



Common Core State Standards

Mathematics I

Integrated Pathway

**Student Workbook
with Scaffolded Practice
Unit 5**

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Introduction

The *CCSS Mathematics I Student Workbook with Scaffolded Practice* includes all of the student pages from the Teacher Resource necessary for your day-to-day classroom use. This includes:

- Warm-Ups
- Problem-Based Tasks
- Practice Problems
- Station Activity Worksheets

In addition, it provides Scaffolded Guided Practice examples that parallel the examples in the TRB and SRB. This supports:

- Taking notes during class
- Working problems for preview or additional practice

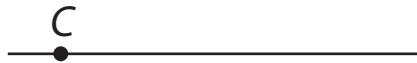
The workbook includes the first Guided Practice example with step-by-step prompts for solving, and the remaining Guided Practice examples without prompts. Sections for you to take notes are provided at the end of each sub-lesson. Additionally, blank coordinate planes are included at the end of the full unit, should you need to graph.

The workbook is printed on perforated paper so you can submit your assignments and three-hole punched to let you store it in a binder.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations**

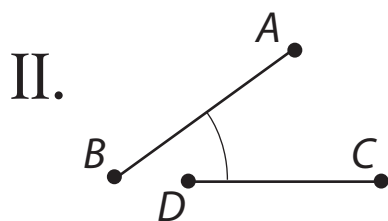
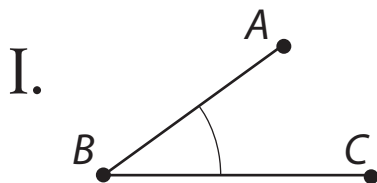
Scaffolded Practice 5.1.1**Example 1**

Refer to the figures below. Can a line segment be defined using the points A and B ? Can a line segment be defined using the point C ? Justify your response to each question.

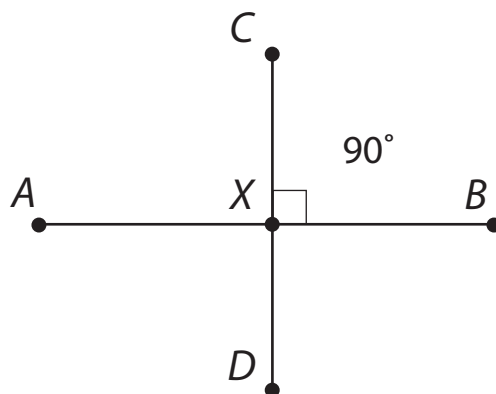
***continued***

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Example 2**

Refer to the figures below. In the first, do the line segments \overline{AB} and \overline{BC} form an angle? In the second figure, do the line segments \overline{AB} and \overline{CD} form an angle? Justify your response to each question.

**Example 3**

By definition, \overline{AB} is perpendicular to \overline{CD} because $m\angle CXB$ is 90° . What are the measures of $\angle AXC$, $\angle AXD$, and $\angle DXB$?

*continued*

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Example 4**

Given the following:

$$\overline{AC} \cong \overline{BD}$$

$$\overline{WY} < \overline{XZ}$$

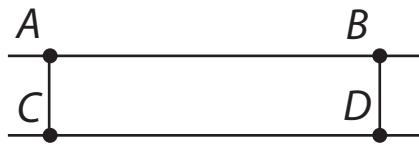
$$\overline{AB} \perp \overline{AC}$$

$$\overline{WX} \perp \overline{WY}$$

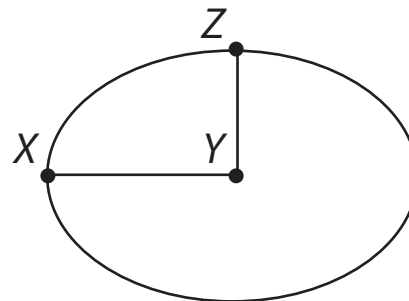
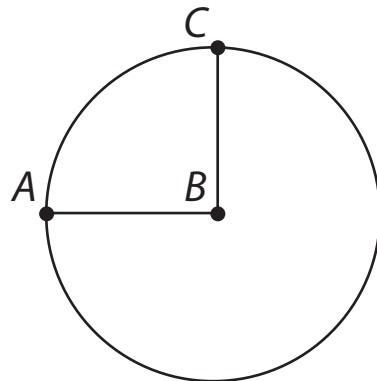
$$\overline{AB} \perp \overline{BD}$$

$$\overline{WX} \perp \overline{XZ}$$

Are \overline{AB} and \overline{CD} parallel? Are \overline{WX} and \overline{YZ} parallel? Explain.

**Example 5**

Refer to the figures below. Given $\overline{AB} \cong \overline{BC}$, is the set of points with center B a circle? Given $\overline{XY} > \overline{YZ}$, is the set of points with center Y a circle?

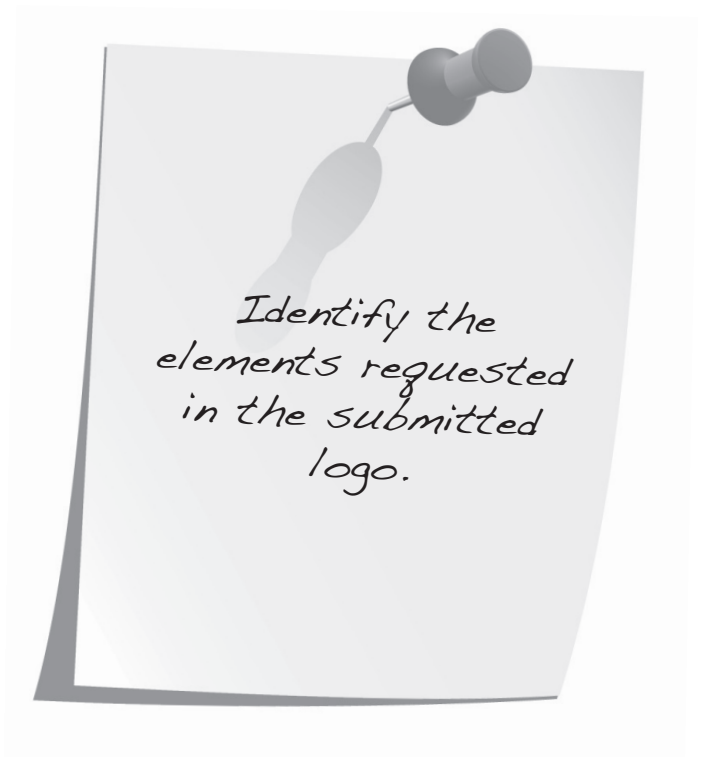
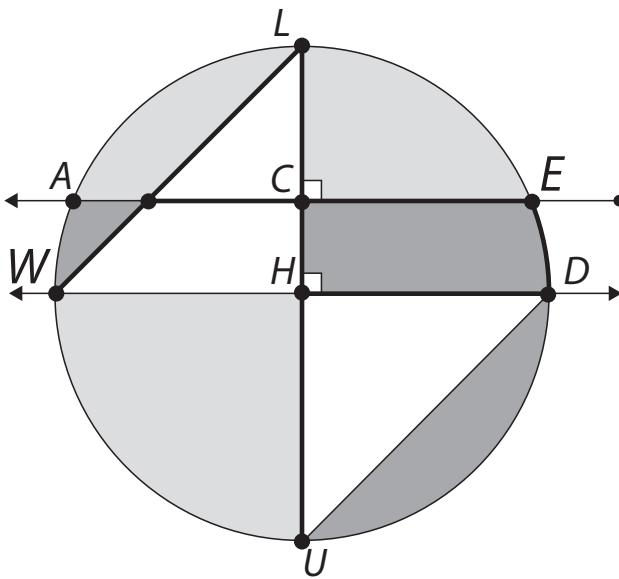


UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Problem-Based Task 5.1.1: A Mathematical Look**

Walch Education contracted Ryan Icons to design a logo for the company. They requested the logo be circular and contain the following elements:

- a line
- a ray
- a line segment
- 2 pairs of parallel lines
- 1 pair of perpendicular lines

Identify the elements requested in the submitted logo shown below.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations**

Practice 5.1.1: Defining Terms

Use what you've learned to answer the questions that follow.

1. What is the part of a line with two endpoints P and Q ? How is it written?
2. What is the definition of a circle?
3. What is a term used to describe two lines that intersect to form a right angle?
4. What is the definition of a point?
5. What type of angle has a measure that is greater than 0° but less than 90° ?
6. What term is used to describe two rays or two line segments that share a common endpoint?
7. Two circular arcs, \widehat{AB} and \widehat{XY} , share the same center, O . The point A is on \overline{OX} and B is on \overline{OY} . What can be said about the relation of the lengths of \widehat{AB} and \widehat{XY} ?
8. Two circular arcs, \widehat{AB} and \widehat{AC} , share the same center, O . The point B lies on the circle between the points A and C . What can be said about the relation of the lengths of \widehat{AB} and \widehat{ABC} ?
9. What type of angle has a measure that is greater than 90° but less than 180° ?
10. What is the term used to describe the set of points between two points P and Q in a plane and the infinite number of points that continue beyond them?

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations**

Example 2

Given $\triangle ABC$: $A(5,2)$, $B(3,5)$, and $C(2,2)$, and the transformation $T(x, y) = (x, -y)$, what are the coordinates of the vertices of $T(\triangle ABC)$? What kind of transformation is T ?

Example 3

Given the transformation of a translation $T_{5,-3}$, and the points $P(-2, 1)$ and $Q(4, 1)$, show that the transformation of a translation is isometric by calculating the distances, or lengths, of \overline{PQ} and $\overline{P'Q'}$.

Example 4

Given $T_{-6,2}(x, y) = (x - 6, y + 2)$, state the translation that would yield the identity transformation, $I = T_{h,k}(T_{-6,2}(x, y))$.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Problem-Based Task 5.1.2: In the Mail Room**

The mail room at a growing retail company stuffs, addresses, weighs, and stamps hundreds of envelopes to be mailed each day. The mail clerks used to do this by hand, but because the company has grown, the process will now be automated. After an open envelope is placed face down on a moving rack, the automated process is as follows:

1. The envelope is stuffed by pushing the open envelope onto the mailer.
2. The envelope is then retracted.
3. The envelope is then moved to where it will be sealed.
4. Once the envelope is sealed it must be flipped face-up to be addressed.
5. The envelope is moved to where it is addressed.
6. The envelope is then rotated 90° and placed on a scale where it is weighed and stamped.
7. Finally, the envelope is pushed off the rack and into a bin to be mailed.

