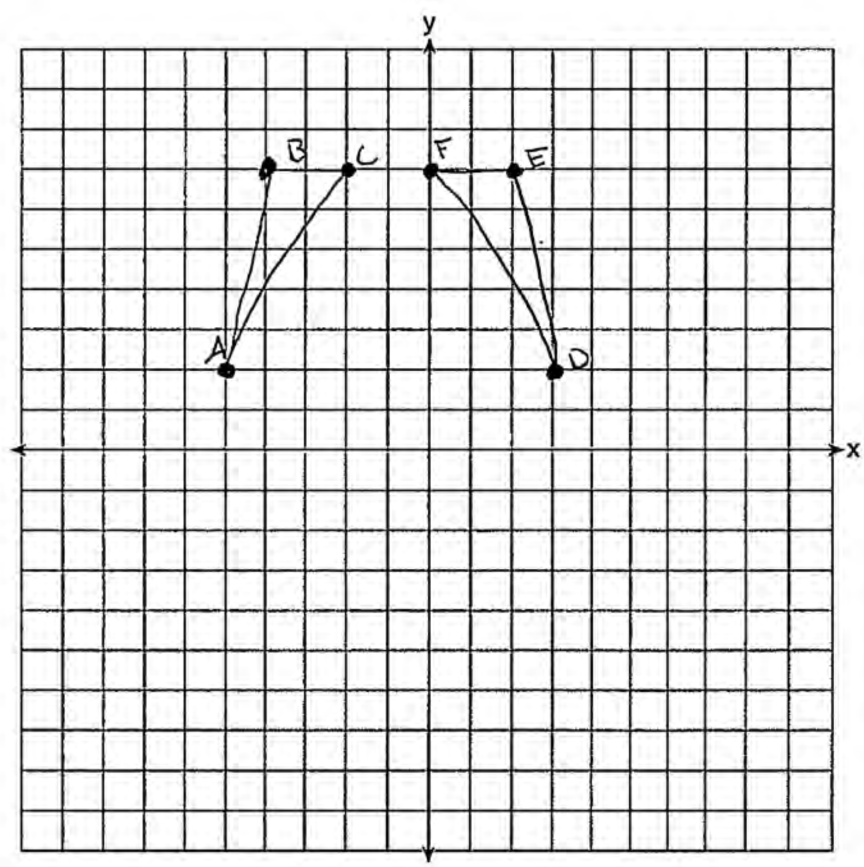
Question 32

32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Transformation: Rotation 270°



Score 1: The student graphed and labeled both triangles correctly, but no further correct work was shown.

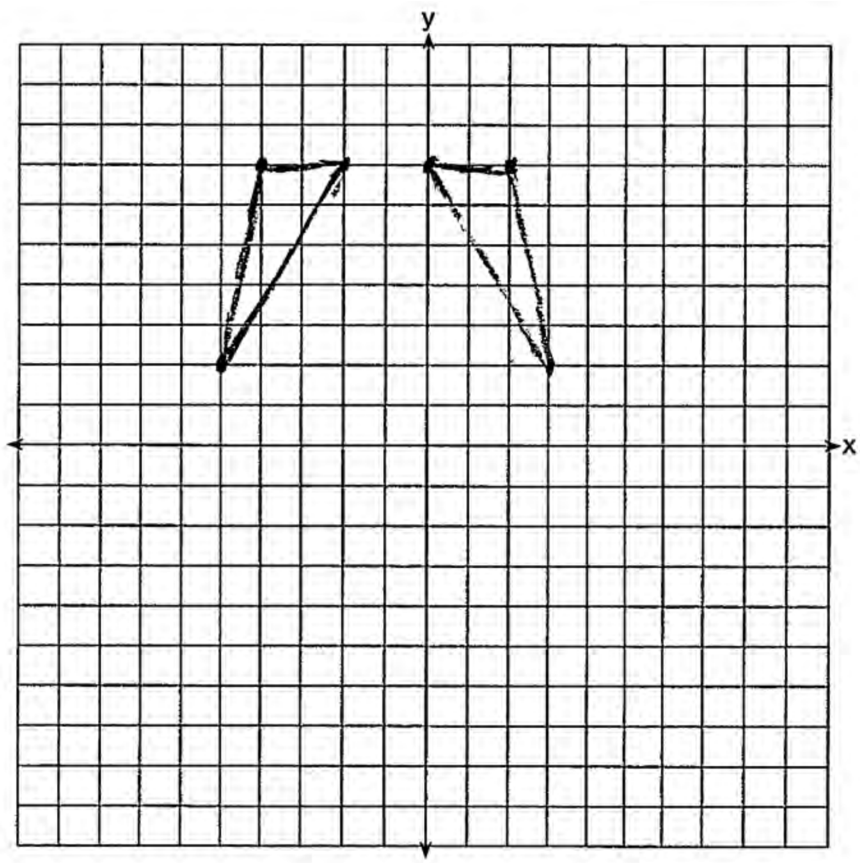
Question 32

32 Triangle ABC has vertices at $A(-5,2)$, $B(-4,7)$, and $C(-2,7)$, and triangle DEF has vertices at $D(3,2)$, $E(2,7)$, and $F(0,7)$. Graph and label $\triangle ABC$ and $\triangle DEF$ on the set of axes below.

Determine and state the single transformation where $\triangle DEF$ is the image of $\triangle ABC$.

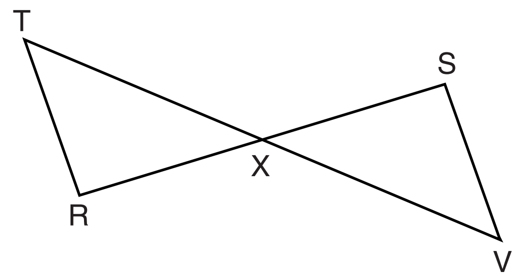
Use your transformation to explain why $\triangle ABC \cong \triangle DEF$.

Reflection over the y-axis



Score 0: The student had a completely incorrect response.

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



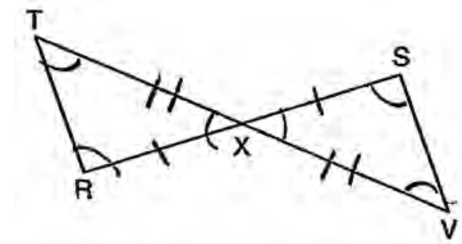
Prove: $\overline{TR} \parallel \overline{SV}$

Statement	Reason
1. $\overline{RS}$ and $\overline{TV}$ bisect each other at point X $\overline{TR}$ and $\overline{SV}$ are drawn	1. given
2. $\overline{TX} \cong \overline{VX}$ $\overline{RX} \cong \overline{SX}$	2. Segment bisectors meet at a midpoint and create 2 ≅ segments.
3. $\angle TXR \cong \angle VXS$	3. vertical angles are congruent
4. $\triangle TXR \cong \triangle VXS$	4. SAS
5. $\angle T \cong \angle V$	5. CPCTC
6. $\overline{TR} \parallel \overline{VS}$	6. If two lines are cut by a transversal so that alternate interior angles are congruent, the lines are parallel.

