Geometry EOC Exam

Name ______________________________

Question 1

Circle J is located in the first quadrant with center (a, b) and radius s. Felipe transforms Circle J to prove that it is similar to any circle centered at the origin with radius t.

Which sequence of transformations did Felipe use?

(A) Translate Circle J by $(x + a,\ y + b)$ and dilate by a factor of $\frac{t}{s}$.

(B) Translate Circle J by $(x + a,\ y + b)$ and dilate by a factor of $\frac{s}{t}$.

(C) Translate Circle J by $(x - a,\ y - b)$ and dilate by a factor of $\frac{t}{s}$.

(D) Translate Circle J by $(x - a,\ y - b)$ and dilate by a factor of $\frac{s}{t}$.

Points Possible: 1

Content Domain: Circles

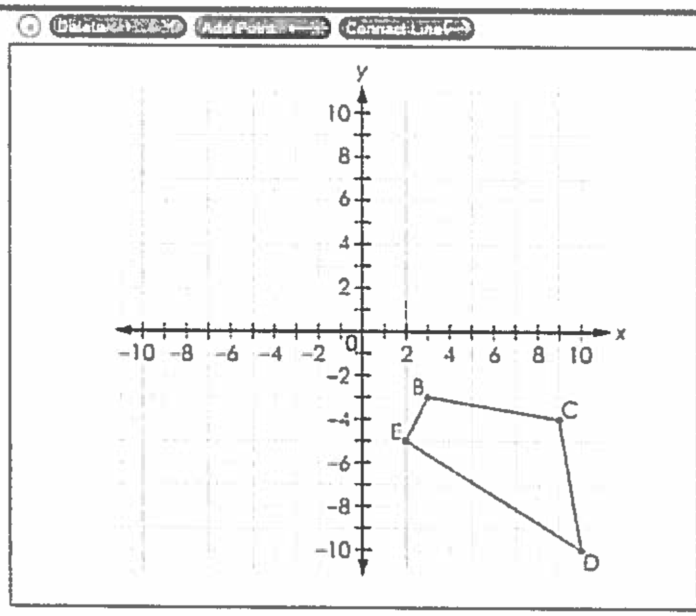
Content Standard: Prove that all circles are similar. *(G.C.1)*

Question 2

Quadrilateral BCDE is shown on the coordinate grid.

Keisha reflects the figure across the line $y = x$ to create B'C'D'E'.

Use the Connect Line tool to draw quadrilateral B'C'D'E'.



Points Possible: 1

Content Domain: Congruence

Content Standard: Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. *(G.CO.5)*

Question 3

Three vertices of parallelogram PQRS are shown.

Q(8, 5), R(5, 1), S(2, 5)

Place statements and reasons in the table to complete the proof that shows that parallelogram PQRS is a rhombus.

Statements	Reasons
	Pythagorean Theorem
SR = QR	Substitution
$\overline{SR} \cong \overline{QR}$	Definition of congruent line segments
PS = QR	Property of a parallelogram
Parallelogram PQRS is a rhombus.	Definition of a rhombus

SR = 5	SR = $\sqrt{7}$	∠PSR = 90°
PQ = 5	PQ = $\sqrt{7}$	$\overline{SR} \cong \overline{PQ}$
QR = 5	QR = $\sqrt{7}$	Pythagorean Theorem
Definition of perpendicular lines	Property of a parallelogram	Definition of parallel lines

Points Possible: 1

Content Domain: Expressing Geometric Properties with Equations

Content Standard: Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, $\sqrt{3}$) lies on the circle centered at the origin and containing the point (0, 2). *(G.GPE.4)*

Question 4

Felicia wants to draw △PQR such that the conditions shown are true.

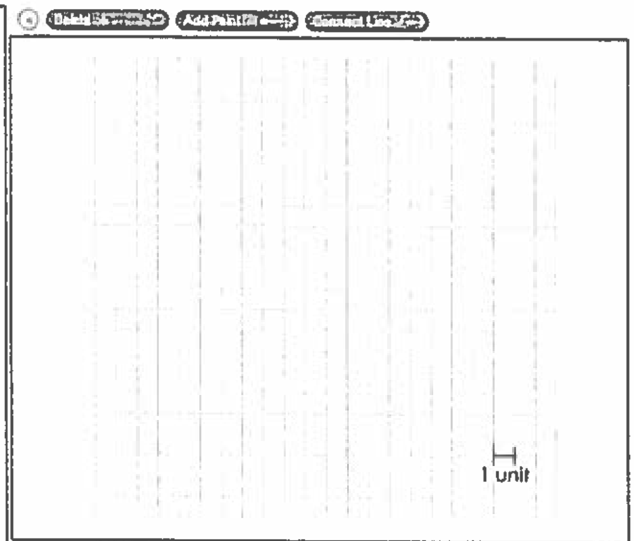
- The area of △PQR is not 6 square units.
- cos P = 0.6

Use the Connect Line tool to draw one possible △PQR. Then drag letters to the vertices to label the triangle.

P

Q

R



Points Possible: 1

Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles. *(G.SRT.6)*

Question 5

Francisco asks the students in his school what pets they have. He studies the events shown.