The transformation functions for each step are as follows:

1. $S_1(x, y) = (x, y + 3)$ Stuffing the envelope.
2. $S_2(x, y) = (x, y - 3)$ Retracting the stuffed envelope.
3. $T(x, y) = (x + 4, y)$ Moving the envelope down the rack.
4. $F(x, y) = (x, -y)$ Flipping the envelope over.
5. $T(x, y) = (x + 4, y)$ Moving the envelope down the rack.
6. $R(x, y) = (y, -x)$ Rotating the envelope clockwise 90° .
7. $T(x, y) = (x + 4, y)$ Moving the envelope down the rack.

continued

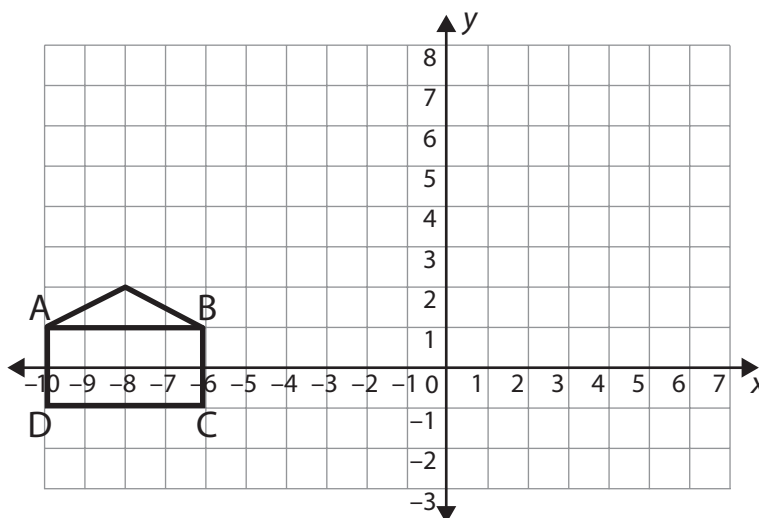
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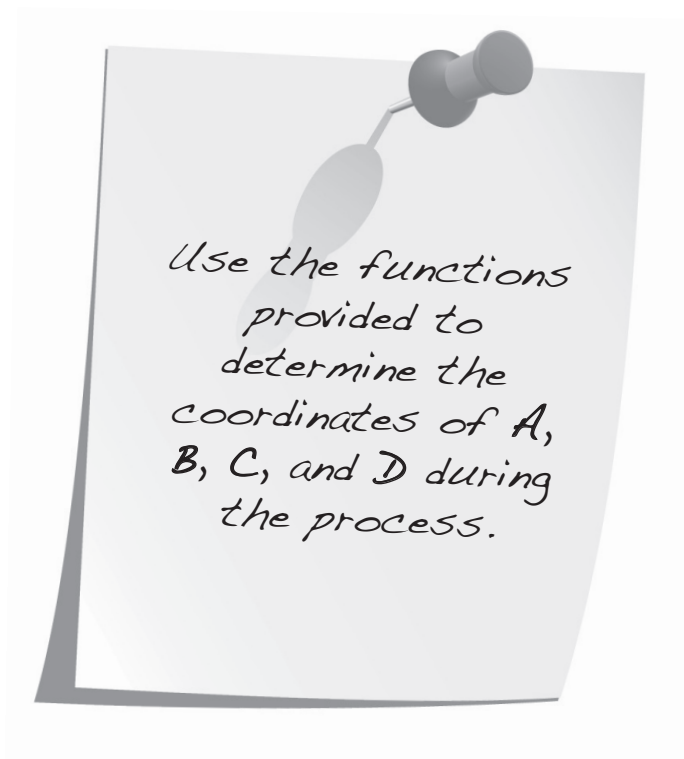
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 1: Introducing Transformations

Each envelope has a width of 4 units and a height of 2 units. Envelopes start at the location shown in the graph below, with the initial coordinates of A $(-10, 1)$, B $(-6, 1)$, C $(-6, -1)$, and D $(-10, -1)$.



Use the functions provided to determine the coordinates of A , B , C , and D during the process.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations**

Practice 5.1.2: Transformations As Functions

Use what you know about transformations to answer the questions.

1. When described as functions, can transformations be combined?
2. Given the expression $f(g(k(x)))$, where f , g , and k are functions, what operation should be performed first? Does the order matter? Why or why not?
3. What does it mean for a transformation to be isometric?
4. A figure is transformed by $T_{3,-1}$ and then transformed by $T_{-3,1}$. How does the preimage relate to the final image?
5. If the transformation T is isometric and $d(PQ)=2$, what is $d(T(PQ))$?
6. Given $T_{h,k}(x,y)=(x+h,y+k)$ and the point $P(2,3)$, what is $T_{5,4}(P)$?
7. Using the form $T_{h,k}(x,y)=(x+h,y+k)$, how can we describe a translation S that moves a point left 5 units and down 1 unit in the coordinate plane?
8. Given $R_{90}(x,y)=(-y,x)$ and the point $Q(1,0)$, what is $R_{90}(Q)$?
9. Find $T(S(x,y))$ if $T(x,y)=(x+2,y+2)$ and $S(x,y)=(x-5,y+1)$. Label your answer P . What values of h and k would prove the equation $T_{h,k}(P)=(x,y)$ true?
10. Given $T_{2,5}(x,y)=(x+2,y+5)$, state the translation that would yield the identity transformation, $I=T_{h,k}(T_{2,5}(x,y))$.

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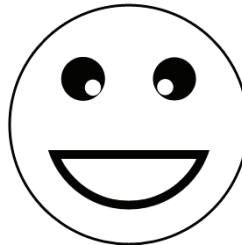
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Lesson 5.1.3: Applying Lines of Symmetry****Warm-Up 5.1.3**

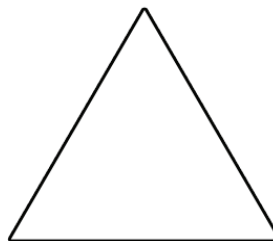
Symmetry is everywhere. We find symmetry in flowers, faces, and buildings. It allows us to predict what something will look like; if we see one half of a basketball court we can assume the other half will match. Because symmetry is common in nature, we see it replicated in art and architecture. Symmetry provides predictability, balance, and strength, which makes it a critical element of mathematics and science. But what defines symmetry? What is found in every symmetrical relationship?

1. In the face below, note the pieces that are symmetrical. Draw a line through the middle of each symmetry.



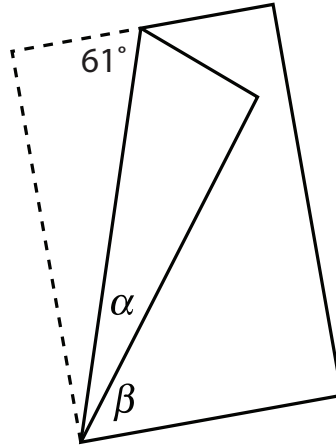
2. Where would a line of symmetry be on the body of a car?

3. Find where the equilateral triangle below is symmetrical and draw lines bisecting the symmetry. Remember, an equilateral triangle has three sides of equal length. How many lines of symmetry can you draw?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Example 2**

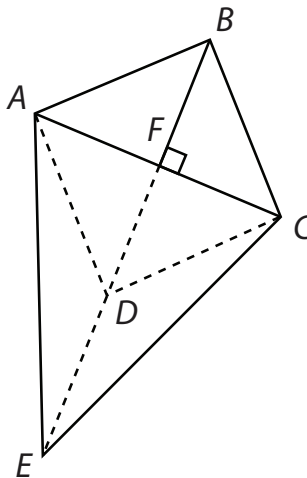
A piece of rectangular paper is folded in the following way:



Find the angles alpha, α , and beta, β .

Example 3

Given the quadrilateral $ABCE$, the square $ABCD$, and the information that F is the same distance from A and C , show that $ABCE$ is symmetrical along \overline{BE} .

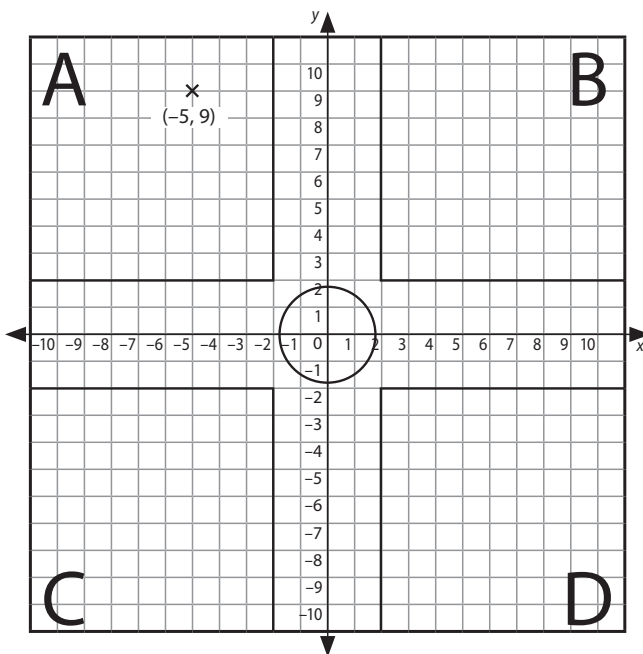


UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations****Problem-Based Task 5.1.3: Lining the Plaza**

A construction crew is building a park plaza that will include a fountain and 8 cherry trees. Two perpendicular walkways will cross through the middle of the plaza, intersecting in the center where the fountain will be placed. The plans call for the trees to be planted in positions that meet the following criteria:

- There are 2 trees in each quadrant.
- The diagonals of each quadrant are lines of symmetry for the quadrant.
- The walkways are lines of symmetry for the plaza.

The plan for the plaza has been laid onto the coordinate map shown below and the location of the first tree in quadrant A has been marked. Find the locations for the remaining trees.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 1: Introducing Transformations**

Practice 5.1.3: Applying Lines of Symmetry

Use what you've learned about symmetry to answer the questions.

1. What shape has an infinite number of lines of symmetry?
2. How many lines of symmetry does a regular hexagon have?
3. Can a quadrilateral with four equal sides have less than four lines of symmetry?
4. How many lines of symmetry does an isosceles triangle have?
5. How many lines of symmetry does a scalene triangle have?
6. What is the smallest number of degrees needed to rotate a regular pentagon around its center onto itself?
7. What relationship is formed by a line of symmetry and the line between opposite points in the symmetry?
8. How many lines of symmetry are there in one of the five-point stars on the American flag?
9. The face of a cat is symmetrical, with the bridge of the nose falling on the line of symmetry directly between the eyes. If a cat's right eye is 3 inches from the bridge of its nose, how far is the cat's left eye from its right eye?
10. How many different ways can a cube be sliced into 2 equal halves?

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 2: Defining and Applying Rotations, Reflections, and Translations

Example 2

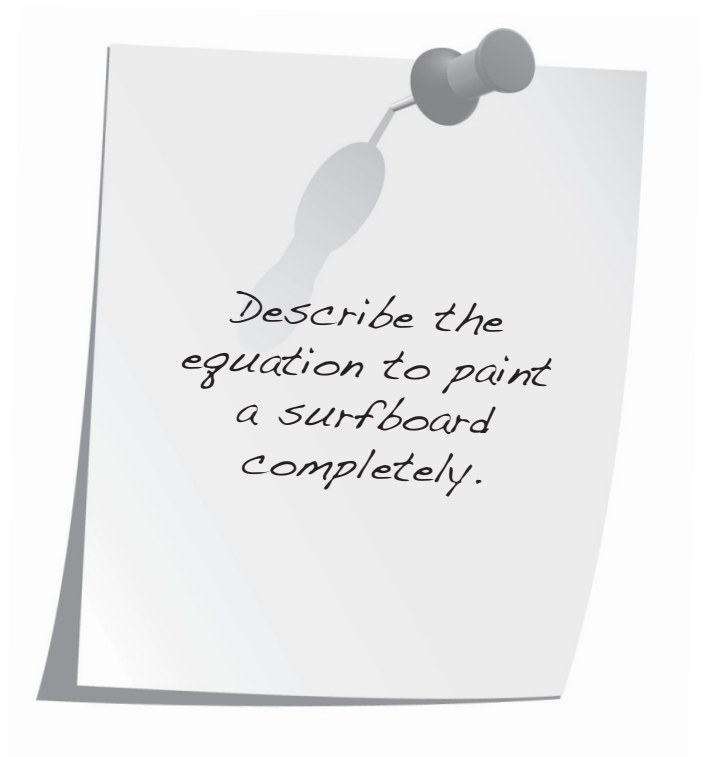
Using the definitions described earlier, write the translation $T_{5,3}$ of the rotation R_{180} in terms of a function F on (x, y) .