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

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



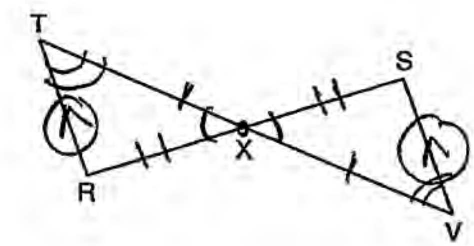
Prove: $\overline{TR} \parallel \overline{SV}$

Statements	Reasons
1. $\overline{RS}$ and $\overline{TV}$ bisect each other	1. Given
2. $\overline{TX} \cong \overline{VX}$; $\overline{SX} \cong \overline{RX}$	2. A segment bisector divides a segment into two $\cong$ parts.
3. ∡TXR and ∡SXV are vertical angles	3. ∦ Lines interect to create vertacal angle.
4. ∡TXR ≅ ∡SXV	4. Vertical angles are ≅
5. △TRX ≅ △VSX	5. S.A.S ≅ S.A.S
6. ∡T ~~ose~~ ≅ ∡V, ∡S ≅ ∡R	6. CPCTC
7. $\overline{TR} \parallel \overline{SV}$	7. Congruent alternate interior angles create parallel lines

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

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



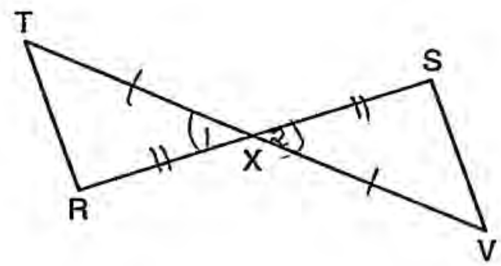
Prove: $\overline{TR} \parallel \overline{SV}$

S	R
1) $\overline{RS}$ and $\overline{TV}$ bisect eachother at point X	2) given
2) $\overline{TX} \cong \overline{XV}$, $\overline{RX} \cong \overline{XS}$	2) a bisector divides a segment into 2 ≅ parts
3) ∡TXR and ∡SXV are vertical ∡s	3) interlecting liner form vertical ∡s
4) ∡TXR ≅ ∡SXV	4) vertical ∡s are ≅
5) △TXR ≅ △VXS	5) SAS ≅ SCS
6) ∡RTX ≅ ∡SVX	6) CPCTC
7) ∡RTX and ∡SVX are alternate interior ∡s	7) ∡s on opposite side of transversal they are alternate interior
8) $\overline{TR} \parallel \overline{SV}$	8) they form alternate interior ∡s

Score 3: The student had an incorrect reason to prove statement 8.

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



Prove: $\overline{TR} \parallel \overline{SV}$

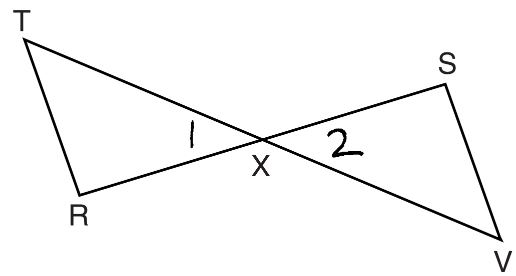
Statements	Reasons
1 $\overline{RS}$ & $\overline{TV}$ bisect eachother at X	1 Given
2 $\overline{TX} \cong \overline{XV}$, $\overline{RX} \cong \overline{XS}$	2 Definition of bisector
3 $\angle 1 \cong \angle 2$	3 Vertical angles are $\cong$
4 $\triangle TXR \cong \triangle VXS$	4. SAS $\cong$ SAS
5 $\overline{TR} \parallel \overline{SV}$	5 CPOCTAC

Score 2: The triangles were proven congruent, but no further correct work was shown.

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X

$\overline{TR}$ and $\overline{SV}$ are drawn



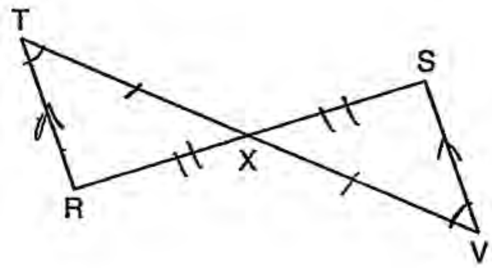
Prove: $\overline{TR} \parallel \overline{SV}$

Statement	Reason
1. $\overline{RS}$ and $\overline{TV}$ bisect each other, $\overline{TR}$ and $\overline{SV}$ are drawn.	1. Given
2. X is the midpoint of $\overline{RS}$ and $\overline{TV}$	2. Bisector definition
3. $\overline{XR} \cong \overline{XS}$, $\overline{XT} \cong \overline{XV}$	3. midpoint definition
4. $\angle 1 \cong \angle 2$	4. Vertical $\angle$'s are $\cong$
5. $\triangle TRX \cong \triangle VSX$	5. SAS
6. $\overline{TR} \parallel \overline{SV}$	6. CPCTC

Score 2: The triangles were proven congruent, but no further correct work was shown.

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



Prove: $\overline{TR} \parallel \overline{SV}$

① $\overline{RS}$ and $\overline{TV}$ bisect each other at point X $\overline{TR}$ and $\overline{SV}$ are drawn ① Given

② $\overline{X}$ ~~x~~ is the midpoint of $\overline{RXS}$ and $\overline{TXV}$ ② def. of seg. bisector

③ $\overline{TX} \cong \overline{XV}$ and $\overline{R\cancel{X}} \cong \overline{XS}$ ③ def. of midpoint

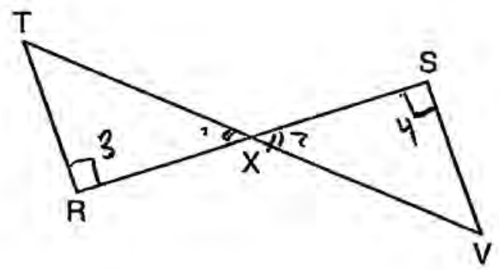
④ $\angle T \cong \angle V$ ④ $\cong$ side have $\cong$ opp. angles

⑤ $\overline{TR} \parallel \overline{SV}$ ⑤ aternate interior angles

Score 1: The student correctly proved $\overline{TX} \cong \overline{XV}$ and $\overline{RX} \cong \overline{XS}$, but no further correct work was shown.

Question 33

33 Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn



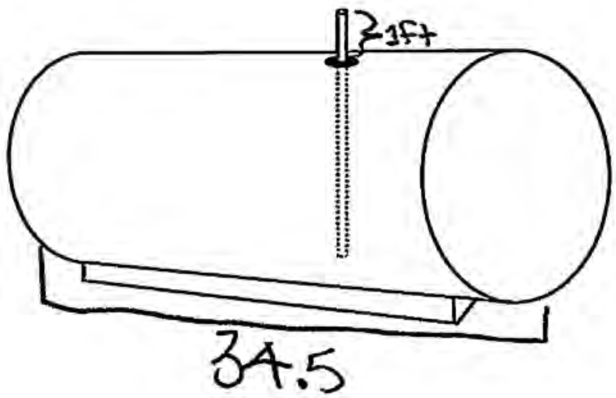
Prove: $\overline{TR} \parallel \overline{SV}$

① $\overline{RS}$ and $\overline{TV}$ bisect each other at point X $\overline{TR}$ and $\overline{SV}$ are drawn	① given
② ∠1 and ∠2 are vertical ∠s	② All vertical ∠'s are ≅
③ ∠3 ≅ ∠4	③
④ $\overline{TR} \parallel \overline{SV}$	④ AA ?

Score 0: The student had a completely incorrect response.

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

$V = \pi r^2 h$

$r^2 = \frac{v}{\pi h}$

$r = \sqrt{\frac{v}{\pi h}}$

$r = \sqrt{\frac{2673.796}{\pi 34.5}}$

$r = 4.9668 \cdot 2 = d$

$d = 9.9$ ft.