- Event S: The student has a cat.
- Event T: The student has a dog.

Francisco finds that the two events are independent.

Select all the equations that must be true for events S and T.

- ☐ $P(S|T) = P(S)$
- ☐ $P(S|T) = P(T)$
- ☐ $P(T|S) = P(S)$
- ☐ $P(T|S) = P(T)$
- ☐ $P(S \cup T) = P(S) \bullet P(T)$
- ☐ $P(S \cap T) = P(S) \bullet P(T)$

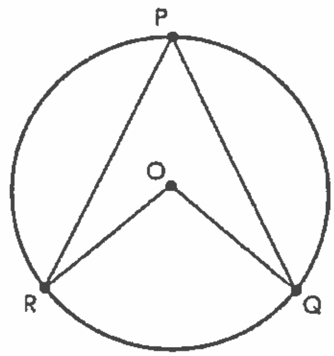
Points Possible: 1

Content Domain: Conditional Probability and the Rules of Probability

Content Standard: Understand the conditional probability of A given B as P (A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B. *(S.CP.3)*

Question 6

A teacher draws circle O, ∠RPQ and ∠ROQ, as shown.



The teacher asks students to select the correct claim about the relationship between m∠RPQ and m∠ROQ.

- Claim 1: The measure of ∠RPQ is equal to the measure of ∠ROQ.
- Claim 2: The measure of ∠ROQ is twice the measure of ∠RPQ.

Which claim is correct? Justify your answer.

Type your answer in the space provided.

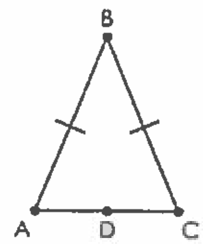
Points Possible: 1

Content Domain: Circles

Content Standard: Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle. *(G.C.2)*

Question 7

Triangle ABC is shown.



Given: Triangle ABC is isosceles. Point D is the midpoint of $\overline{AC}$.

Prove: $\angle BAC \cong \angle BCA$

Place reasons in the table to complete the proof.

Statements	Reasons
1. Triangle ABC is isosceles. D is the midpoint of $\overline{AC}$.	1. Given
2. 2. $\overline{AD} \cong \overline{DC}$	2. Definition of midpoint
3. 3. $\overline{BA} \cong \overline{BC}$	3. Definition of isosceles triangle
4. 4. $\overline{BD}$ exists.	4. A single line segment can be drawn between any two points.
5. 5. $\overline{BD} \cong \overline{BD}$	5.
6. 6. $\triangle ABD \cong \triangle CBD$	6.
7. 7. $\angle BAC \cong \angle BCA$	7.

AA congruency postulate	Reflexive property
SAS congruency postulate	Symmetric property
SSS congruency postulate	Midpoint theorem
Corresponding parts of congruent triangles are congruent.	

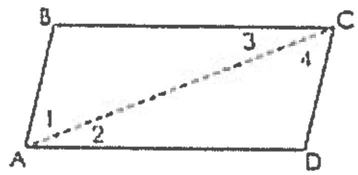
Points Possible: 1

Content Domain: Congruence

Content Standard: Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. *(G.CO.10)*

Question 8

The proof shows that opposite angles of a parallelogram are congruent.



Given: ABCD is a parallelogram with diagonal $\overline{AC}$.
Prove: $\angle BAD \cong \angle DCB$

Proof:

Statements	Reasons
ABCD is a parallelogram with diagonal $\overline{AC}$.	Given
$\overline{AB} \parallel \overline{CD}$ and $\overline{AD} \parallel \overline{BC}$	Definition of parallelogram
$\angle 2 \cong \angle 3$ $\angle 1 \cong \angle 4$	Alternate interior angles are congruent.
$m\angle 2 = m\angle 3$ and $m\angle 1 = m\angle 4$	Measures of congruent angles are equal.
$m\angle 1 + m\angle 2 = m\angle 4 + m\angle 2$	Addition property of equality
$m\angle 1 + m\angle 2 = m\angle 4 + m\angle 3$	?
$m\angle 1 + m\angle 2 = m\angle BAD$ $m\angle 3 + m\angle 4 = m\angle DCB$	Angle addition postulate
$m\angle BAD = m\angle DCB$	Substitution
$\angle BAD \cong \angle DCB$	Angles are congruent when their measures are equal.

What is the missing reason in this partial proof?

(A) ASA

(B) Substitution

(C) Angle addition postulate

(D) Alternate interior angles are congruent.

Points Possible: 1

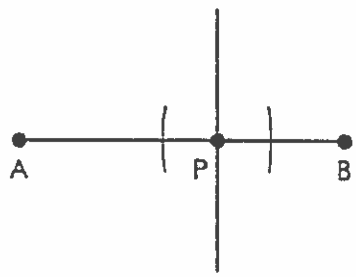
Content Domain: Congruence

Content Standard: Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. *(G.CO.11)*

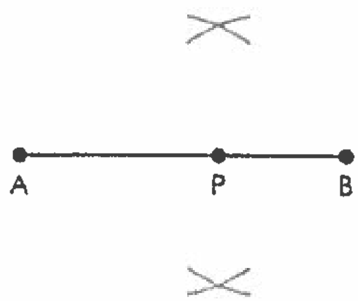
Question 9

Which diagram shows only the first step of constructing the line perpendicular to $\overline{AB}$ through point P?

