STAAR CONNECTION™

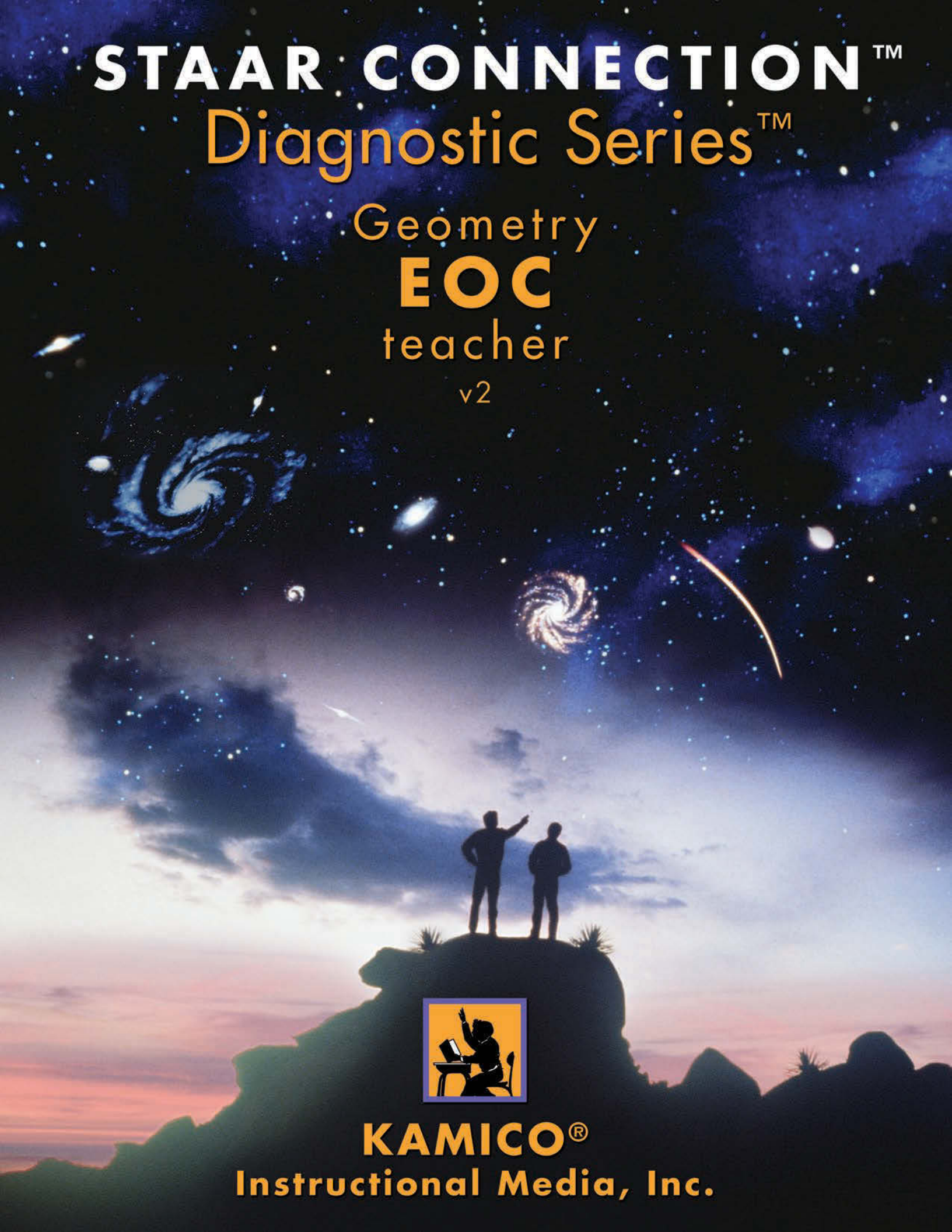
Diagnostic Series™

Geometry

EOC

teacher

v2



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Instructional Media, Inc.