Example 3

Using the definitions described earlier, write the reflection $r_{y=x}$ of the translation $T_{2,3}$ of the reflection $r_{x\text{-axis}}$ on (x, y) in terms of a function S on (x, y) .

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 2: Defining and Applying Rotations, Reflections, and Translations****Problem-Based Task 5.2.1: Painting Surfboards**

At a surfboard manufacturer, a conveyor belt moves the board along through a paint sprayer. A mechanical arm then rotates the board 90° and puts it back on the conveyor belt. Then, the surfboard is pushed one more full length through another paint sprayer and the arm again rotates the board 90° . Using the variable b for the board, the function C for the motion of the conveyor belt, and the function A for the action of the arm rotating the board 90° , describe the equation to paint a surfboard completely.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 2: Defining and Applying Rotations, Reflections, and Translations**

Practice 5.2.1: Defining Rotations, Reflections, and Translations

Answer the questions and complete the following problems about transformations.

1. In a rotation of a set of points, what geometric structure defines the motion of points?
2. What linear relationship defines the movement of a translation?
3. What linear relationship defines the movement of a reflection?
4. In a rotation, which points are moved the greatest distance?
5. In a reflection, what happens to the points that lie on the line of reflection?
6. With respect to x and y , how many units does the translation $T_{6,8}$ move a point $Z(x, y)$?
7. What transformation moves $R_{180}(r_{x\text{-axis}}(P))$ back to P ?
8. Find the coordinates of the vertices of $R_{270}(T_{2,3}(\triangle ABC))$ where $A(1, 1)$, $B(2, 8)$, and $C(4, 6)$.
9. Describe the reflection through the line $y = x$ of the point $T(P)$ for which $T(x - 3, y + 1)$ and $P(24, -32)$.
10. In terms of x and y , how does the point $V(3, 3)$ move in the transformation $T_{2,5}(R_{180}(V))$?

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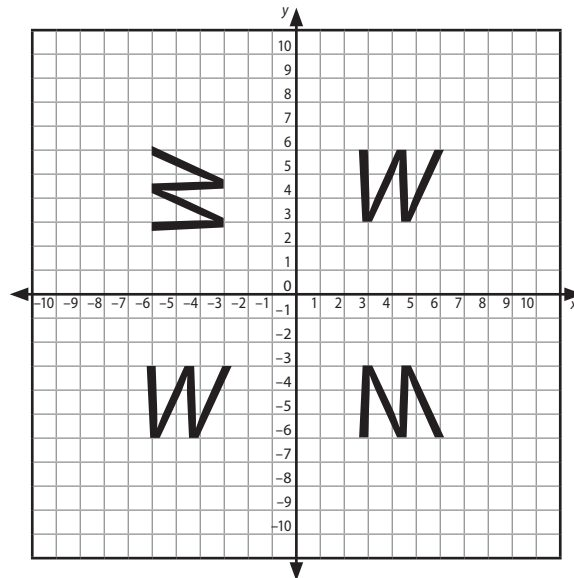
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 2: Defining and Applying Rotations, Reflections, and Translations****Lesson 5.2.2: Applying Rotations, Reflections, and Translations****Warm-Up 5.2.2**

Willow Springs is a new company that sells yoga mats. Their logo is represented below. Assume the W in Quadrant I is the preimage and other W 's have been transformed. How have each of the W 's been transformed from the preimage?



1. By observation, what transformation occurred on the W in Quadrant II?
2. By observation, what transformation occurred on the W in Quadrant III?
3. By observation, what transformation occurred on the W in Quadrant IV?

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 2: Defining and Applying Rotations, Reflections, and Translations

Example 2

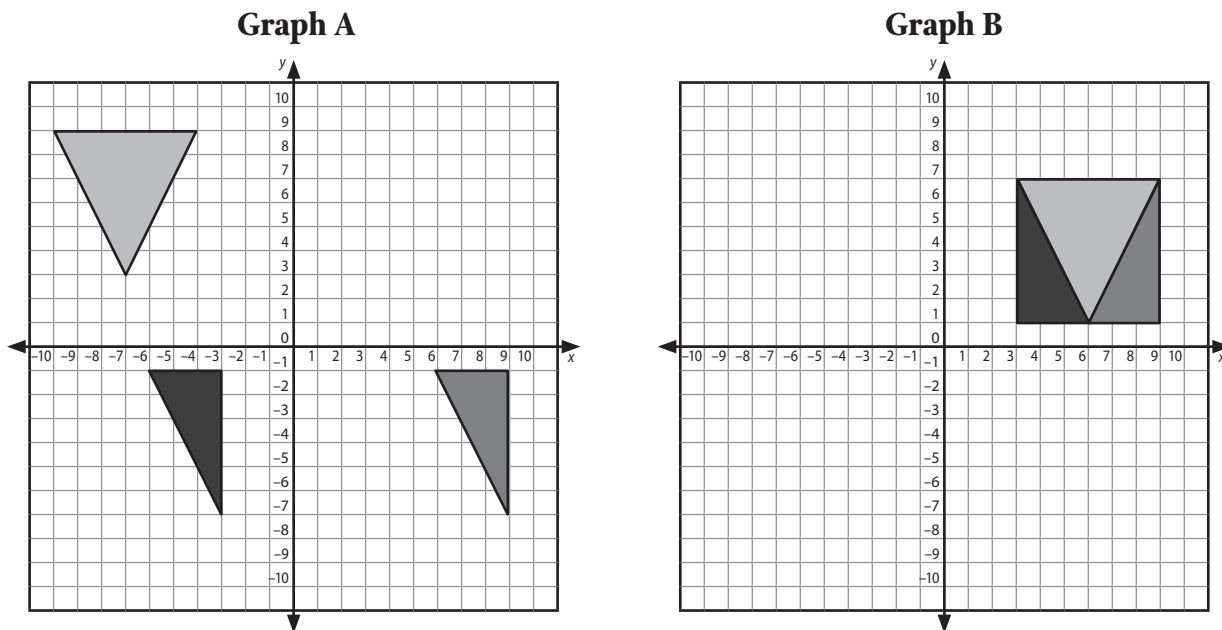
Use the definitions you have learned to graph the reflection of parallelogram $ABCD$, or $\square ABCD$, through the y -axis given $\square ABCD$ with the points $A(-5, 5)$, $B(-3, 4)$, $C(-4, 1)$, and $D(-6, 2)$.

Example 3

Using the definitions you have learned, graph a 90° rotation of $\triangle ABC$ with the points $A(1, 4)$, $B(6, 3)$, and $C(3, 1)$.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 2: Defining and Applying Rotations, Reflections, and Translations****Problem-Based Task 5.2.2: Animating a Logo**

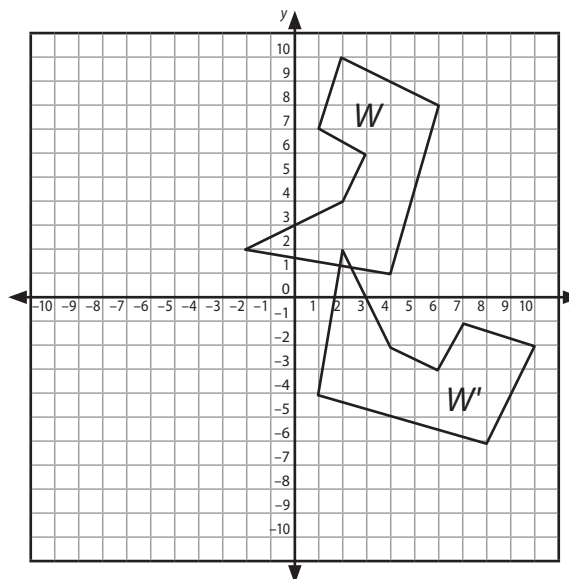
The marketing department for Mitchell Software is designing an animation for their logo. The logo is shown in Quadrant I of Graph B below. The shapes used in the logo can be found in Quadrants II, III, and IV of Graph A. The marketing department will use three unique transformations to bring together the triangles. What transformations must occur in the animation?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 2: Defining and Applying Rotations, Reflections, and Translations****Practice 5.2.2: Applying Rotations, Reflections, and Translations**

Use what you know about transformations to complete each problem.

- Graph the transformation $T_{2,-3}(T_{2,5}(\Delta ABC))$ where $A(1, 2)$, $B(2, 7)$, and $C(4, 1)$.
- Graph the transformation $R_{180}(T_{5,1}(\Delta ABC))$ where $A(-4, -2)$, $B(-6, -7)$, and $C(-2, -3)$.
- In what quadrant is $T_{5,4}(T_{1,1}(P))$ when $P(-7, 1)$?
- Given $R_{90}(x, y) = (-y, x)$ and $P(5, -1)$, what is $R_{90}(T_{1,1}(P))$?
- Given $\square ABCD$ with points $A(-2, 2)$, $B(-1, 2)$, $C(-1, 1)$, and $D(-2, 1)$, what is $R_{180}(\square ABCD)$?
- Using a rotation R_m , can you create a function $R_m(r_{x\text{-axis}}(r_{y\text{-axis}}(\square ABCD)))$ that is equivalent to $r_{x\text{-axis}}(r_{y\text{-axis}}(\square ABCD))$?
- A reflection through what line will move $P(6, -13)$ to $P'(6, 13)$?
- Graph the transformation $r_{y\text{-axis}}(r_{x\text{-axis}}(\Delta DEF))$ where $D(9, 10)$, $E(8, -2)$, and $F(1, 4)$.
- Graph the transformation $R_{180}(T_{5,1}(\Delta ABC))$ where $A(-1, -1)$, $B(-7, -2)$, and $C(-4, -9)$.
- Given the graph below, determine the transformation.



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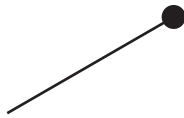
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Lesson 5.3.1: Copying Segments and Angles**Warm-Up 5.3.1**

Maryellen is caring for a pet goat. To keep the goat from roaming the neighborhood, Maryellen ties the goat to a leash staked in the yard. Maryellen learned quickly that goats enjoy chewing grass, so she must change the location of the stake periodically.

The original location of the stake is shown below on the left with the leash stretched out. Maryellen moved the stake to a new location, shown below on the right. Use the diagrams to solve the problems that follow.

Original stake location



New stake location



1. Using only a compass, determine if there will be an overlap in the area the goat will chew.

2. Maryellen wants to keep both her goat and her yard healthy. Describe a process for determining where Maryellen should place each new stake in order to prevent the goat from overgrazing on the same patch of grass.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Scaffolded Practice 5.3.1**Example 1**

Copy the following segment using only a compass and a straightedge.