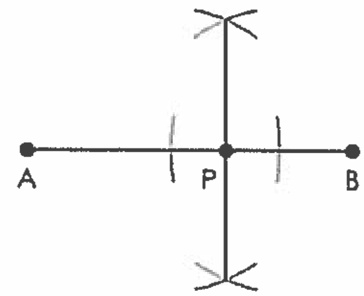
(A)



(B)



(C)



(D)

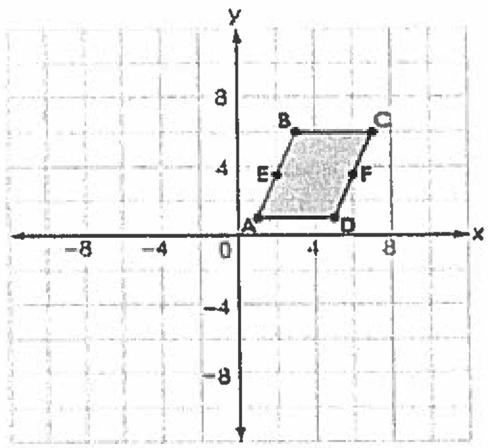
Points Possible: 1

Content Domain: Congruence

Content Standard: Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line. *(G.CO.12)*

Question 10

Parallelogram ABCD is shown. Point E is the midpoint of segment AB. Point F is the midpoint of segment CD.



Which transformation carries the parallelogram onto itself?

Ⓐ a reflection across line segment AC

Ⓑ a reflection across line segment EF

Ⓒ a rotation of 180 degrees clockwise about the origin

Ⓓ a rotation of 180 degrees clockwise about the center of the parallelogram

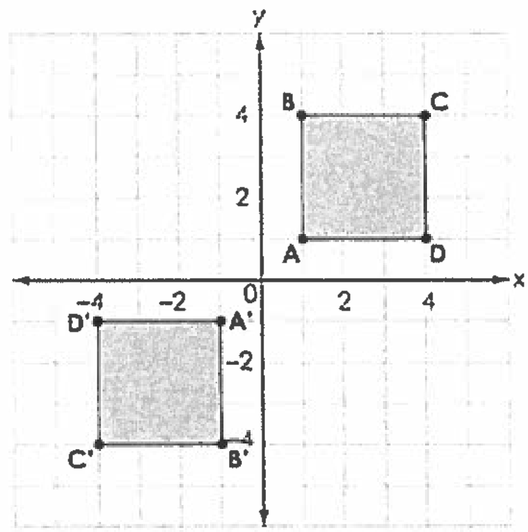
Points Possible: 1

Content Domain: Congruence

Content Standard: Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. *(G.CO.3)*

Question 11

Square ABCD is transformed to create the image A'B'C'D', as shown.



Select all of the transformations that could have been performed.

- ☐ a reflection across the line $y = x$
- ☐ a reflection across the line $y = -2x$
- ☐ a rotation of 180 degrees clockwise about the origin
- ☐ a reflection across the x-axis, and then a reflection across the y-axis
- ☐ a rotation of 270 degrees counterclockwise about the origin, and then a reflection across the x-axis

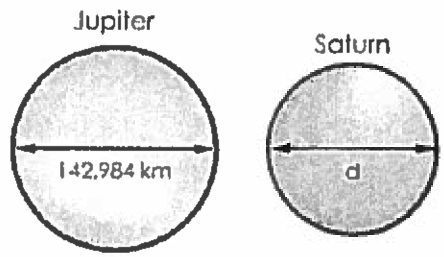
Points Possible: 1

Content Domain: Congruence

Content Standard: Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. *(G.CO.6)*

Question 12

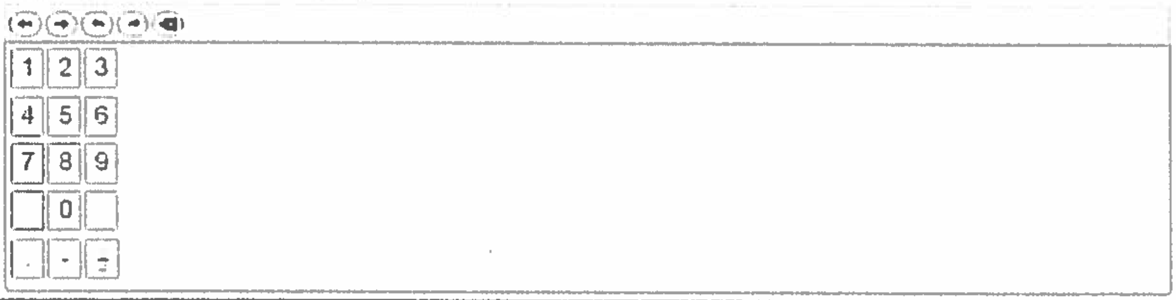
The planets in our solar system can be modeled using spheres. The diameters for Jupiter and Saturn are shown in the diagram.



The volume of Saturn is 59.9% the volume of Jupiter.