$+1$ ft

10.9 ft

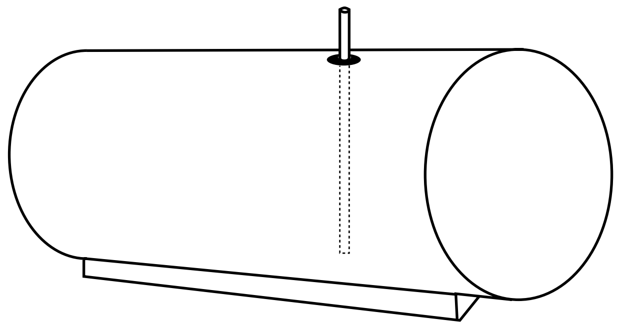
$\frac{20{,}000}{7.48} = 2673.796$

The pole must be 10.9ft to reach the bottom w/ one foot of metal still outside the tank

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

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

$V = 20000$ gal

$= \frac{20000}{7.48} \approx 2673.8 \text{ ft}^3$

$V = \pi r^2 h$

$2673.8 = \pi r^2 (34.5)$

$r^2 = \frac{2673.8}{34.5}$

$r^2 = 77.5$

$r = 8.8035$

length of pole

$2r + 1$

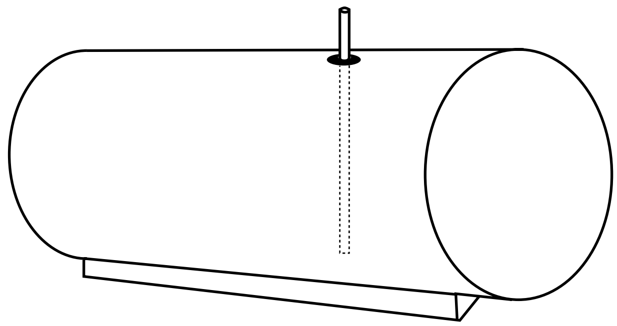
$2(8.8035) + 1$

$\boxed{l = 18.6}$

Score 3: The student did not divide by π when finding the radius.

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

$$\frac{20{,}000}{\div\ 7.48}$$

$$\frac{2673.796791}{34.5} = \frac{\pi r^2(34.5)}{34.5}$$

$$\frac{77.50135627}{\pi} = \frac{\pi r^2}{\pi}$$

$$\sqrt{24.66944789} = \sqrt{r^2}$$

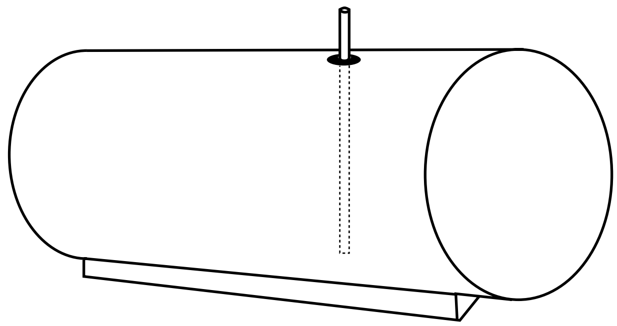
$$4.9668834796 = r$$

$\boxed{\text{6 feet}}$ because the tank is about 5 feet tall

Score 3: The student found the length of the radius, but no further correct work was shown.

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

$V = \pi r^2 h$

$20{,}000 = \pi r^2 (34.5)$

$\frac{20{,}000}{108.38} = \frac{108.38 r^2}{108.38}$

$\sqrt{184.54} = \sqrt{r^2}$

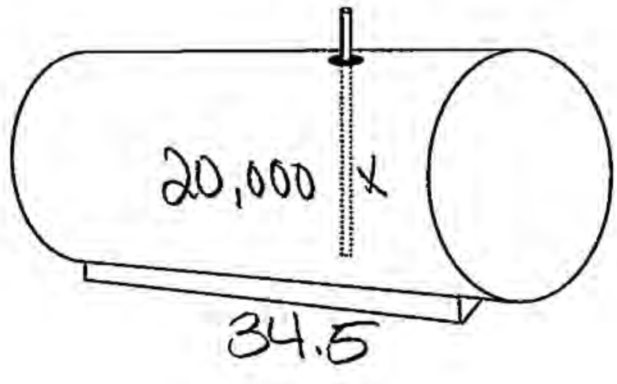
$13.58 = r$

$13.58 \times 2 + 1 = \boxed{28.2 \text{ Ft.}}$

Score 2: The student did not convert gallons to cubic feet.

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

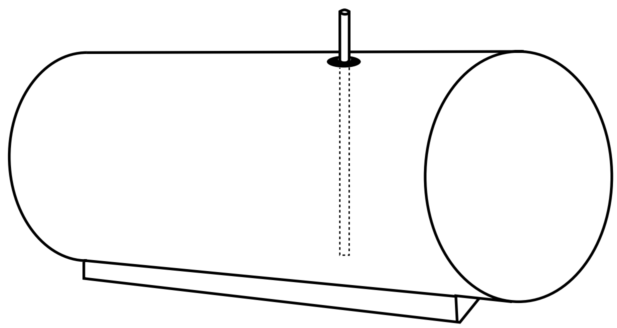
It will be 2,674 because when dividing the amount of gallons in the tank (20,000) by 7.48 you get 2,673.8. then adding another Foot outside the tank making it 2,674.

$$\begin{array}{r} 20{,}000 \\ \div\ 7.48 \\ \hline 2{,}673.8 \\ 2{,}674 \end{array}$$

Score 1: The student found the volume in cubic feet, but no further correct work was shown.

Question 34

34 A gas station has a cylindrical fueling tank that holds the gasoline for its pumps, as modeled below. The tank holds a maximum of 20,000 gallons of gasoline and has a length of 34.5 feet.



A metal pole is used to measure how much gas is in the tank. To the *nearest tenth of a foot*, how long does the pole need to be in order to reach the bottom of the tank and still extend one foot outside the tank? Justify your answer. [1 ft^3 = 7.48 gallons]

It need to be 155ft

$V = \pi r^2 \cdot h$

$V = 4417.25$

$\frac{201000}{17.25} = \frac{4417.25 \cdot h}{1.25}$

$\frac{1}{7.48} = \frac{x}{1154.42029}$

$\frac{7.48x}{7.48} = \frac{1154.42029}{7.48}$

$x \approx 155\text{ft}$

Score 0: The student had a completely incorrect response.

Question 35

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus.
[The use of the set of axes on the next page is optional.]