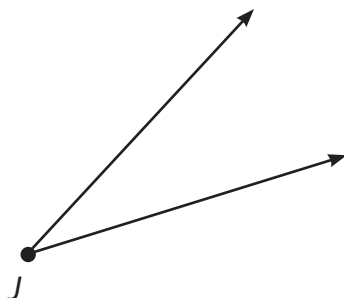


1. Make an endpoint on your paper. Label the endpoint P .
2. Put the sharp point of your compass on endpoint M . Open the compass until the pencil end touches endpoint N .
3. Without changing your compass setting, put the sharp point of your compass on endpoint P . Make a large arc.
4. Use your straightedge to connect endpoint P to any point on your arc.
5. Label the point of intersection of the arc and your segment Q .

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Example 2**

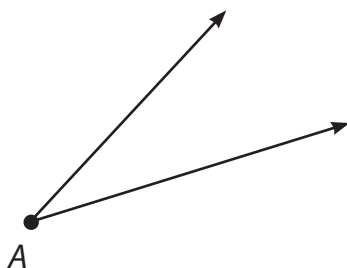
Copy the following angle using only a compass and a straightedge.

**Example 3**

Use the given line segment to construct a new line segment with length $2AB$.

**Example 4**

Use the given angle to construct a new angle equal to $\angle A + \angle A$.

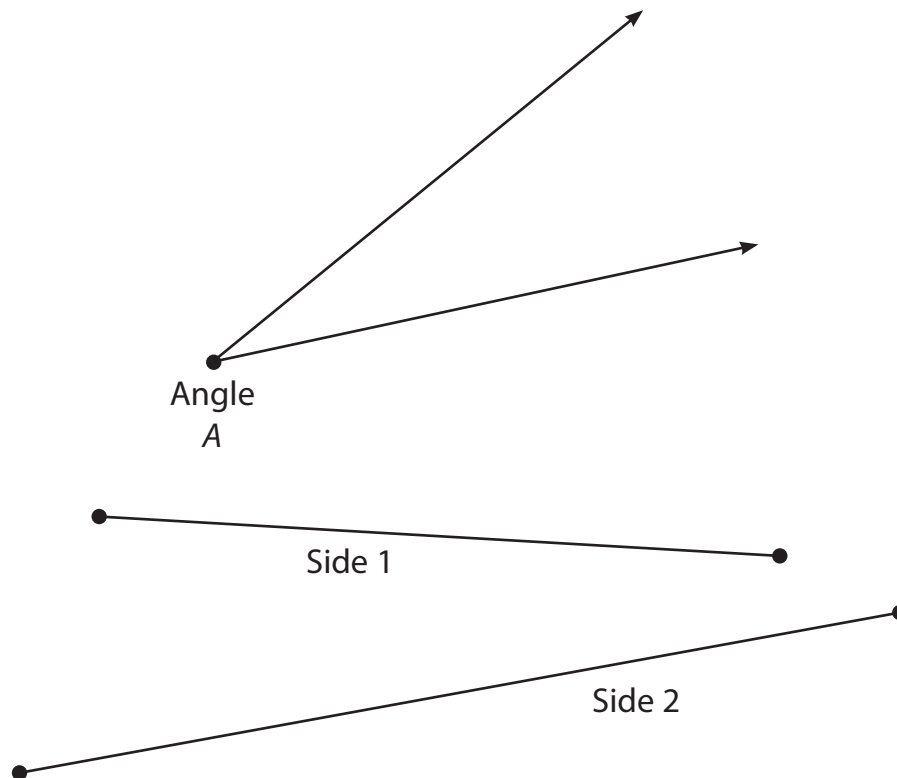
**Example 5**

Use the given segments to construct a new segment equal to $AB - CD$.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Problem-Based Task 5.3.1: How Many Triangles?**

How many non-congruent triangles can be constructed using the two sides and angle given? Use your construction tools to show all possible triangles.

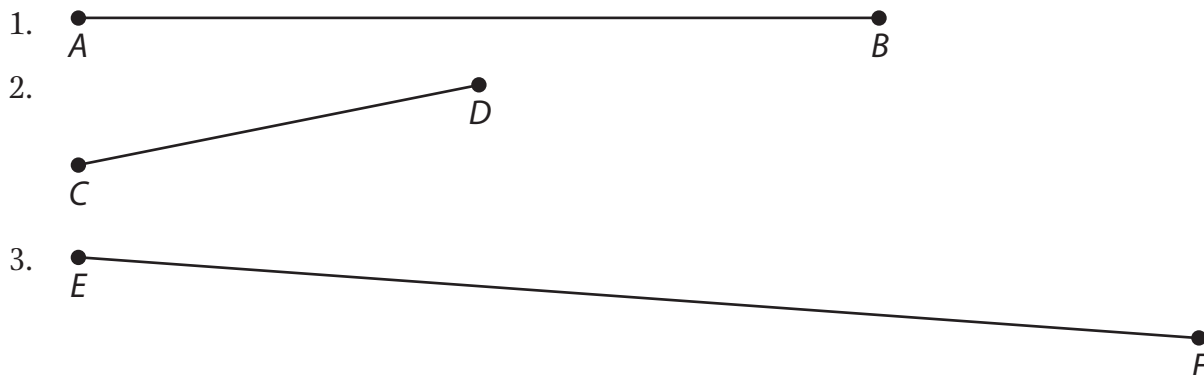


What additional information could you provide to be sure that only one triangle is constructed?

What additional information could you provide to be sure that only one triangle is constructed?

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Practice 5.3.1: Copying Segments and Angles**

Copy the following segments using a straightedge and a compass.

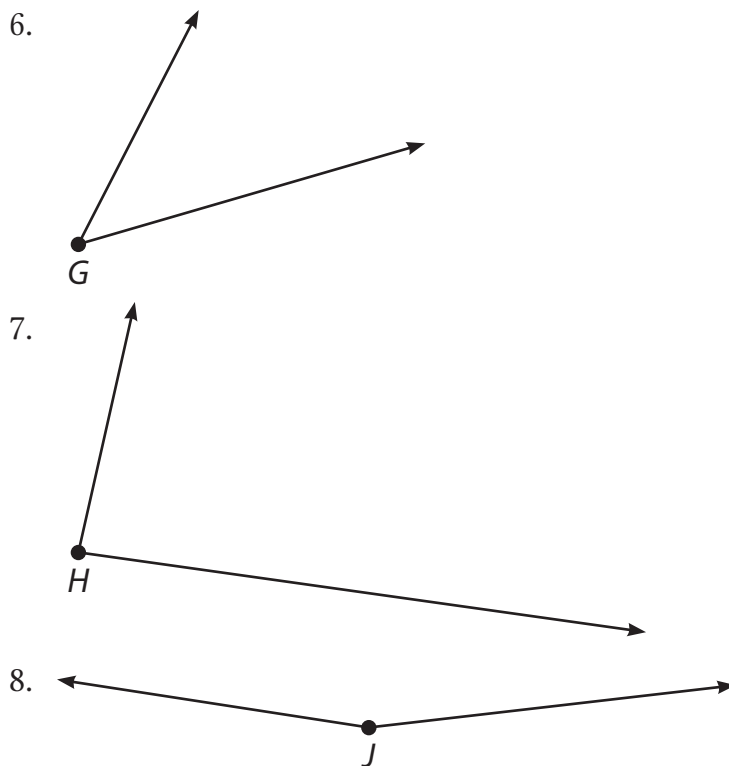


Use the line segments in problems 1–3 to construct the line segments described in problems 4 and 5.

4. $EF - AB$

5. $2AB + CD$

Copy the following angles using a straightedge and a compass.



Use the angles from problems 6–8 to construct the angles described in problems 9 and 10.

9. $\angle J - \angle G$

10. $\angle G + \angle H$

Name: _____

Date: _____

Notes

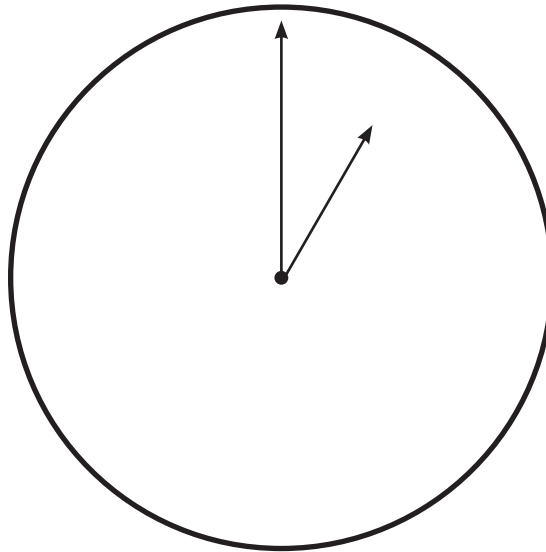
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Lesson 5.3.2: Bisecting Segments and Angles****Warm-Up 5.3.2**

Henri is designing a set for the upcoming school play. The play opens with the main character in front of the clock tower at 1:00 P.M. Henri easily constructs the hands of the clock for the first scene, but needs help with the placement of the hands for the second scene. The second scene takes place 2 hours later in front of the same tower.



1. Use a compass and a straightedge to construct the hands of the clock for the second scene. Be sure to use construction methods previously learned.

2. If the measure of the angle of the hands for the first scene is 30° , what is the measure of the angle of the hands for the second scene?

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Scaffolded Practice 5.3.2**Example 1**

Use a compass and straightedge to find the midpoint of \overline{CD} . Label the midpoint of the segment M .



1. Copy the segment and label it \overline{CD} .
2. Make a large arc intersecting \overline{CD} .
3. Make a second large arc.
4. Connect the points of intersection of the arcs.
5. Label the midpoint of the segment M .

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Example 2

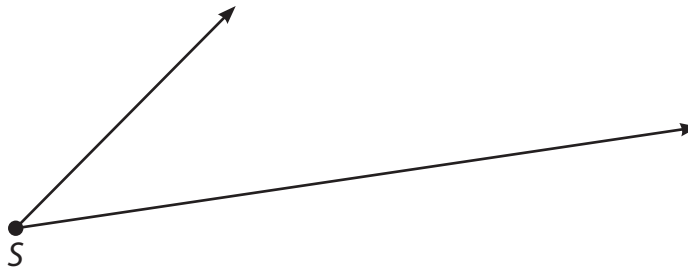
Construct a segment whose measure is $\frac{1}{4}$ the length of \overline{PQ} .

**Example 3**

Use a compass and a straightedge to bisect an angle.

Example 4

Construct an angle whose measure is $\frac{3}{4}$ the measure of $\angle S$.