What is Saturn's diameter, *d*, in kilometers? Round your answer to the nearest thousandth.

_______ *km*



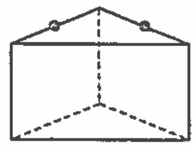
Points Possible: 1

Content Domain: Geometric Measurement and Dimension

Content Standard: Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems. *(G.GMD.3)*

Question 13

A cross section of a right triangular prism is created by a plane cut through the points shown and is also perpendicular to the opposite base.



What is the most specific name of the shape representing the cross section?

Ⓐ triangle

Ⓑ rectangle

Ⓒ trapezoid

Ⓓ parallelogram

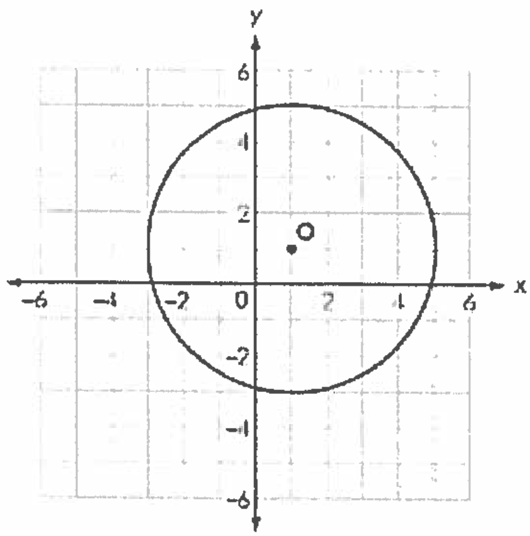
Points Possible: 1

Content Domain: Geometric Measurement and Dimension

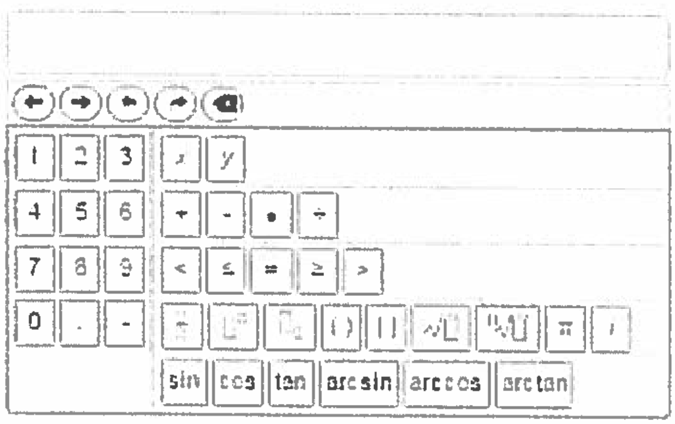
Content Standard: Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects. *(G.GMD.4)*

Question 14

A circle with center O is shown.



Create the equation for the circle.



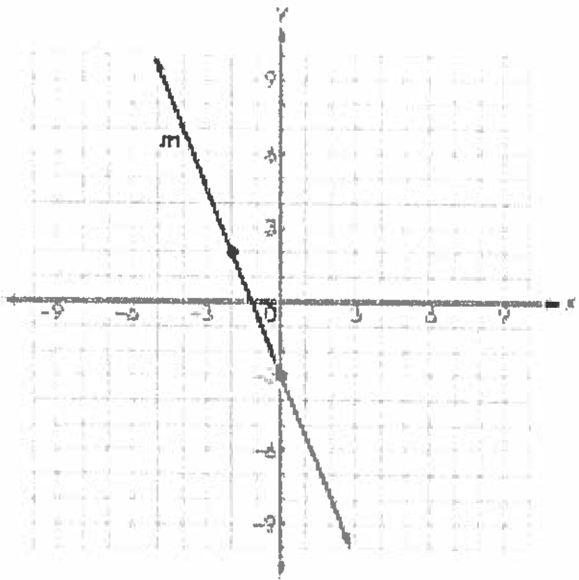
Points Possible: 1

Content Domain: Expressing Geometric Properties with Equations

Content Standard: Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. *(G.GPE.1)*

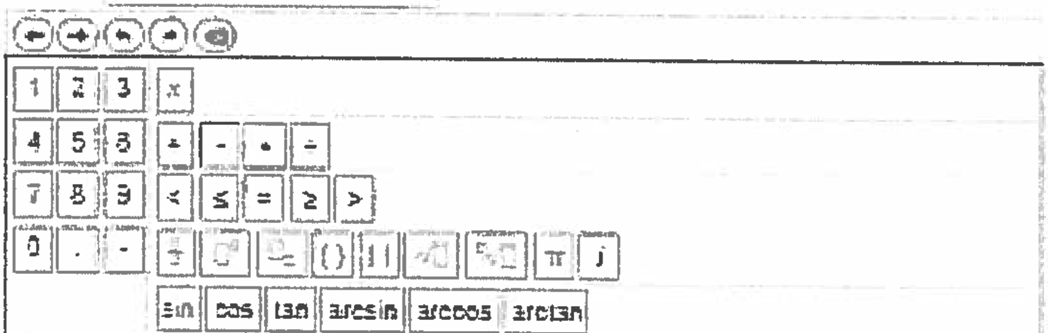
Question 15

The graph of line *m* is shown.