STAAR CONNECTION™

Geometry
EOC
teacher

Diagnostic Series™

XVI/ix/MMXXVI
Version 2.1



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KAMICO® Instructional Media, Inc.
CONNECTION® to the TEKS
Introduction

KAMICO® Instructional Media's program is validated by scientifically based research. **STAAR CONNECTION™ Diagnostic Series™** and **CONNECTION® to the TEKS Developmental Series™** can be used in tandem to ensure mastery of Texas reporting categories and TEKS. The *Diagnostic Series™* consists of a bank of assessments. Each assessment covers a mixture of reporting categories and TEKS. This research-based format provides continual reinforcement for and ensures retention of mastered concepts. To take full advantage of this series, administer an assessment to students. After they have completed the assessment, use it as an instructional tool. Go over each item with the class, discussing all correct and incorrect answers. Then, use the assessment as a diagnostic tool to determine a standard for which students need remediation. Find that standard in the *Developmental Series™*.

Each book in the **CONNECTION® to the TEKS Developmental Series™** consists of instructional activities and assessments over isolated TEKS to allow for the remediation and development of specific TEKS. For every TEKS, there is at least one individual or group activity. The activities provide a fun, challenging, yet nonthreatening, way to develop mastery of the TEKS. In addition to these activities, each *Developmental Series™* book contains assessments on isolated TEKS to be used to identify mastery or the need for further skill development or reinforcement. Continue to alternate between the **STAAR CONNECTION™ Diagnostic Series™** and the **CONNECTION® to the TEKS Developmental Series™**.

KAMICO's **Game Gallery®** consists of over 300 board games in English and in Spanish. These games create a game-based learning environment to facilitate additional reinforcement of TEKS.

KAMICO® Instructional Media, Inc., supports efforts to ensure adequate yearly progress and eliminate surprises in high-stakes test results.

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Mathematical Process Standards

These student expectations will not be listed under a separate reporting category. Instead, they will be incorporated into test questions across reporting categories since the application of mathematical process standards is part of each knowledge statement.

(G.1) **Mathematical process standards**. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to

(A) apply mathematics to problems arising in everyday life, society, and the workplace;

(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;

(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;

(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;

(E) create and use representations to organize, record, and communicate mathematical ideas;

(F) analyze mathematical relationships to connect and communicate mathematical ideas; and

(G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

(G.2) **Coordinate and transformational geometry.** The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures. The student is expected to:

(A) determine the coordinates of a point that is a given fractional distance less than one from one end of a line segment to the other in one- and two-dimensional coordinate systems, including finding the midpoint;

(B) derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and

(C) determine an equation of a line parallel or perpendicular to a given line that passes through a given point.

(G.3) **Coordinate and transformational geometry.** The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity). The student is expected to:

(A) describe and perform transformations of figures in a plane using coordinate notation;

(B) determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;

(C) identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and

(D) identify and distinguish between reflectional and rotational symmetry in a plane figure.

(G.4) **Logical argument and constructions.** The student uses the process skills with deductive reasoning to understand geometric relationships. The student is expected to:

(A) distinguish between undefined terms, definitions, postulates, conjectures, and theorems;

(B) identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;

(C) verify that a conjecture is false using a counterexample; and

(D) compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.

(G.5) **Logical argument and constructions.** The student uses constructions to validate conjectures about geometric figures. The student is expected to:

(A) investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;

(B) construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;

(C) use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and

(D) verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.

(G.6) **Proof and congruence.** The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:

(A) verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;

(B) prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;

(C) apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;

(D) verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and

(E) prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.

(G.7) **Similarity, proof, and trigonometry.** The student uses the process skills in applying similarity to solve problems. The student is expected to:

(A) apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and

(B) apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.

(G.8) **Similarity, proof, and trigonometry.** The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:

(A) prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and

(B) identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.