Name: _____

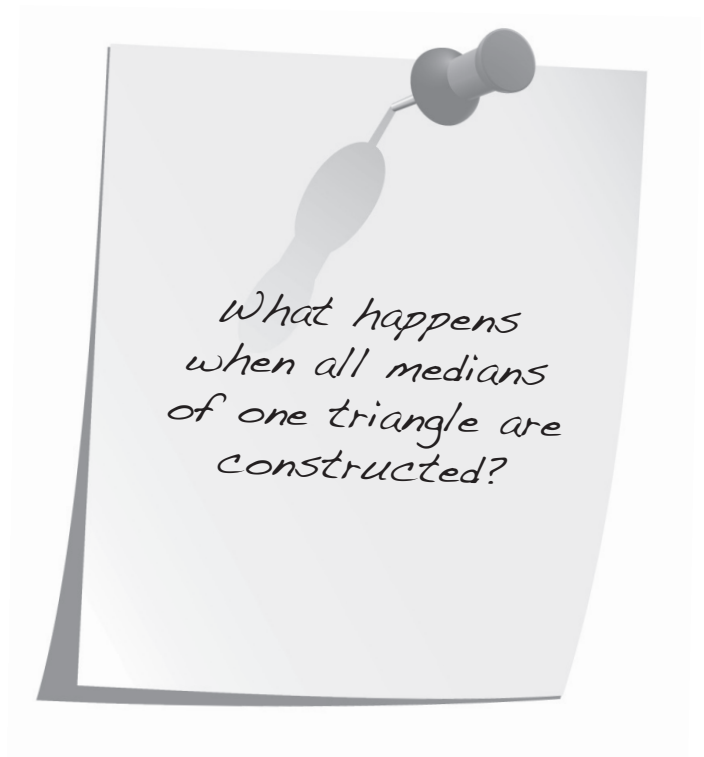
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 3: Constructing Lines, Segments, and Angles

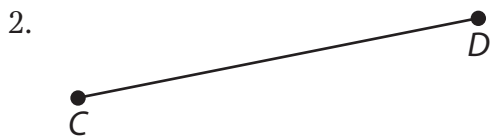
Problem-Based Task 5.3.2: Triangle Medians

The median of a triangle is a line segment joining the vertex of a triangle to the midpoint of the opposite side. What happens when all medians of one triangle are constructed?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Practice 5.3.2: Bisecting Segments and Angles**

Use a compass and straightedge to copy each segment, and then construct the bisector of each segment.



Use a compass and straightedge to construct each segment as specified.

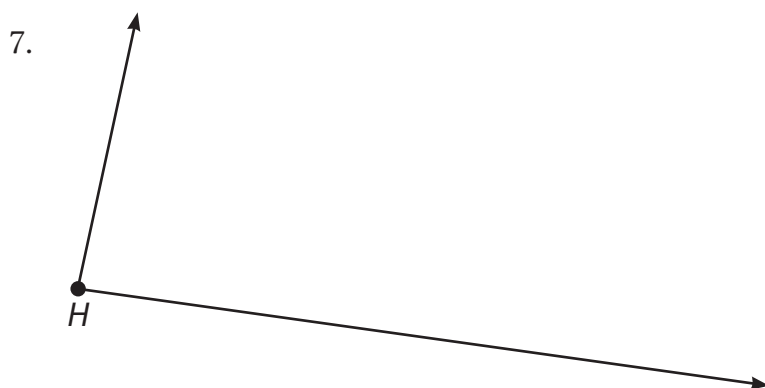
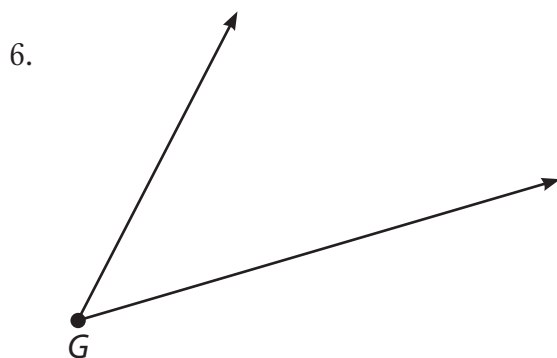
4. Construct a segment whose measure is $\frac{1}{4}$ the length of \overline{AB} in problem 1.

5. Construct a segment whose measure is $\frac{3}{4}$ the length of \overline{EF} in problem 3.

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Use a compass and straightedge to copy each angle, and then construct the bisector of each angle.



Use a compass and straightedge to construct each angle as specified.

9. Construct an angle whose measure is $\frac{1}{4}$ the measure of $\angle G$ in problem 6.

10. Construct an angle whose measure is $\frac{3}{4}$ the measure of $\angle H$ in problem 7.

Name: _____

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles**

Scaffolded Practice 5.3.3**Example 1**

Use a compass and a straightedge to construct the perpendicular bisector of \overline{AB} .



1. Make a large arc intersecting \overline{AB} .
2. Make a second large arc.
3. Connect the points of intersection of the arcs.

continued

Name: _____

Date: _____

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 3: Constructing Lines, Segments, and Angles

Example 2

Use a compass and a straightedge to construct a line perpendicular to line ℓ through point A .

Example 3

Use a compass and a straightedge to construct a line perpendicular to line m through point B that is not on the line.

Example 4

Use a compass and a straightedge to construct a line parallel to line n through point C that is not on the line.

Name: _____

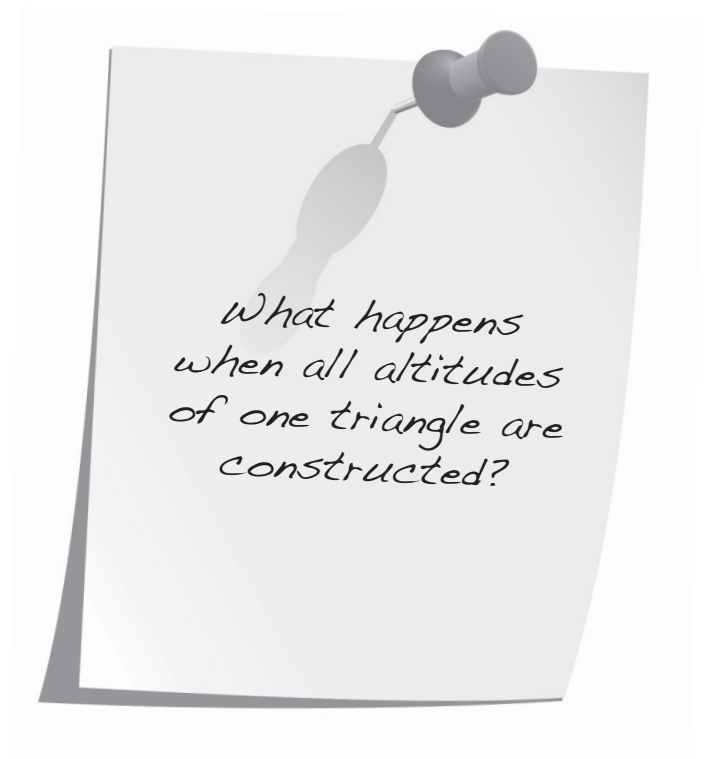
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 3: Constructing Lines, Segments, and Angles

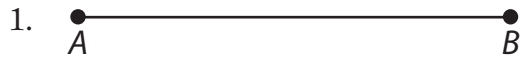
Problem-Based Task 5.3.3: Triangle Altitudes

The altitude of a triangle is the perpendicular line from a vertex to its opposite side. The altitude of a triangle is also called the height. What happens when all altitudes of one triangle are constructed?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 3: Constructing Lines, Segments, and Angles****Practice 5.3.3: Constructing Perpendicular and Parallel Lines**

Use a compass and a straightedge to copy each segment, and then construct the perpendicular bisector of each.



Use a compass and a straightedge to copy each segment, place a point on the segment, and then construct a perpendicular line through the point.



Use a compass and a straightedge to copy each segment, place a point not on the segment, and then construct a perpendicular line through the point.



Use a compass and a straightedge to copy each segment, place a point not on the segment, and then construct a parallel line through the point.



Name: _____

Date: _____

Notes

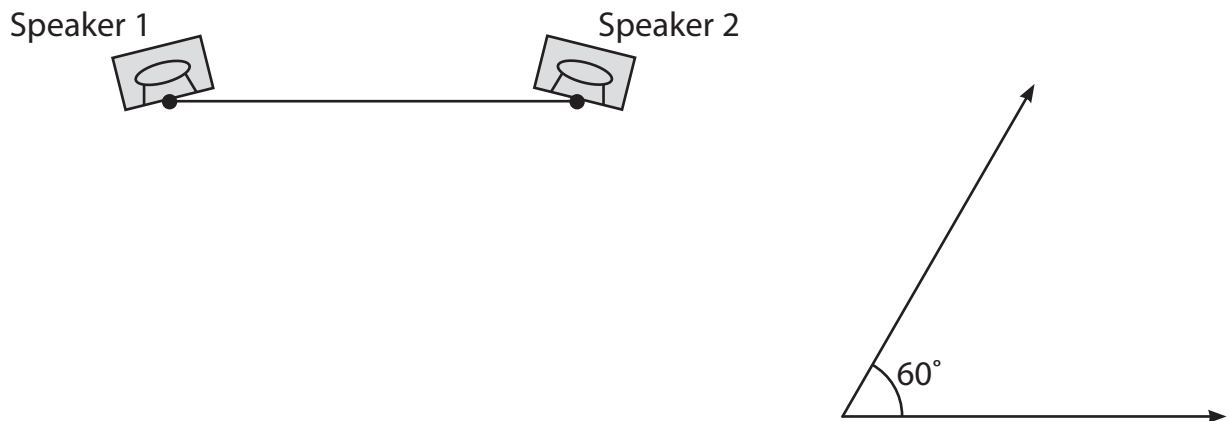
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Lesson 5.4.1: Constructing Equilateral Triangles Inscribed in Circles****Warm-Up 5.4.1**

The town of Fairside is planning an outdoor concert in the park. During the planning process, committee members determined there will be two large speakers, but they can't decide where the audience should sit. The best arrangement for two speakers and the center of the audience is a triangle where each angle is 60° . The diagram below depicts the line segment formed by the two speakers; a 60° angle is also shown.



1. Use the 60° angle and the given segment to construct the triangle created by the two speakers and the center of the audience.

2. Triangles are said to be congruent if the angle measures of both triangles are the same and the lengths of the sides are the same. Is it possible to construct a second non-congruent triangle using the given information? Explain your reasoning.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons**

Scaffolded Practice 5.4.1**Example 1**

Construct equilateral triangle ACE inscribed in circle O using Method 1.

1. Construct circle O .
2. Label a point on the circle point Z .
3. Locate vertices A and C of the equilateral triangle.
4. Locate the third vertex of the equilateral triangle.
5. Construct the sides of the triangle.

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons**

Example 2

Construct equilateral triangle ACE inscribed in circle O using Method 2.

Example 3

Construct equilateral triangle JKL inscribed in circle P using Method 1. Use the length of \overline{HP} as the radius for circle P .

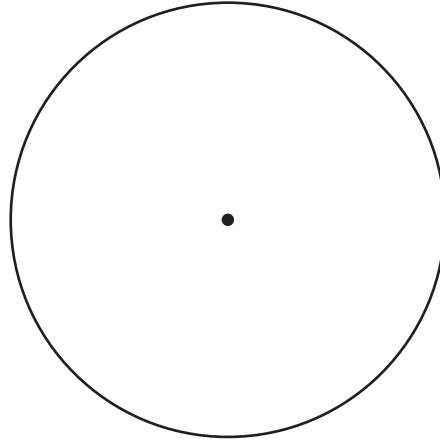
**Example 4**

Construct equilateral triangle JLN inscribed in circle P using Method 2. Use the length of \overline{HP} as the radius for circle P .



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Problem-Based Task 5.4.1: Vending Machine Placement**

As an employee of a skating rink, Jarno was asked to determine the placement of 3 vending machines. Each of the 3 machines needs to be placed along the edge of the circular skating rink. The distance between each machine must be the same. Where should Jarno place each machine? A diagram of the skating rink is provided below.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Practice 5.4.1: Constructing Equilateral Triangles Inscribed in Circles**

Use a compass and a straightedge to construct each equilateral triangle using Method 1.