What is the equation of the line that is perpendicular to line *m* and passes through the point (3, 2)?

$y =$



Points Possible: 1

Content Domain: Expressing Geometric Properties with Equations

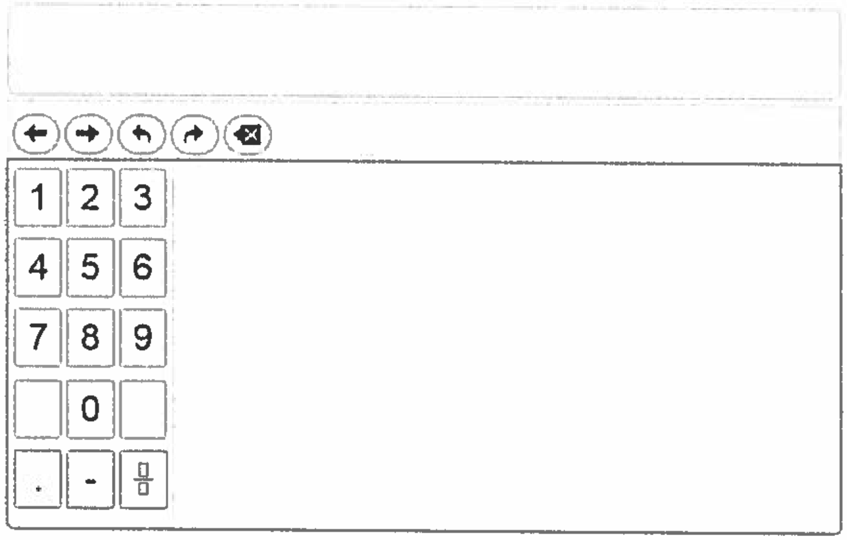
Content Standard: Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point). *(G.GPE.5)*

Question 16

Line segment AC has endpoints A (–1, –3.5) and C (5, –1).

Point B is on line segment AC and is located at (0.2, –3).

What is the ratio of $\frac{AB}{BC}$?



Points Possible: 1

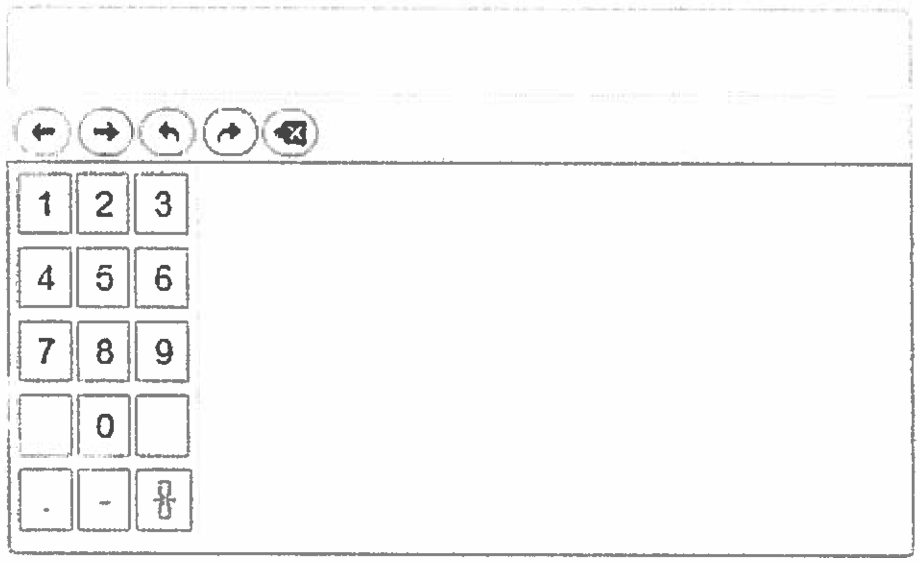
Content Domain: Expressing Geometric Properties with Equations

Content Standard: Find the point on a directed line segment between two given points that partitions the segment in a given ratio. *(G.GPE.6)*

Question 17

Triangle ABC has vertices at $(-4, 0)$, $(-1, 6)$ and $(3, -1)$.

What is the perimeter of triangle ABC, rounded to the nearest tenth?



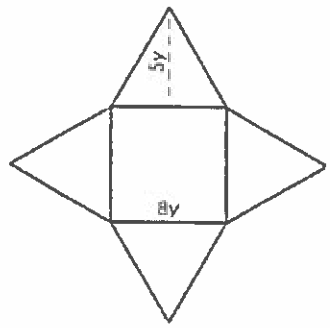
Points Possible: 1

Content Domain: Expressing Geometric Properties with Equations

Content Standard: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula. *(G.GPE.7)*

Question 18

Allison designs fancy boxes to fill with chocolates. The boxes are in the shape of a right square pyramid as shown, where $8y$ represents the length of one side of the base of the pyramid, and $5y$ represents the height of one triangular face of the pyramid.



The large size box must be designed to have a volume of 1,000 cubic centimeters.