(G.9) **Similarity, proof, and trigonometry.** The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:

(A) determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and

(B) apply the relationships in special right triangles 30°-60°-90° and 45°-45°-90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.

(G.10) **Two-dimensional and three-dimensional figures.** The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:

(A) identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify three-dimensional objects generated by rotations of two-dimensional shapes; and

(B) determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.

(G.11) **Two-dimensional and three-dimensional figures.** The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:

(A) apply the formula for the area of regular polygons to solve problems using appropriate units of measure;

(B) determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;

(C) apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and

(D) apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.

(G.12) **Circles.** The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:

(A) apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;

(B) apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;

(C) apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;

(D) describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and

(E) show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k), $(x - h)^2 + (y - k)^2 = r^2$.

(G.13) **Probability.** The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:

(A) develop strategies to use permutations and combinations to solve contextual problems;

(B) determine probabilities based on area to solve contextual problems;

(C) identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;

(D) apply conditional probability in contextual problems; and

(E) apply independence in contextual problems.

Name _____ Date _____

1 A coordinate grid is placed over a map of a city. The city hall is located at (5, –8), and the library is located at (–7, 2). The water department is located exactly halfway between the city hall and the library. What are the coordinates of the water department?

A (3, –3)

B (0, –4)

C (–2, –2)

D (–1, –3)

2 Which of the following constitutes a theorem that does not contain undefined terms?

F Two lines are parallel if and only if they never intersect.

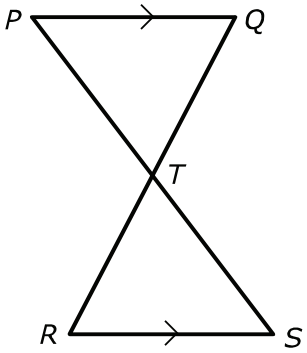
G If two angles of a triangle are congruent, then the sides opposite the angles are congruent.

H If two lines are perpendicular to the same line, then the two lines are parallel to each other.

J If a line is tangent to a circle, then it is perpendicular to a radius of the circle drawn to the point of tangency.

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3 In the figure below, $\overline{PQ} \parallel \overline{RS}$.



Which proof is not correct?

A

Statements	Reasons
$\overline{PQ} \parallel \overline{RS}$	Given
$m\angle PQT = m\angle SRT$	Alternate Interior Angles Theorem
$m\angle QPT = m\angle RST$	Alternate Interior Angles Theorem
$\triangle PTQ \sim \triangle STR$	Angle-Angle Similarity Postulate

B

Statements	Reasons
$\overline{PQ} \parallel \overline{RS}$	Given
$m\angle QPT = m\angle RST$	Alternate Interior Angles Theorem
$\frac{PT}{TS} = \frac{PQ}{RS}$	Two Transversal Proportionality Corollary
$\triangle PTQ \sim \triangle STR$	Angle-Angle Similarity Postulate

C

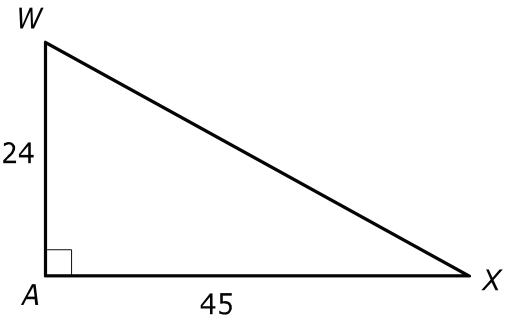
Statements	Reasons
$\overline{PQ} \parallel \overline{RS}$	Given
$m\angle PTQ = m\angle RTS$	Vertical Angles Theorem
$m\angle QPT = m\angle RST$	Alternate Interior Angles Theorem
$\triangle PTQ \sim \triangle STR$	Angle-Angle Similarity Postulate