Prove Quad PQRS rhombus:

Distance formula:

PQ: $\sqrt{(8-3)^2+(3+2)^2} = \sqrt{50} = 5\sqrt{2}$

QR: $\sqrt{(1-8)^2+(4-3)^2} = \sqrt{50} = 5\sqrt{2}$

RS: $\sqrt{(-4-1)^2+(-1-4)^2} = \sqrt{50} = 5\sqrt{2}$

PS: $\sqrt{(-4+3)^2+(-1+2)^2} = \sqrt{50} = 5\sqrt{2}$

$\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{PS}$

$\therefore$ Its a rhombus because all sides are equal

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]

Prove Quad PQRS is not a Square;

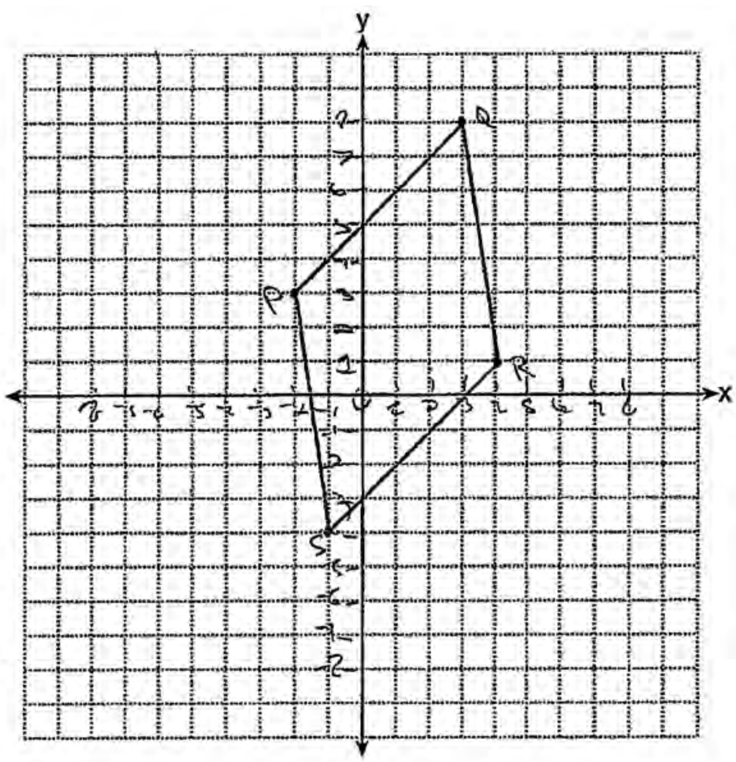
Slope:

$\overline{PQ}$: $\frac{8-3}{3+2} = \frac{5}{5} = 1$ $\qquad 1 \cdot \frac{-7}{1} \neq -1$

$\overline{QR}$: $\frac{1-8}{4-3} = \frac{-7}{1}$

$\overline{PQ} \not\perp \overline{QR}$, $\angle Q$ is not a right angle.

$\therefore$ PQRs is not a square because it doesnt have right angles.



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

35 Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that *PQRS* is a rhombus.
[The use of the set of axes on the next page is optional.]

$PQ = \sqrt{(3-(-2))^2+(8-3)^2}$
$= \sqrt{5^2+5^2}$
$= \sqrt{25+25}$
$PQ = \sqrt{50}$

$QR = \sqrt{(4-3)^2+(1-8)^2}$
$= \sqrt{1^2+(-7)^2}$
$= \sqrt{1+49}$
$QR = \sqrt{50}$

$RS = \sqrt{(-1-4)^2+(-4-1)^2}$
$= \sqrt{(-5)^2+(-5)^2}$
$= \sqrt{25+25}$
$RS = \sqrt{50}$

$PS = \sqrt{(-1-(-2))^2+(-4-3)^2}$
$= \sqrt{1^2+(-7)^2}$
$= \sqrt{1+49}$
$= \sqrt{50}$

$\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{PS}$

Since all 4 sides of quadrilateral PQRS are $\cong$, PQRS is a rhombus.

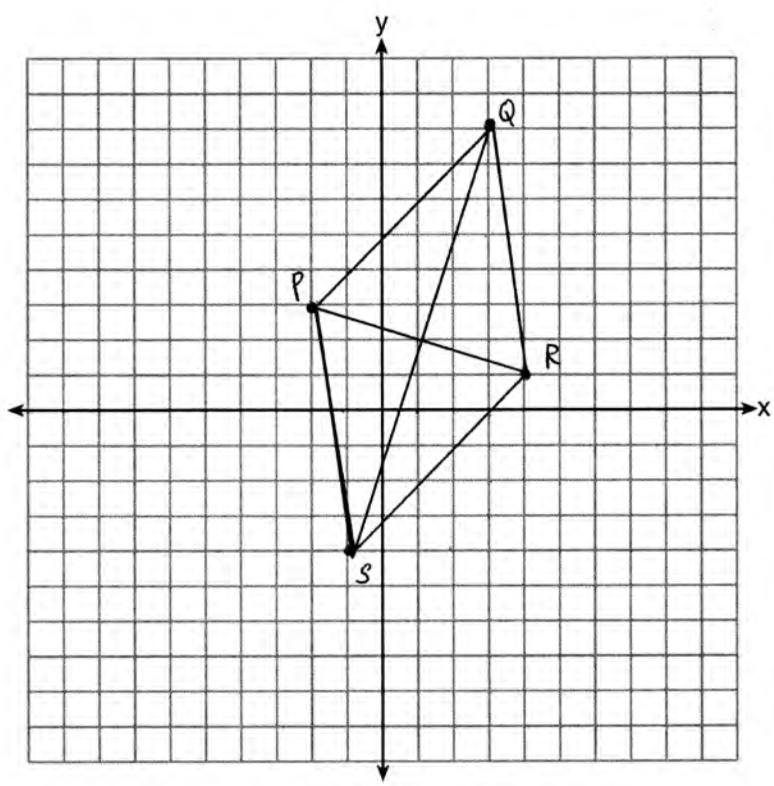
Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]

$PR = \sqrt{(4-(-2))^2 + (1-3)^2}$
$= \sqrt{(6)^2 + (-2)^2}$
$= \sqrt{36 + 4}$
$PR = \sqrt{40}$

$QS = \sqrt{(-1-3)^2 + (-4-8)^2}$
$= \sqrt{(-4)^2 + (-12)^2}$
$= \sqrt{16 + 144}$
$QS = \sqrt{160}$

Since diagonals $\overline{PR}$ and $\overline{QS}$ are not congruent, rhombus PQRS is not a square.



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

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus.
[The use of the set of axes on the next page is optional.]

Statement	reasons
1) $\overline{PQ} \cong \overline{QR} \cong \overline{SR} \cong \overline{PS}$	distance are $\cong$
2) PQRS is a rhombus	a quadrilateral with all sides congruent is a rhombus

PQ $d=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$
$\sqrt{(-2-3)^2+(3-8)^2}$
$\sqrt{(-5)^2+(-5)^2}$
$\sqrt{25+25}$
$\sqrt{50}$
$\sqrt{25}\sqrt{2}$
$5\sqrt{2}$

$d=\sqrt{(3-4)^2+(8-1)^2}$
$\sqrt{(-1)^2+(7)^2}$
$\sqrt{1+49}$
$\sqrt{50}$
$\sqrt{25}\sqrt{2}$
$5\sqrt{2}$

SR $d=\sqrt{(-1-4)^2+(-4-1)^2}$
$\sqrt{(-5)^2+(-5)^2}$
$\sqrt{25+25}$
$\sqrt{50}$
$\sqrt{25}\sqrt{2}$
$5\sqrt{2}$

PS $d=\sqrt{(-2+(+1))^2+(3+(+4))^2}$
$\sqrt{(-1)^2+(7)^2}$
$\sqrt{1+49}$
$\sqrt{50}$
$\sqrt{25}\sqrt{2}$
$5\sqrt{2}$

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]

PQRS is not a square because the slopes are not negative recipicals.