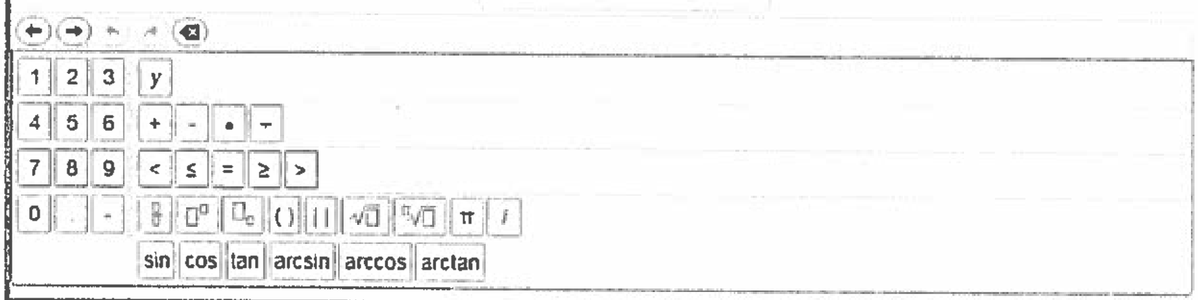
A. Create an equation that can be used to calculate the length of the base and height of the triangular face of the box. Enter your equation in the first response box.

B. What dimensions for the length, in centimeters, of the base and the height of the triangular face, in centimeters, satisfy these constraints?

A. [ ]

B. Length of Base = [ ] *centimeters*

B. Height of Triangular Face = [ ] *centimeters*



Points Possible: 2

Content Domain: Modeling with Geometry

Content Standard: Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). *(G.MG.3)*

Question 19

Kyle performs a transformation on a triangle. The resulting triangle is similar but not congruent to the original triangle.

Which transformation did Kyle perform on the triangle?

(A) dilation

(B) reflection

(C) rotation

(D) translation

Points Possible: 1

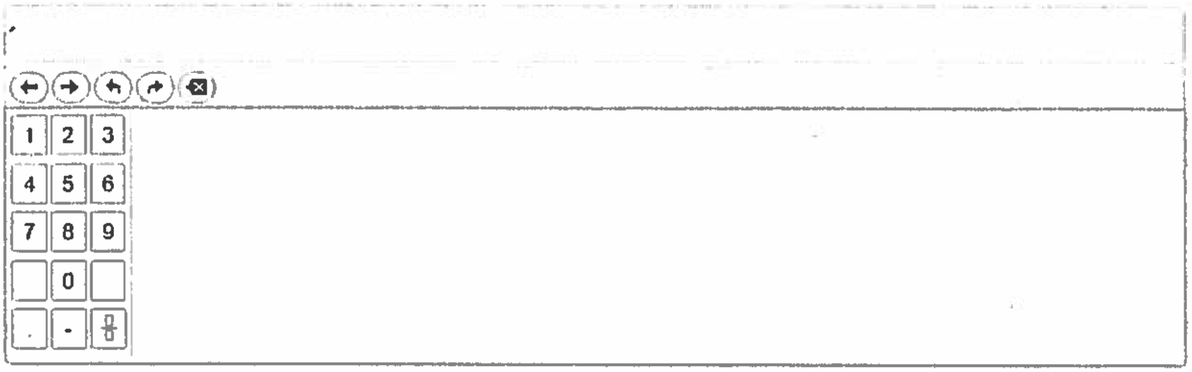
Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. *(G.SRT.2)*

Question 20

Triangle ABC has vertices A (1, 1), B (2.5, 3), and C (0, −3). It is dilated by a scale factor of $\frac{1}{2}$ about the origin to create triangle A′B′C′.

What is the length, in units, of side $\overline{B'C'}$?



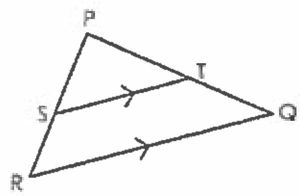
Points Possible: 1

Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Verify experimentally the properties of dilations given by a center and a scale factor:
b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor. *(G.SRT.1b)*

Question 21

Triangle PQR is shown, where $\overline{ST}$ is parallel to $\overline{RQ}$.



Marta wants to prove that $\frac{SR}{PS} = \frac{TQ}{PT}$.

Place a statement or reason in each blank box to complete Marta's proof.

Statements	Reasons
1. $\overline{ST} \parallel \overline{RQ}$	1. Given
2. $\angle PST \cong \angle R$ and $\angle PTS \cong \angle Q$	2. If two parallel lines are cut by a transversal, then corresponding angles are congruent.
3. $\triangle PQR \sim \triangle PTS$	3.
4.	4.
5. $PR = PS + SR$, $PQ = PT + TQ$	5. Segment addition postulate
6. $\frac{PS + SR}{PS} = \frac{PT + TQ}{PT}$	6. Substitution
7. $\frac{PS}{PS} + \frac{SR}{PS} = \frac{PT}{PT} + \frac{TQ}{PT}$	7. Commutative property of addition
8. $\frac{SR}{PS} = \frac{TQ}{PT}$	8. Subtraction property of equality

$\frac{PR}{PS} = \frac{PQ}{PT}$	$\frac{PS}{SR} = \frac{PT}{ST}$	$\angle P \cong \angle P$
AA Similarity	ASA Similarity	SSS Similarity
Reflexive property	Segment addition postulate	Corresponding sides of similar triangles are proportional.
Corresponding sides of similar triangles are congruent.	If two parallel lines are cut by a transversal, then alternate interior angles are congruent.	If two parallel lines are cut by a transversal, then alternate exterior angles are congruent.