1. Construct equilateral triangle BCD inscribed in circle Z .



2. Construct equilateral triangle FGH inscribed in circle Y with radius \overline{AB} .



3. Construct equilateral triangle JKL inscribed in circle X with radius \overline{CD} .



4. Construct equilateral triangle NOP inscribed in circle W with the radius equal to twice \overline{EF} .



5. Construct equilateral triangle RST inscribed in circle V with the radius equal to one-half \overline{GH} .

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons**

Use a compass and a straightedge to construct each equilateral triangle using Method 2.

6. Construct equilateral triangle BCD inscribed in circle Z .

7. Construct equilateral triangle FGH inscribed in circle Y with radius \overline{AB} .



8. Construct equilateral triangle JKL inscribed in circle X with radius \overline{CD} .



9. Construct equilateral triangle NOP inscribed in circle W with the radius equal to twice \overline{EF} .



10. Construct equilateral triangle RST inscribed in circle V with the radius equal to one-half \overline{GH} .



Name: _____

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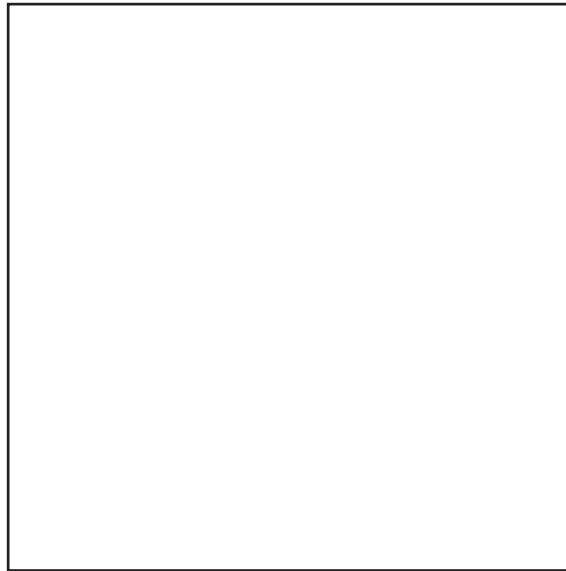
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Lesson 5.4.2: Constructing Squares Inscribed in Circles****Warm-Up 5.4.2**

Antonia is making four corner tables, one for each of her three sisters and herself. She has one large square piece of wood that she plans to cut into four tabletops. She begins by marking the needed cuts for the tabletops on the square piece of wood.



1. Each angle of the square piece of wood measures 90° . If Antonia bisects one angle of the square, what is the measure of the two new angles?
2. Bisect one angle of the square. Extend the angle bisector so that it intersects the square in two places. Where does the bisector intersect the square?
3. Bisect the remaining angles of the square. If Antonia cuts along each angle bisector, what figures will she have created?
4. What are the measures of each of the angles of the new figures?

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons**

Scaffolded Practice 5.4.2**Example 1**

Construct square $ABCD$ inscribed in circle O .

1. Construct circle O .
2. Label a point on the circle point A .
3. Construct the diameter of the circle.
4. Construct the perpendicular bisector of \overline{AC} .
5. Construct the sides of the square.

continued

Name: _____

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 4: Constructing Polygons

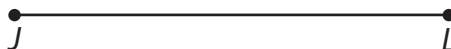
Example 2

Construct square $EFGH$ inscribed in circle P with the radius equal to the length of \overline{EP} .



Example 3

Construct square $JKLM$ inscribed in circle Q with the radius equal to one-half the length of \overline{JL} .



Name: _____

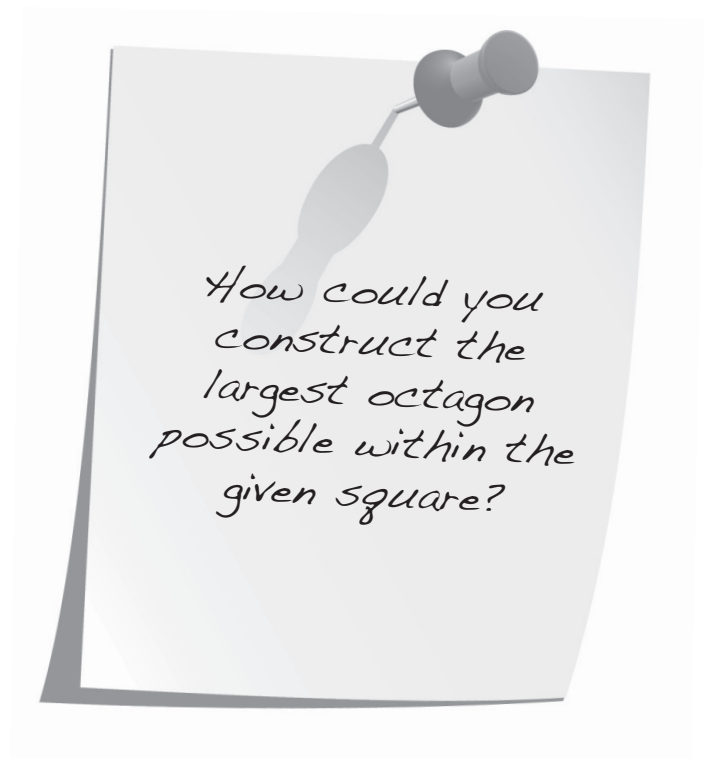
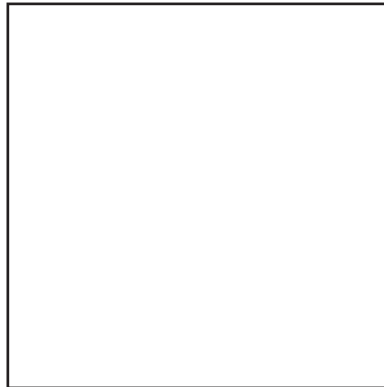
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 4: Constructing Polygons

Problem-Based Task 5.4.2: Constructing a Regular Octagon

A regular octagon is a polygon with eight sides that are equal in length and eight angles that are equal in measure. How could you construct the largest octagon possible within the given square?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Practice 5.4.2: Constructing Squares Inscribed in Circles**

Use a compass and a straightedge to construct each square inscribed in a circle.

1. Construct square $ABCD$ inscribed in circle E .
2. Construct square $FGHJ$ inscribed in circle K .
3. Construct square $LMNO$ inscribed in circle P with radius \overline{LP} .



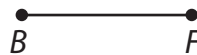
4. Construct square $QRST$ inscribed in circle U with radius \overline{QU} .



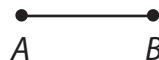
5. Construct square $VWXY$ inscribed in circle Z with radius \overline{VZ} .



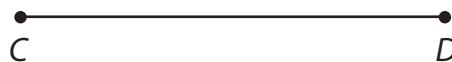
6. Construct square $BCDE$ inscribed in circle F with radius \overline{BF} .



7. Construct square $GHJK$ inscribed in circle L with the radius equal to twice \overline{AB} .



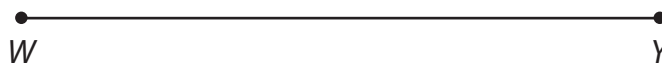
8. Construct square $MNOP$ inscribed in circle Q with the radius equal to one-half \overline{CD} .



9. Construct square $RSTU$ inscribed in circle V with the diameter equal to \overline{RT} .



10. Construct square $WXYZ$ inscribed in circle A with the diameter equal to \overline{WY} .



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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons**

Scaffolded Practice 5.4.3**Example 1**

Construct regular hexagon $ABCDEF$ inscribed in circle O using Method 1.

1. Construct circle O .
2. Label a point on the circle point A .
3. Construct the diameter of the circle.
4. Locate two vertices on either side of point A .
5. Locate two vertices on either side of point D .
6. Construct the sides of the hexagon.

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Name: _____

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

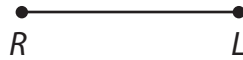
Lesson 4: Constructing Polygons

Example 2

Construct regular hexagon $ABCDEF$ inscribed in circle O using Method 2.

Example 3

Construct regular hexagon $LMNOPQ$ inscribed in circle R using Method 1. Use the length of \overline{RL} as the radius for circle R .



Example 4

Construct regular hexagon $LMNOPQ$ inscribed in circle R using Method 2. Use the length of \overline{RL} as the radius for circle R .



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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 4: Constructing Polygons

Problem-Based Task 5.4.3: Constructing a Regular Dodecagon

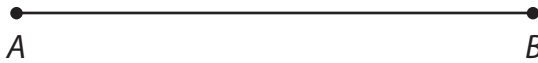
A regular dodecagon is a polygon with 12 sides that are equal in length and 12 angles that each measure 150° . How could you construct a regular dodecagon?



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 4: Constructing Polygons****Practice 5.4.3: Constructing Regular Hexagons Inscribed in Circles**

Use a compass and a straightedge to construct each regular hexagon using Method 1.

- Construct regular hexagon $BCDEFG$ inscribed in circle Z .
- Construct regular hexagon $HJKLMN$ inscribed in circle Y with radius \overline{AB} .



- Construct regular hexagon $PQRSTU$ inscribed in circle X with radius \overline{CD} .



- Construct regular hexagon $DEFGHJ$ inscribed in circle W with the radius equal to twice \overline{EF} .

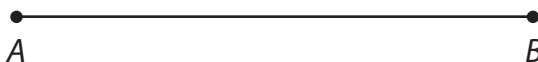


- Construct regular hexagon $RSTUVW$ inscribed in circle A with the radius equal to one-half \overline{GH} .



Use a compass and a straightedge to construct each regular hexagon using Method 2.

- Construct regular hexagon $BCDEFG$ inscribed in circle Z .
- Construct regular hexagon $HJKLMN$ inscribed in circle Y with radius \overline{AB} .



- Construct regular hexagon $PQRSTU$ inscribed in circle X with radius \overline{CD} .



- Construct regular hexagon $DEFGHJ$ inscribed in circle W with the radius equal to twice \overline{EF} .



- Construct regular hexagon $RSTUVW$ inscribed in circle A with the radius equal to one-half \overline{GH} .



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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

Lesson 5.5.1: Describing Rigid Motions and Predicting the Effects**Warm-Up 5.5.1**

Before the digital age, printing presses were used to create text products such as newspapers, brochures, and any other mass-produced, printed material. Printing presses used printing blocks that were the reflection of the image to be printed. Some antique collectors seek out hand-carved printing blocks.

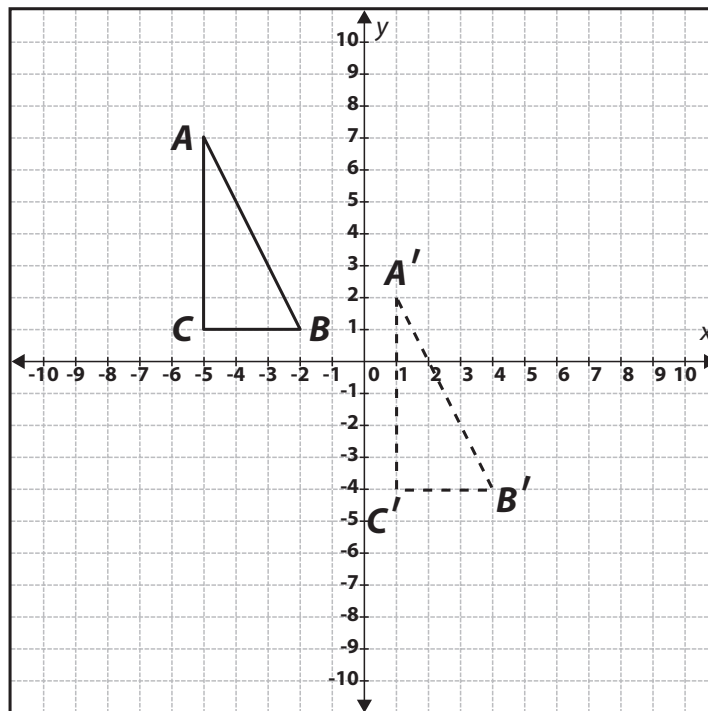
An antique poster of the printed letter “L” was created using a printing block. The “L” has the coordinates $A(2, 5)$, $B(3, 5)$, $C(3, 2)$, $D(5, 2)$, $E(5, 1)$, and $F(2, 1)$. Use this information to solve the following problems.