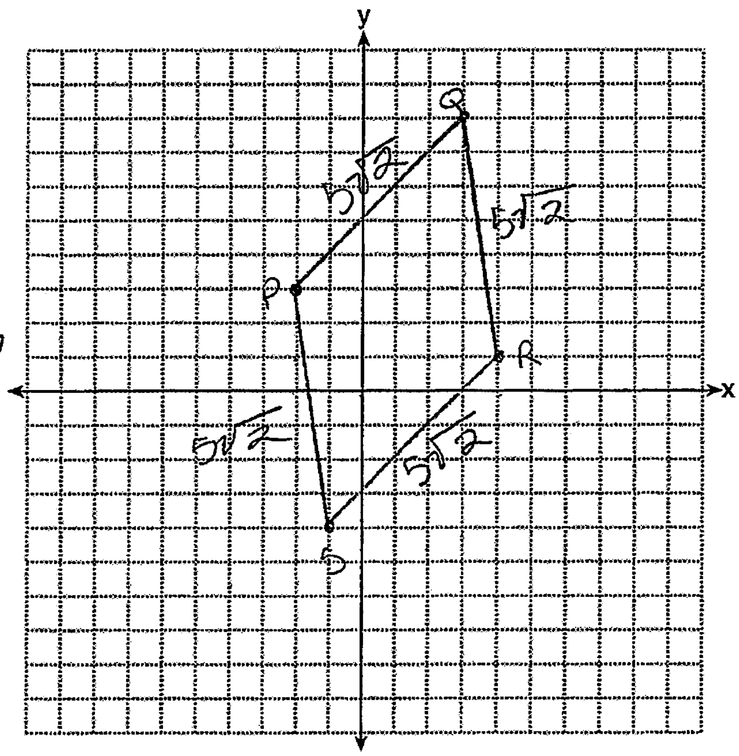
$m = \dfrac{y_1 - y_2}{x_1 - x_2}$

PQ $m = \dfrac{3-8}{-2-3}$

$m = \dfrac{-5}{-5} = \dfrac{5}{5}$

PS $m = \dfrac{3+(+4)}{-2+(+1)}$

$= \dfrac{7}{-1} = -7$



Score 5: The student wrote an incomplete concluding statement when proving *PQRS* is not a square.

Question 35

35 Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that *PQRS* is a rhombus.
[The use of the set of axes on the next page is optional.]

$\overline{PG} = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$= \sqrt{(3+2)^2+(8-3)^2}$
$= \sqrt{5^2+5^2}$
$= \sqrt{25+25}$
$= \sqrt{50}$

$\overline{QR} = \sqrt{(4-3)^2+(1-8)^2}$
$= \sqrt{-1^2+-7^2}$
$= \sqrt{1+49}$
$= \sqrt{50}$

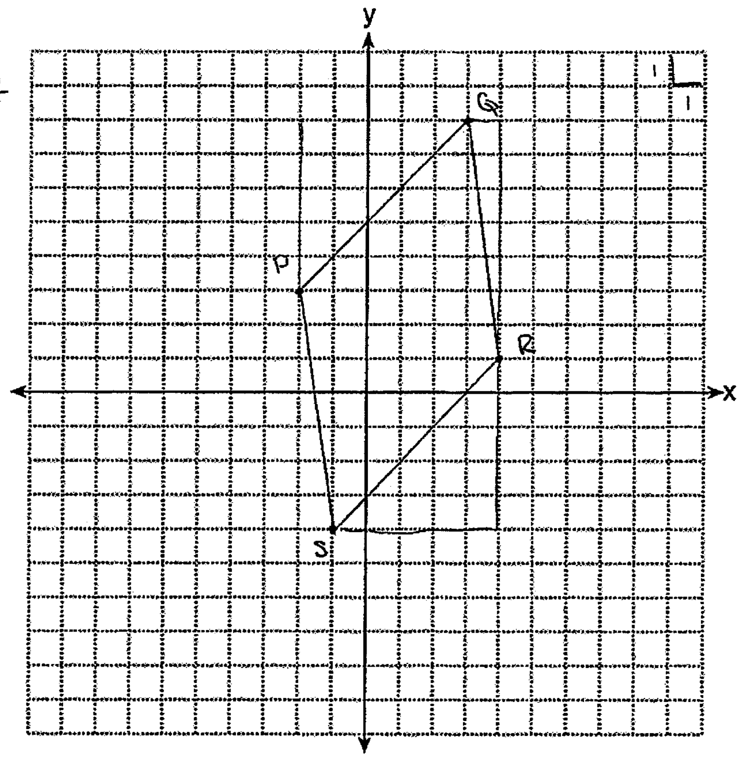
$\overline{RS} = \sqrt{(-1-4)^2+(-4-1)^2}$
$= \sqrt{-5^2+-5^2}$
$= \sqrt{25+25}$
$= \sqrt{50}$

$\overline{SP} = \sqrt{(-2+1)^2+(3+4)}$
$= \sqrt{-1^2+7^2}$
$= \sqrt{1+49}$
$= \sqrt{50}$

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]

PQRS is a rhombus because all of its sides are congruent



Score 4: *PQRS* is a rhombus was proven, but no further correct work was shown.

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus.
[The use of the set of axes on the next page is optional.]

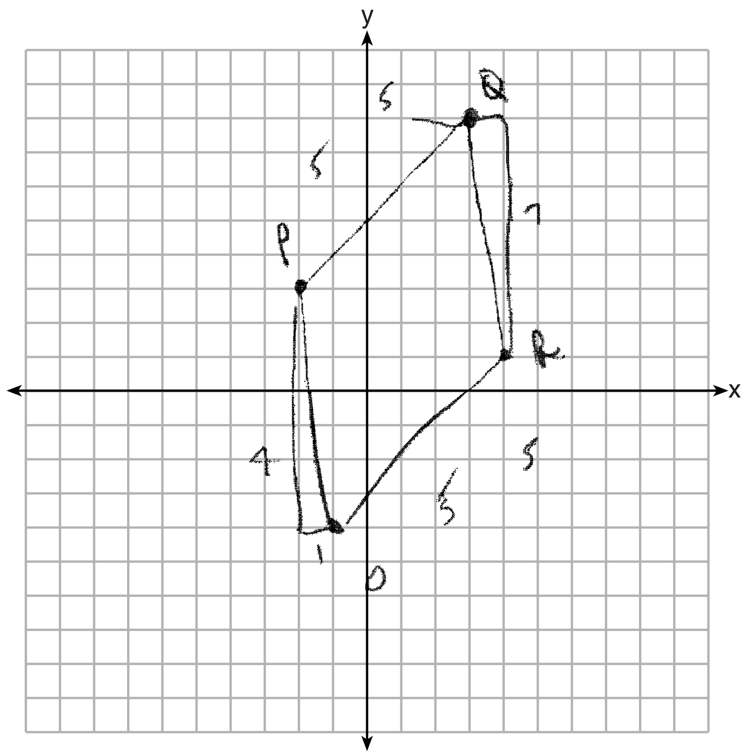
PQRS is a ▱ b/c both sets of opposite sides of the quad are ∥.

$m\overline{PQ} = \frac{5}{5} = 1$
$m\overline{RS} = \frac{5}{5} = 1$] = slopes → ∥

$m\overline{PS} = \frac{-7}{1} = -7$
$m\overline{QR} = \frac{-7}{1} = -7$] = slopes → ∥

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]



Score 3: *PQRS* is a parallelogram was proven, but no further correct work was shown.

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus.
[The use of the set of axes on the next page is optional.]