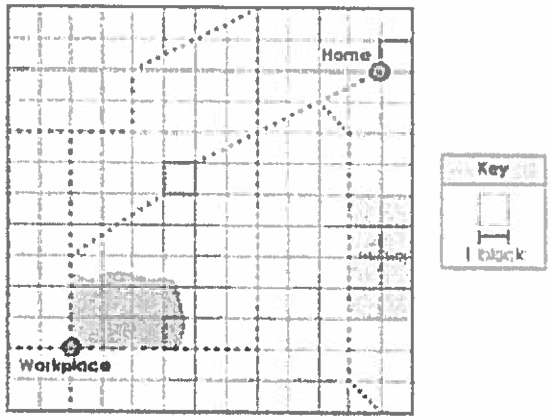
Points Possible: 1

Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity. *(G.SRT.4)*

Question 22

A map of Jane's town with her home and workplace is shown.



Jane wants to determine the shortest route from her home to her workplace. She walks only on the sidewalks indicated by dotted lines on the map.

What is the distance of the shortest route, to the nearest whole block?

blocks

Points Possible: 1

Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. *(G.SRT.8)*

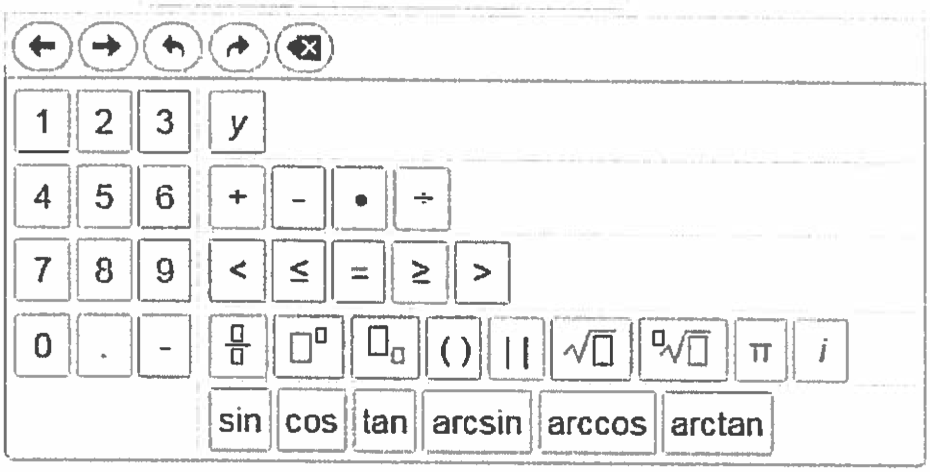
Question 23

An equation is shown, where $0 < x < 90$ and $0 < y < 90$.

$\cos(x°) = \sin(y°)$

Create an expression for x in terms of y.

$x =$



Points Possible: 1

Content Domain: Similarity, Right Triangles, and Trigonometry

Content Standard: Explain and use the relationship between the sine and cosine of complementary angles. *(G.SRT.7)*

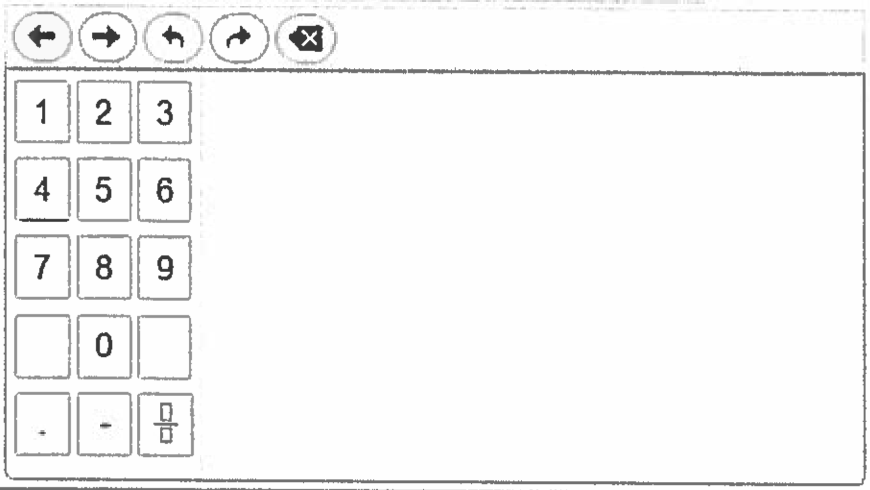
Question 24

Two events, A and B, are independent.

- P(A) = 0.3
- P(A and B) = 0.24

What is P(B)?

$P(B) =$



Points Possible: 1

Content Domain: Conditional Probability and the Rules of Probability

Content Standard: Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. *(S.CP.2)*

Question 25

A total of 200 people attend a party, as shown in the table.