D

Statements	Reasons
$\overline{PQ} \parallel \overline{RS}$	Given
$m\angle PTQ = m\angle RTS$	Vertical Angles Theorem
$\frac{PT}{TS} = \frac{QT}{TR}$	Two Transversal Proportionality Corollary
$\triangle PTQ \sim \triangle STR$	Side-Angle-Side Similarity Postulate

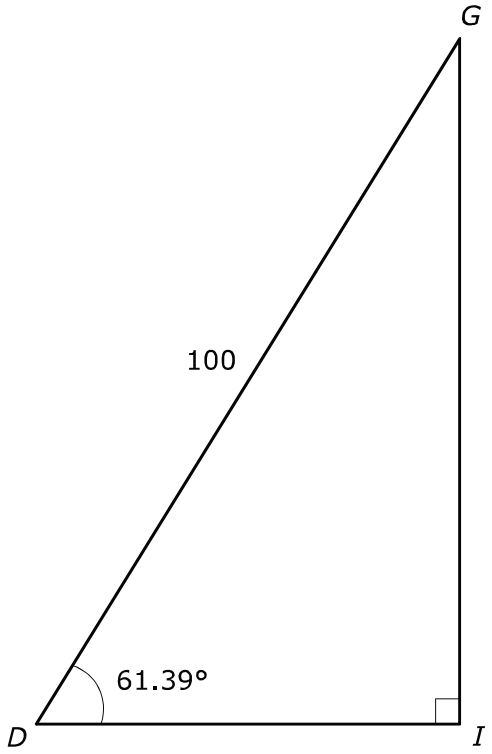
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4 The indicated measures of △*WAX* are shown.

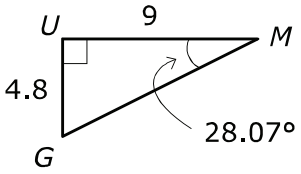


Which triangle below is not similar to △*WAX*?

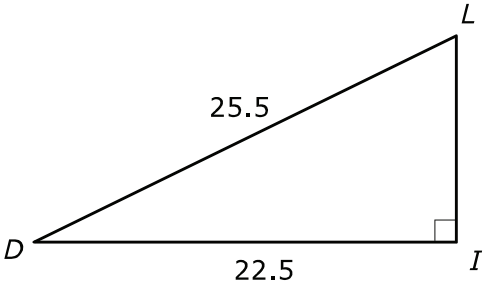
F



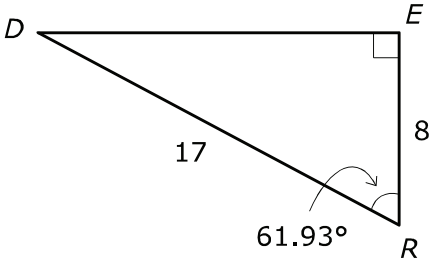
H



G

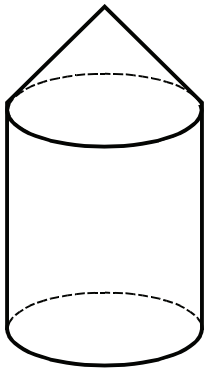


J



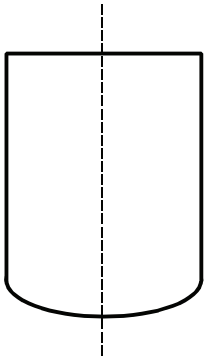
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5 A cylinder is topped with a cone, as shown.

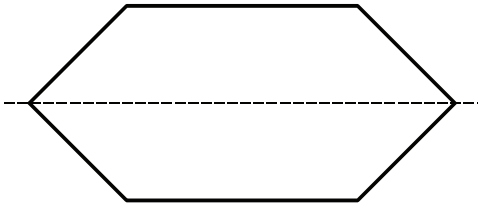


Which of these best represents the two-dimensional shape rotated about the axis shown to produce the above figure?