(x, y)
$P\ (-2,3)$
$Q\ (3,8)$
$R\ (4,1)$
$S\ (-1,-4)$

PQ
$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$d=\sqrt{(3+2)^2+(8-3)^2}$
$d=\sqrt{(5)^2+(5)^2}$
$d=\sqrt{25+25}$
$d=\sqrt{50}$
$d=\sqrt{2}\sqrt{25}$
$d=5\sqrt{2}$

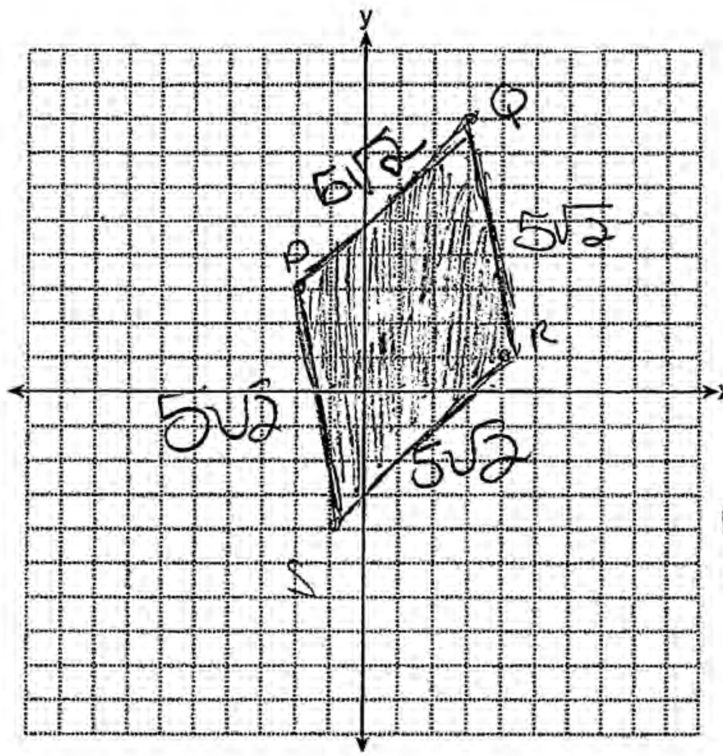
QR
$D=\sqrt{(4-3)^2+(1-8)^2}$
$D=\sqrt{(1)^2+(-7)^2}$
$d=\sqrt{1+49}$
$d=\sqrt{50}$
$d=\sqrt{2}\sqrt{25}$
$d=5\sqrt{2}$

PS
$\sqrt{(-1+2)^2+(-4-3)^2}$
$\sqrt{(1)^2+(-7)^2}$
$d=\sqrt{1+49}$
$d=\sqrt{50}$
$d=\sqrt{2}\sqrt{25}$
$d=5\sqrt{2}$

RS
$d=\sqrt{(-1-4)^2+(-4-1)^2}$
$d=\sqrt{(-5)^2+(-5)^2}$
$d=\sqrt{25+25}$
$d=\sqrt{50}$
$d=\sqrt{2}\sqrt{25}$
$d=5\sqrt{2}$

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]



PQRS is a square

Score 2: The student found the lengths of all four sides, but no further correct work was shown.

Question 35

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus.
[The use of the set of axes on the next page is optional.]

① quad PQRS has vertices P(-2,3) Q(3,8) R(4,1) S(-1,-4)	① Given
② $\overline{PS} \cong \overline{QR}$, $\overline{PQ} \cong \overline{SR}$	② opposite sides are congruent in a quadrilateral
③ PQRS is a rhombus	③ all sides are congruent
④ PQRS is not a square	④ there are no rt ∡'s

$\text{slope} = \dfrac{y_1-y_2}{x_1-x_2}$

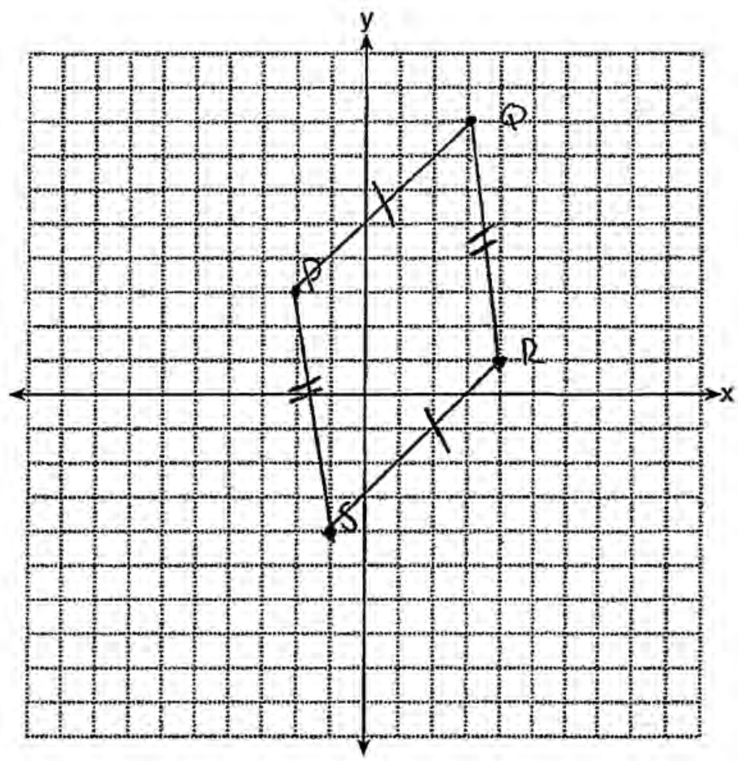
$\overline{PQ}$ slope $(x_1,y_1)(x_2,y_2)$ $(-2,3)(3,8)$ $= \dfrac{3-8}{-2-3} = \dfrac{-5}{-5} = 1$

$QR = \dfrac{y_1-y_2}{x_1-x_2}$

$(x_1,y_1)(x_2,y_2)$ $(3,8)(4,1) = \dfrac{8-1}{3-4} = \dfrac{7}{-1}$

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]



Score 1: The student found the slopes of two consecutive sides, but wrote an incomplete concluding statement about why *PQRS* is not a square.

Question 35

35 Quadrilateral $PQRS$ has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$.

Prove that $PQRS$ is a rhombus. = opposite sides are parallel
[The use of the set of axes on the next page is optional.]

QR

$\frac{1-8}{4-3} = \frac{-7}{1} = -7$

PS

$\frac{-4-3}{-1+2} = -\frac{7}{1} = -7$

SR

$D = \sqrt{(4+1)^2 + (1+4)^2}$

$D = \sqrt{5^2 + 5^2}$

$D = \sqrt{25+25}$

$D = \sqrt{50}$

$\sqrt{25}\sqrt{2}$

$5\sqrt{2}$

PQ

$D = \sqrt{(-2-3)^2 + (-3-8)^2}$

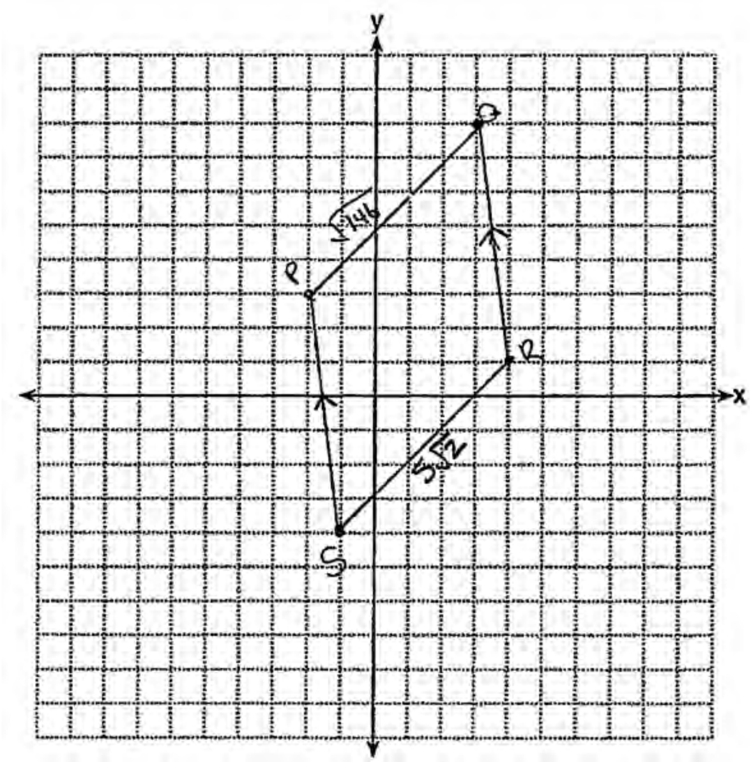
$D = \sqrt{(-5^2) + (-11^2)}$

$D = \sqrt{25 + 121}$

$D = \sqrt{146}$

Question 35 is continued on the next page.