1. What are the coordinates of the printing block through $r_{x\text{-axis}}$?

2. Graph the preimage and the image.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Scaffolded Practice 5.5.1****Example 1**

Describe the transformation that has taken place in the diagram below.



1. Examine the orientation of the figures to determine if the orientation has changed or stayed the same. Look at the sides of the triangle.

Side length	Preimage orientation	Image orientation
Shortest		
Longest		
Intermediate		

continued

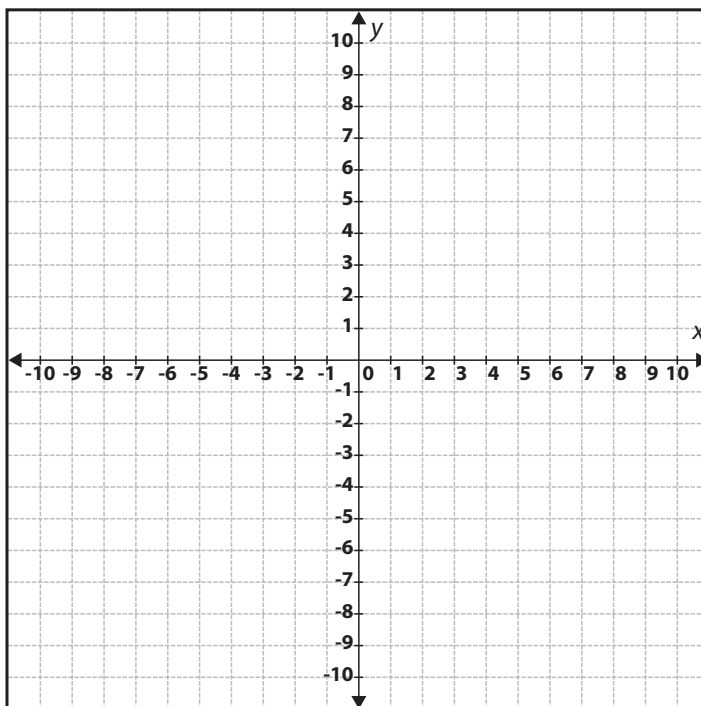
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 5: Exploring Congruence

2. Connect the corresponding vertices with lines.



3. Analyze the change in position.

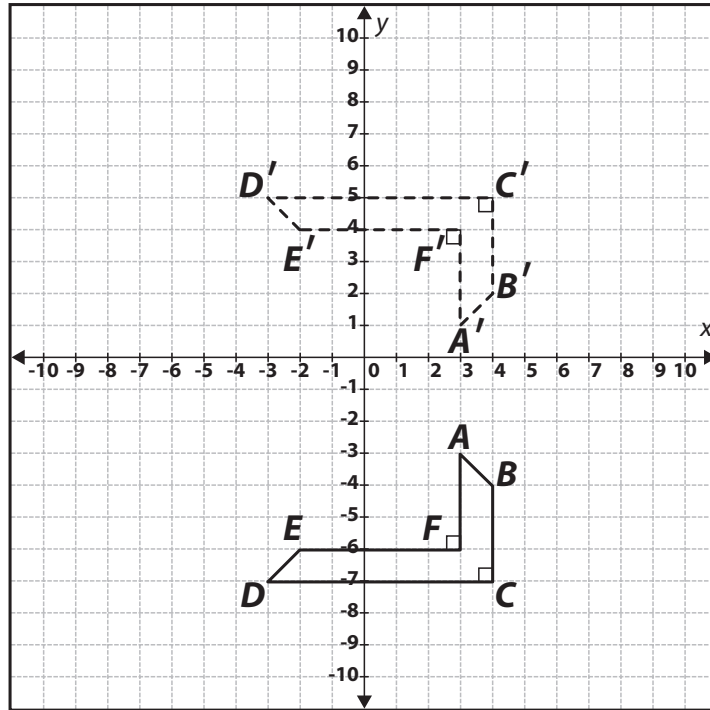
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 5: Exploring Congruence

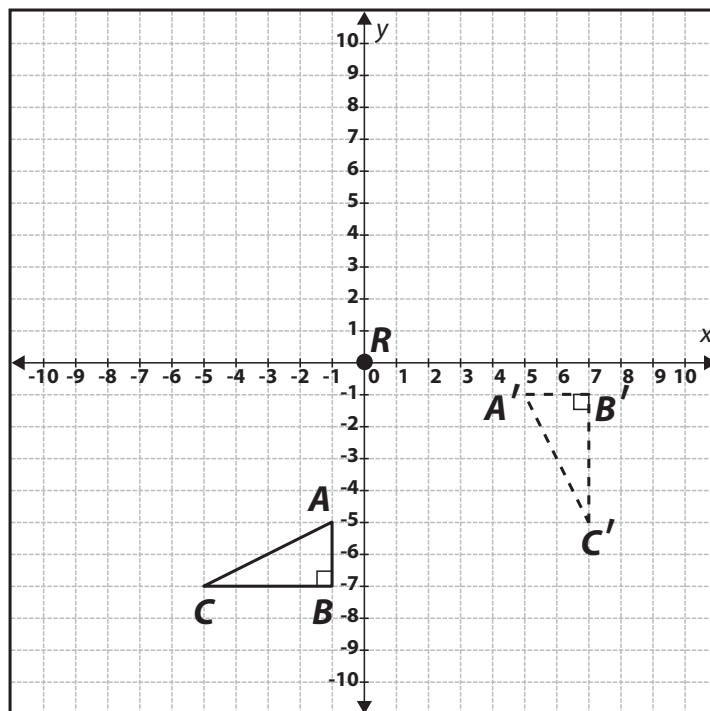
Example 2

Describe the transformation that has taken place in the diagram below.



Example 3

Describe the transformation that has taken place in the diagram below.



continued

Name: _____

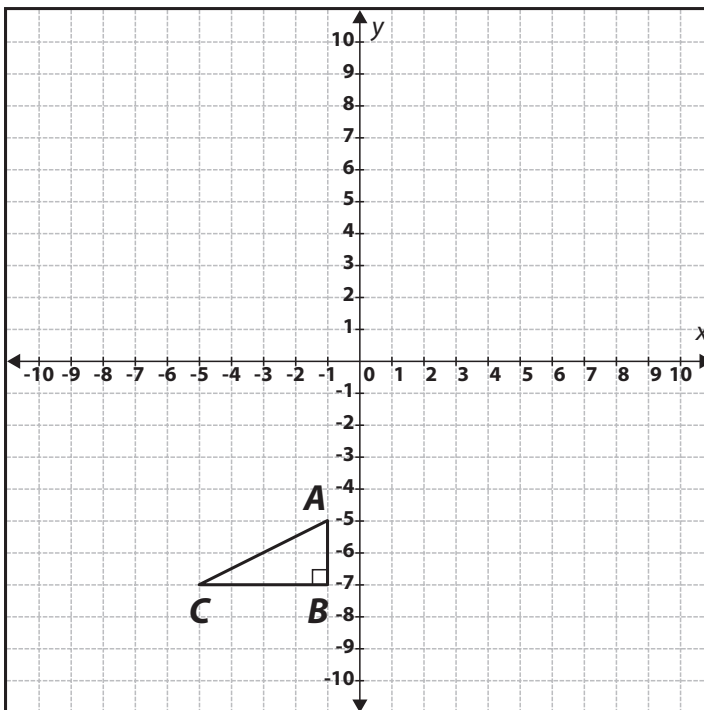
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 5: Exploring Congruence

Example 4

Rotate the given figure 45° counterclockwise about the origin.



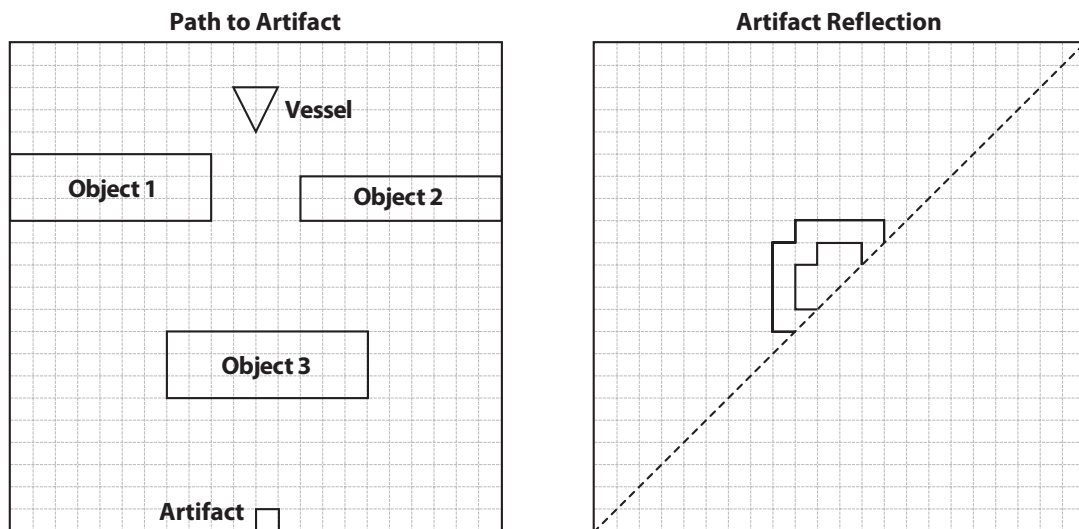
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Problem-Based Task 5.5.1: Artifacts Recovered and Restored**

The *Titanic* sank on the morning of April 15, 1912, after hitting an iceberg. In recent years, many artifacts from the ship have been recovered and some have been restored. Your job is to coordinate the recovery and restoration of a particular artifact from the *Titanic*. Your search team will use an unmanned vessel to retrieve the artifact so artists can restore it.

Your team controls the unmanned vessel remotely so it can navigate around objects. The vessel can be translated and rotated, but it cannot touch any of the objects—it must be at least 1 unit away from each item. The point of rotation is at the center of the vessel. The vessel is roughly the shape of a triangle and always points forward when moving. The vessel is currently positioned forward toward Object 3.

To restore the damaged artifact to its original condition, artists will use reflections.

What rigid motions must be used for the unmanned vessel to recover the artifact? What will the artifact look like after it has been restored? Use the following diagrams to answer the questions. The diagram on the left represents a map of the sea floor, including the vessel, the artifact, and objects to avoid. The diagram on the right shows what you expect to recover of the artifact.