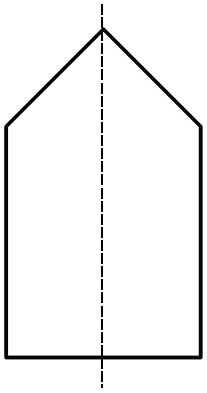
A



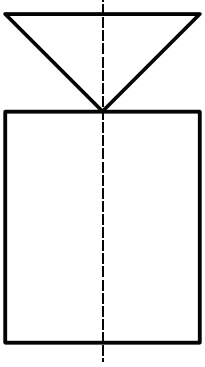
C



B

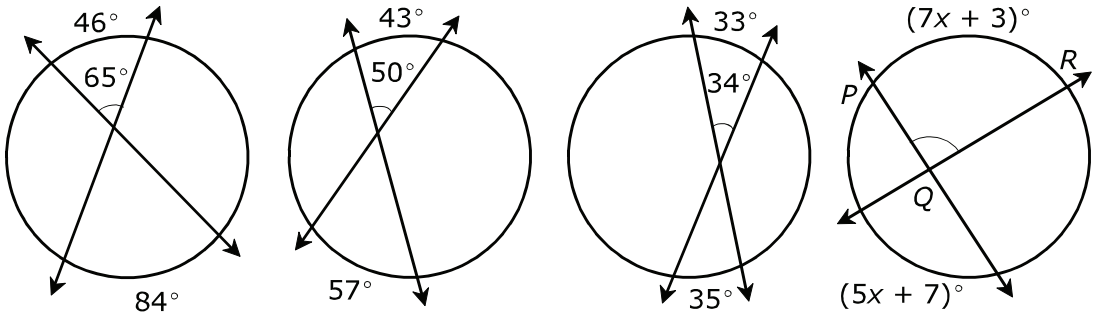


D



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6 In each of the circles, four angles are formed by the intersection of 2 secant lines. The measures of two intercepted arcs and one angle are shown for the first three circles.



Which expression can be used to represent m∠*PQR* in degrees?

F $\frac{1}{2}[(7x + 3) - (5x + 7)]$

G $\frac{1}{2}[(7x + 3) + (5x + 7)]$

H $2[(7x + 3) - (5x + 7)]$

J $2[(7x + 3) + (5x + 7)]$

7 A bank customer needs to devise a PIN to access her bank's telephone hotline. The bank's hotline system is programmed to prevent the use of a customer's birth date as a PIN. So, she rearranges the digits of the month and day of her birth date, October 25 (1025), to use as her PIN. Does the PIN represent a permutation or a combination? How many possible PINs can she have?

A permutation; 24 possibilities

B permutation; 23 possibilities

C combination; 16 possibilities

D combination; 24 possibilities

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8 A triangle with a vertex on the line $y = -x$ and another vertex at $(-3, -4)$ has line symmetry about the line $y = -x$. What are the coordinates of the third vertex?

F $(11, -4)$

G $(3, 4)$

H $(-3, 10)$

J $(4, 3)$

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Student Name:

STAAR CONNECTION™
EOC Geometry
Diagnostic Series Math

The following charts provide the correct answer to each assessment question, along with the content student expectation and the process student expectation.

Circle the number of any question that has been answered incorrectly. Circle the TEKS that need additional reinforcement.

Assessment 1

Item Number	Correct Answer	Content Student Expectation (TEKS)	Process Student Expectation (TEKS)
1	D	G.2A	G.1A
2	G	G.4A	G.1G
3	B	G.6A	G.1E
4	F	G.7A	G.1F
5	B	G.10A	G.1E
6	G	G.12A	G.1D
7	B	G.13A	G.1A
8	J	G.3D	G.1F

Assessment 2

Item Number	Correct Answer	Content Student Expectation (TEKS)	Process Student Expectation (TEKS)
1	C	G.2B	G.1A
2	H	G.4B	G.1G
3	C	G.6B	G.1E
4	J	G.7B	G.1G
5	A	G.10B	G.1B
6	H	G.12B	G.1C
7	C	G.13B	G.1A
8	115	G.5A	G.1B

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