Prove that *PQRS* is *not* a square.
[The use of the set of axes below is optional.]



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

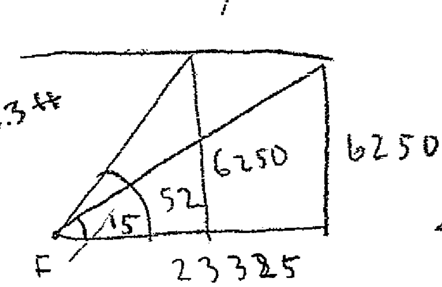
36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

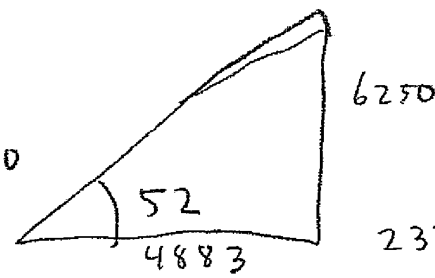
It has traveled 18,442 ft

$\tan 15 = \frac{6250}{x}$

$\frac{6250}{\tan 15} = x$

$x \approx 23325.3$ ft





$\tan 52 = \frac{6250}{x}$

$\frac{6250}{\tan 52} = x$

$x \approx 4883.0$

$23325.3 - 4883.0 =$

18442.3 ft

18442 ft

Determine and state the speed of the airplane, to the *nearest mile per hour*.

1 mile = 5280

$\frac{1 \text{ min}}{18442 \text{ ft}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \approx \frac{1 \text{ hr}}{1106520 \text{ ft}}$

$\cancel{\frac{1 \text{ hr}}{29\,2980 \text{ ft}}} \approx$

$\frac{1106520 \text{ ft}}{1 \text{ hr}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \approx 210$ mph

The airplane's speed is 210 mph

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

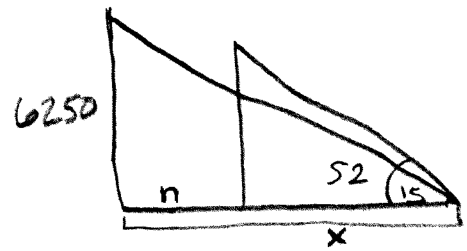
36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

$$n = \frac{6250}{\tan 15} = 23,325.3'$$

$$x = \frac{6250}{\tan 52} = -4,883.0'$$

$$18,442.3'$$

$\boxed{18,442'}$ distance traveled in 1 min.



Determine and state the speed of the airplane, to the *nearest mile per hour*.

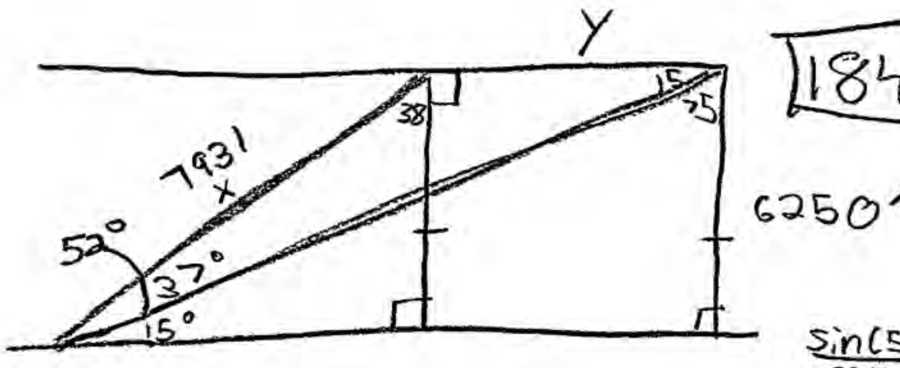
$r = \frac{d}{t}$ (mi/h)

$$\frac{18,442'}{1\text{ min.}} \cdot \frac{60\text{ min}}{1\text{ hr.}} \cdot \frac{1\text{ mi}}{5,280'} = \boxed{210\text{ mi/h}}$$

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

Question 36

36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?



$\boxed{18442\text{ft}}$

$$\frac{\sin(52)}{6250} = \frac{\sin(90)}{x}$$

Determine and state the speed of the airplane, to the *nearest mile per hour*.

$\boxed{1106520\ \text{mil/hr}}$

$$\frac{\sin(52)x}{\sin(52)} = \frac{\sin(90)\cdot 6250}{\sin(52)}$$

$$x = 7931.4$$

$$\frac{\sin(15)}{7931.4} = \frac{\sin(37)}{y}$$

$$\frac{\sin(37)\cdot 7931.4}{\sin(15)} = \frac{\sin(15)y}{\sin(15)}$$

$$18442 = y$$

$$\begin{array}{r} 38 \\ +15 \\ \hline 53 \end{array} \qquad \begin{array}{r} 90 \\ -53 \\ \hline 37 \end{array}$$

18442
× 60

Score 5: The student used an acceptable alternative method to find the correct distance traveled by the airplane, but found the speed of the airplane in feet per hour.

Question 36

36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

Soh Cah Toa

$\tan 52 = \frac{6250}{x}$

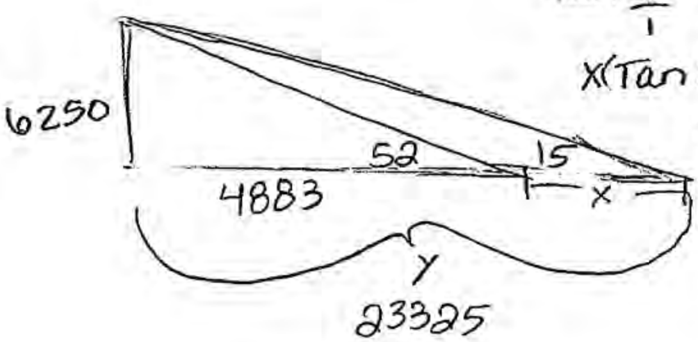
$x(\tan 52) = 6250$

$x = 4883$

$\tan 15 = \frac{6250}{y}$

$y(\tan 15) = 6250$

$y = 23325$



$23325 - 4883$

18442 ft

Determine and state the speed of the airplane, to the *nearest mile per hour*.

$\frac{18442}{60}$

307 m/h

Score 4: The student found the correct distance traveled by the airplane, but no further correct work was shown.