A person is selected at random to win a prize. The probability of selecting a female is 0.6. The probability of selecting a child, given that the person is female, is 0.25. The probability of selecting a male, given that the person is a child, is 0.4.

Complete the two-way table to show the number of adults, children, males, and females who attended the party.

	Adults	Children	Total
Male			80
Female			120
Total	150	50	200

Points Possible: 1

Content Domain: Conditional Probability and the Rules of Probability

Content Standard: Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For example, collect data from a random sample of students in your school on their favorite subject among Math, Science, and English. Estimate the probability that a randomly selected student from your school will favor Science given that the student is in tenth grade. Do the same for other subjects and compare the results. *(S.CP.4)*

Question 26

Sam is picking fruit from a basket that contains many different kinds of fruit.

Which set of events is independent?

(A) Event 1: He picks a kiwi and eats it.
Event 2: He picks an apple and eats it.

(B) Event 1: He picks an apple and eats it.
Event 2: He picks an apple and eats it.

(C) Event 1: He picks a kiwi and eats it.
Event 2: He picks a kiwi and puts it back.

(D) Event 1: He picks a kiwi and puts it back.
Event 2: He picks an apple and puts it back.

Points Possible: 1

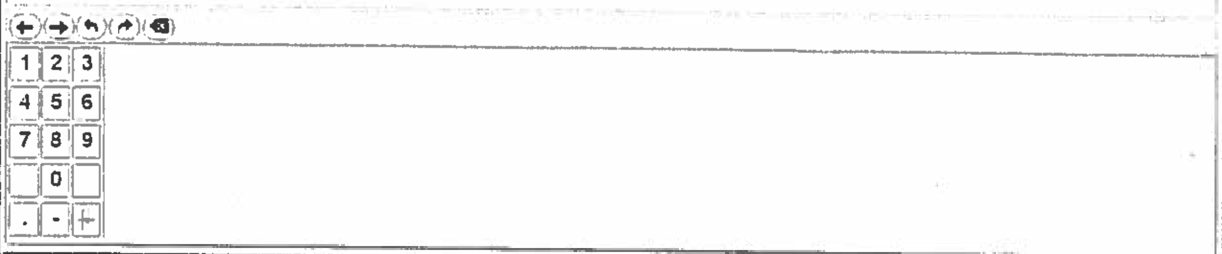
Content Domain: Conditional Probability and the Rules of Probability

Content Standard: Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer. *(S.CP.5)*

Question 27

The probability of flipping a fair coin and heads landing face up is 0.5. The probability of rolling a fair number cube, with sides numbered 1 through 6, and an odd number landing face up is 0.5.

What is the probability of flipping heads or rolling an odd number?



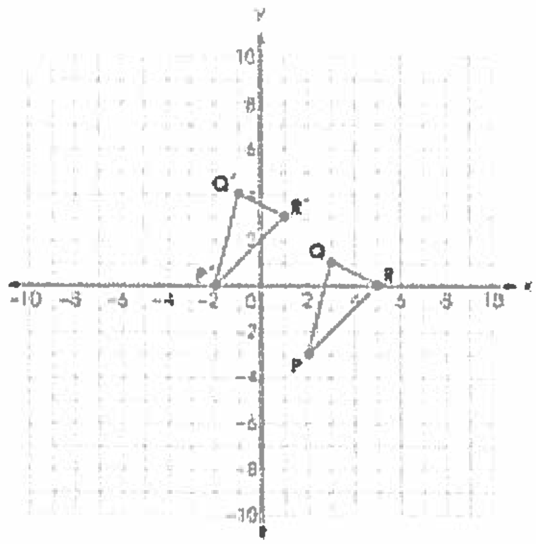
Points Possible: 1

Content Domain: Conditional Probability and the Rules of Probability

Content Standard: Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model. *(S.CP.7)*

Question 28

A translation is applied to $\triangle PQR$ to create $\triangle P'Q'R'$.

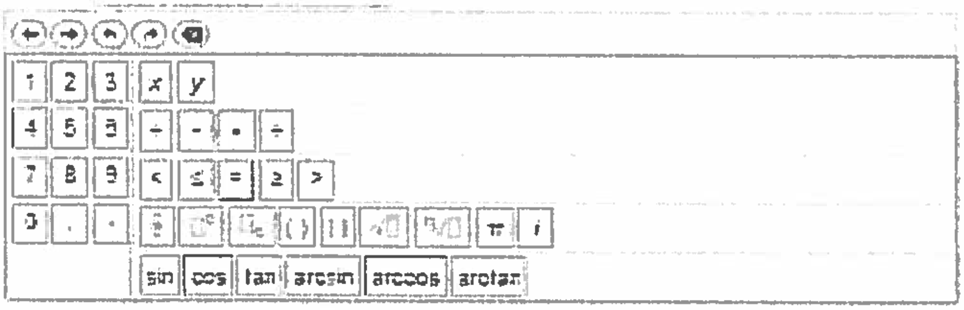


Let the statement $(x, y) \rightarrow (a, b)$ describe the translation.

Create equations for a in terms of x and for b in terms of y that could be used to describe the translation.

$a =$

$b =$



Points Possible: 1

Content Domain: Congruence

Content Standard: Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch). *(G.CO.2)*