Question 36

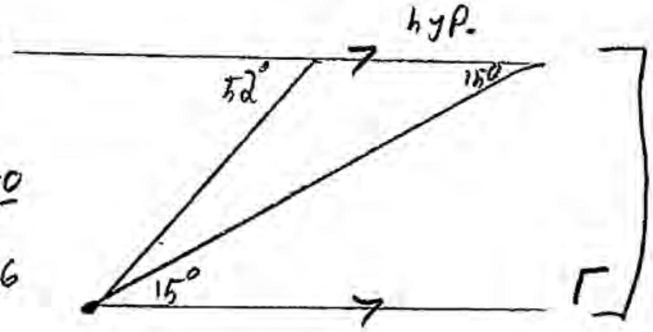
36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

$\sin 15 = \frac{6250}{x}$

24148.1

$\sin 52 = \frac{6250}{x}$

7931.36



opp.

6250′

24148.1
7931.4
16216.7

16217 feet

Determine and state the speed of the airplane, to the *nearest mile per hour*.

1 mile = 5280 feet
1 hour = 60 minutes

16217 ft/min

$\frac{16217}{5280} = 3.0714$ ft/min

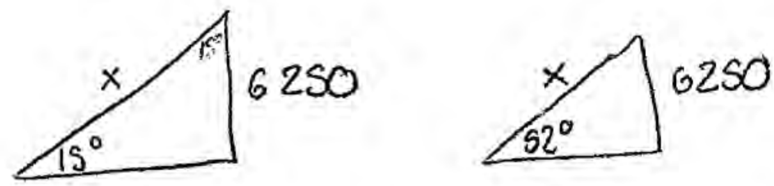
3.0714 · 60 = 184.824

185 miles per hour

Score 3: The student made an error by using the sine function and made a transcription error.

Question 36

36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?



The airplane traveled 3,276 Ft

Determine and state the speed of the airplane, to the *nearest mile per hour*.

$\sin 15° = \frac{6250}{x}$ $\sin 52° = \frac{6250}{x}$

$\frac{6250}{\sin 15} = \frac{x \sin 15}{\sin 15}$ $\frac{6250}{\sin 52} = \frac{x \sin 52}{\sin 52}$

$\frac{6250}{\sin 15} = x$ $\frac{6250}{\sin 52} = x$

$x = 9611$ $x = 6335$

The speed of the airplane is 196,560 per hour

1 min = 60 sec
1 hour = 60 minutes
$3276 \times 60 = 196560$

Score 2: The student made one conceptual error by using the sine function and two other errors by using radian measure and not dividing by 5280.

36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?

$\tan 15° = \frac{6250}{x}$

$0.27 = \frac{6250}{x}$

$\frac{x(0.27)}{0.27} = \frac{6250}{0.27}$

$x = 23148.15$

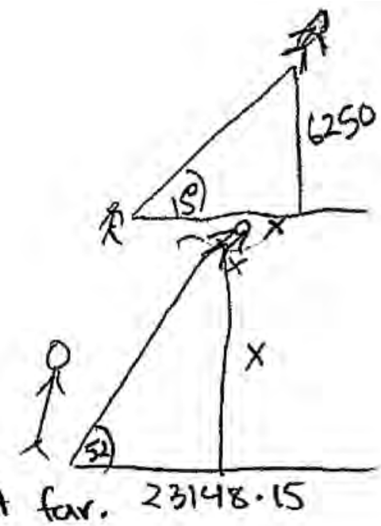
$\tan 52° = \frac{x}{23148.15}$

$1.28 = \frac{x}{23148.15}$

$29629.6 = x$

$ft = (29629.6 - 6250)$

$= 23379.6$



The airplane has traveled 23379.6 foot far.

Determine and state the speed of the airplane, to the *nearest mile per hour*.

minute = 29629.6 foot

60 " = (60 x 29629.6)

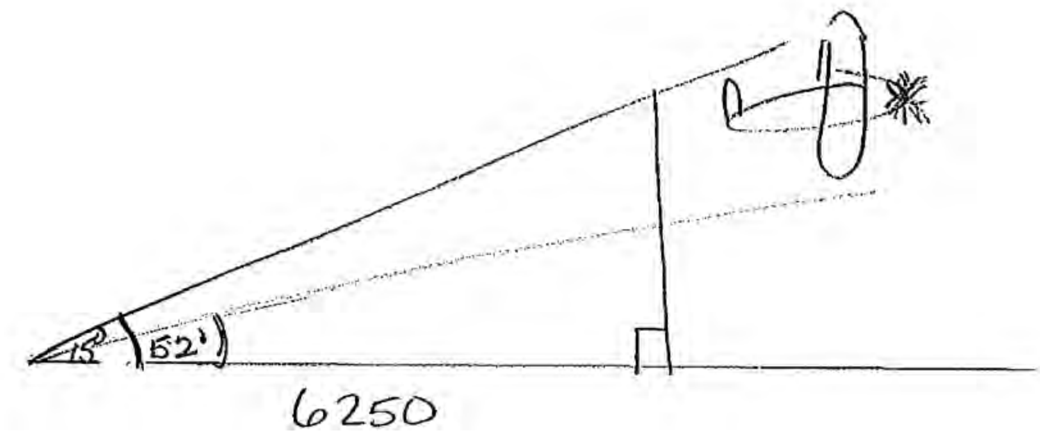
= 1777776

The nearest mile per hour is 1777776.

Score 1: The student wrote only one correct relevant trigonometric equation. No further correct work was shown.

Question 36

36 Freda, who is training to use a radar system, detects an airplane flying at a constant speed and heading in a straight line to pass directly over her location. She sees the airplane at an angle of elevation of 15° and notes that it is maintaining a constant altitude of 6250 feet. One minute later, she sees the airplane at an angle of elevation of 52°. How far has the airplane traveled, to the *nearest foot*?



Determine and state the speed of the airplane, to the *nearest mile per hour*.

Score 0: The student had a completely incorrect response.

Regents Examination in Geometry (Common Core) – June 2017

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

(Use for the June 2017 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	**79**	3	27	**58**	2
84	**98**	5	55	**78**	3	26	**57**	2
83	**97**	5	54	**78**	3	25	**55**	2
82	**96**	5	53	**78**	3	24	**54**	1
81	**95**	5	52	**77**	3	23	**53**	1
80	**94**	5	51	**77**	3	22	**51**	1
79	**93**	5	50	**76**	3	21	**50**	1
78	**92**	5	49	**76**	3	20	**48**	1
77	**91**	5	48	**75**	3	19	**46**	1
76	**90**	5	47	**75**	3	18	**45**	1
75	**90**	5	46	**74**	3	17	**43**	1
74	**89**	5	45	**73**	3	16	**41**	1
73	**88**	5	44	**73**	3	15	**39**	1
72	**88**	5	43	**72**	3	14	**37**	1
71	**87**	5	42	**72**	3	13	**35**	1
70	**86**	5	41	**71**	3	12	**33**	1
69	**86**	5	40	**70**	3	11	**31**	1
68	**85**	5	39	**69**	3	10	**29**	1
67	**84**	4	38	**69**	3	9	**27**	1
66	**84**	4	37	**68**	3	8	**24**	1
65	**83**	4	36	**67**	3	7	**22**	1
64	**83**	4	35	**66**	3	6	**19**	1
63	**82**	4	34	**65**	3	5	**16**	1
62	**82**	4	33	**64**	2	4	**14**	1
61	**81**	4	32	**63**	2	3	**11**	1
60	**81**	4	31	**62**	2	2	**7**	1
59	**80**	4	30	**61**	2	1	**4**	1
58	**80**	4	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).