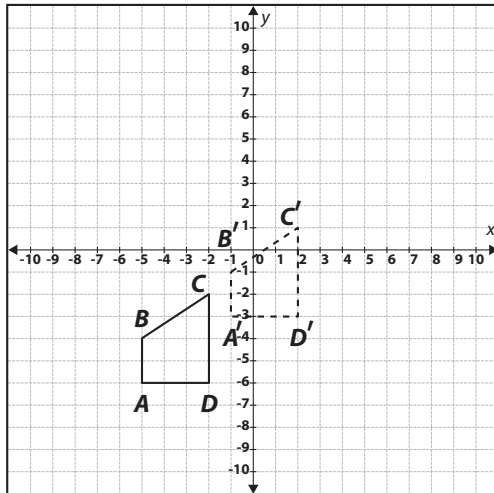


What rigid motions must be used for the unmanned vessel to recover the artifact?

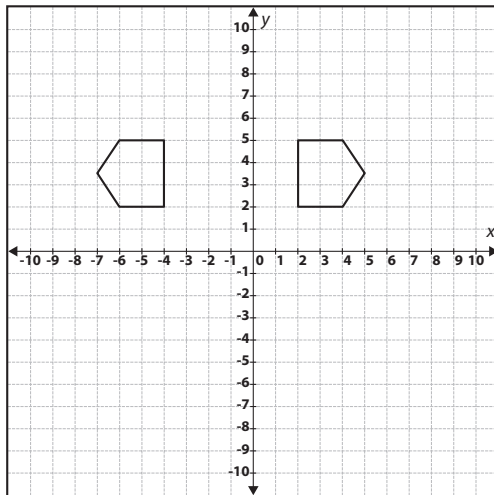
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Practice 5.5.1: Describing Rigid Motions and Predicting the Effects**

For problems 1–3, describe the rigid motion used to transform each figure. If the transformation is a translation, state the units and direction(s) the figure was transformed. If the transformation is a reflection, state the line of reflection. Write a statement justifying your answer.

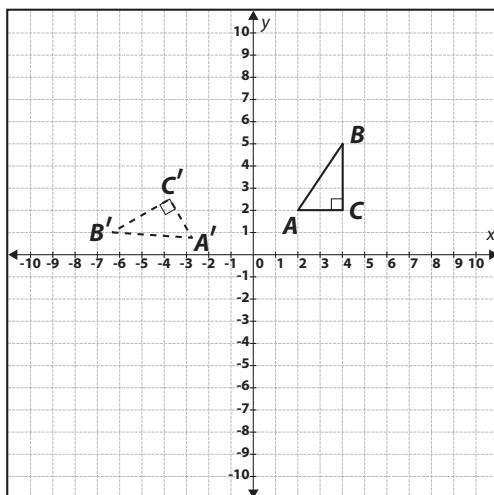
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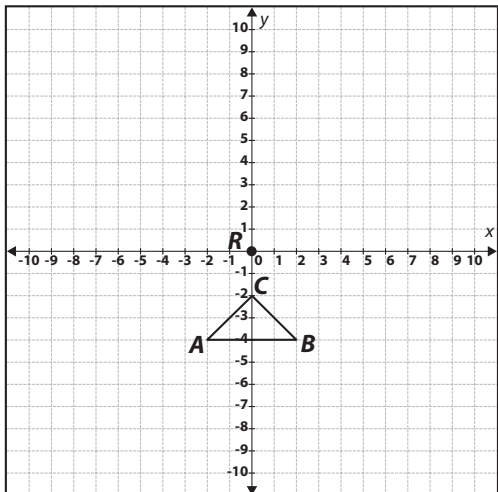
3.

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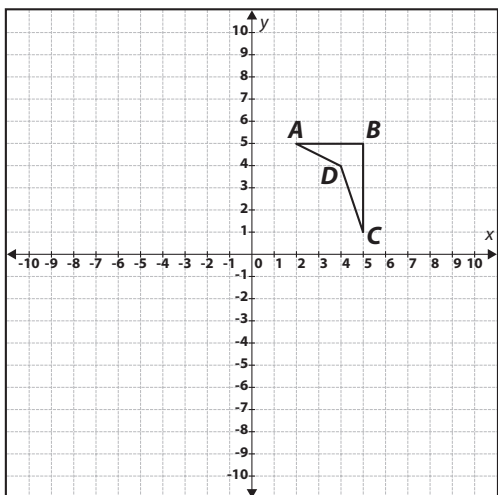
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

For problems 4–10, use the given rigid motion to predict the effect(s) it will have on the given figure.

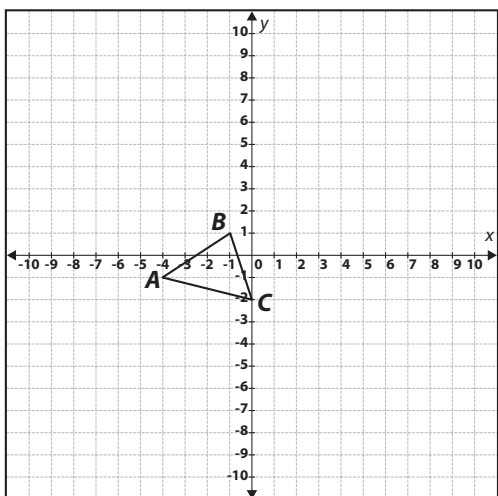
4. Rotate the given triangle 120° counterclockwise about the origin.



5. Translate the given quadrilateral to the left 6 units and down 5 units.

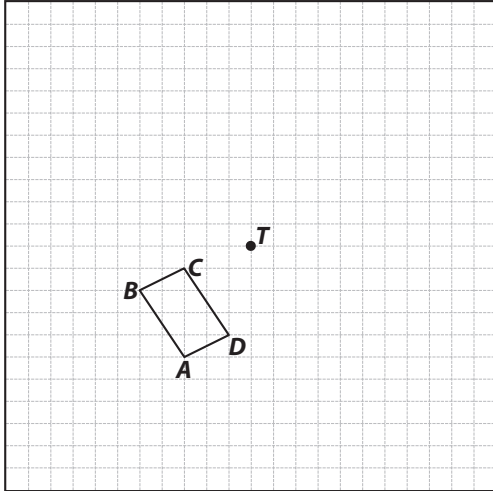


6. Reflect the given triangle over the line $x = 3$.

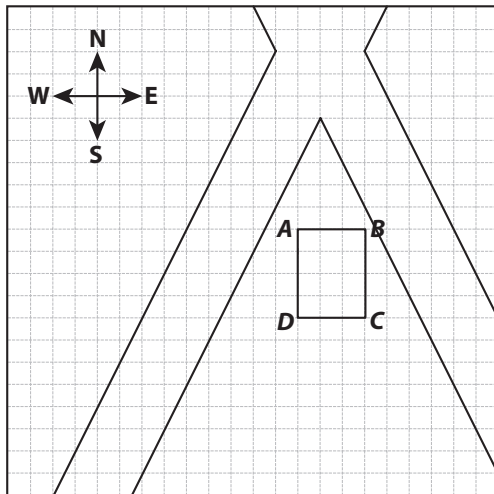
**continued**

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

7. An interior designer wants to rotate the couch in a family room 60° about the center of the coffee table, T . What will be the final position of the couch?

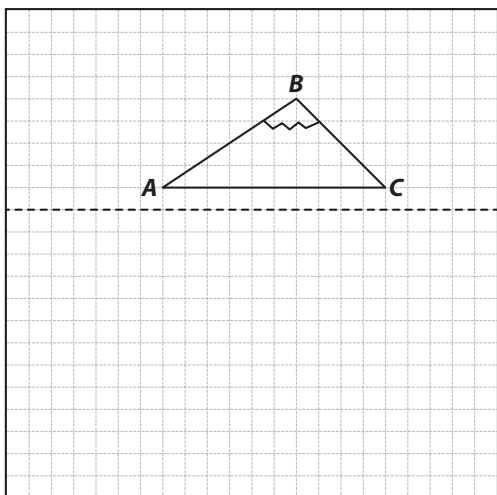


8. Due to the widening of a road, a house needs to be moved west 8 feet and south 32 feet. The house is shown as $\square ABCD$ in the diagram below. Each square on the grid represents 8 feet. What will be the final position of the house?

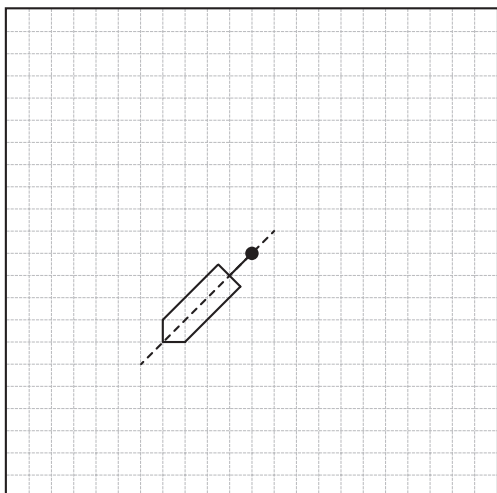
**continued**

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

9. Artists often paint the reflection of a mountain peak in a nearby body of water. Reflect the mountain over the body of water represented by the dashed line.



10. A ceiling fan has 4 paddles that are separated by a constant angle of rotation. Each paddle has a line of symmetry, as shown in the diagram below. Describe a series of rigid motions that can be performed with the figure below to generate a ceiling fan with 4 paddles. Keep in mind that there are 360° degrees of rotation to bring a figure back onto itself. Draw the figure of the completed fan.



Name:

Date:

Notes

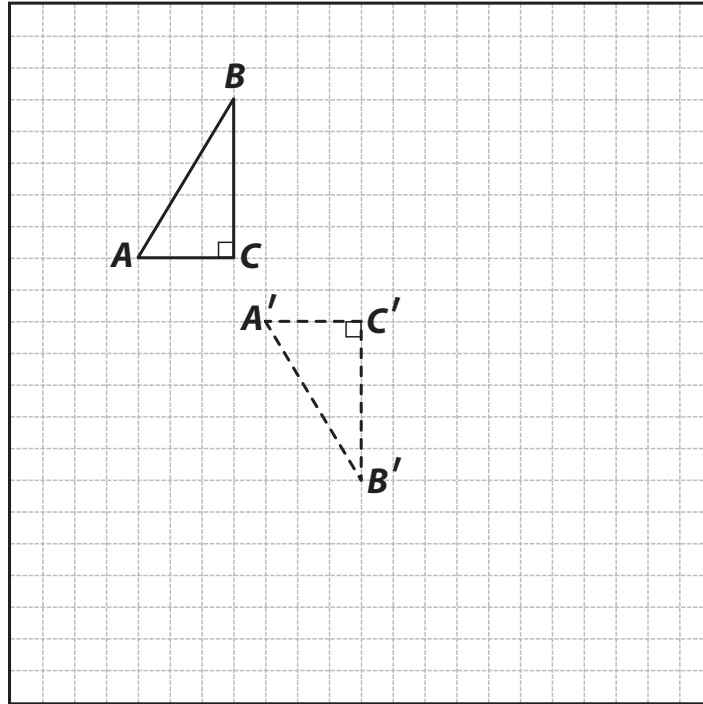
Name:

Date:

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Scaffolded Practice 5.5.2****Example 1**

Determine if the two figures below are congruent by identifying the transformations that have taken place.

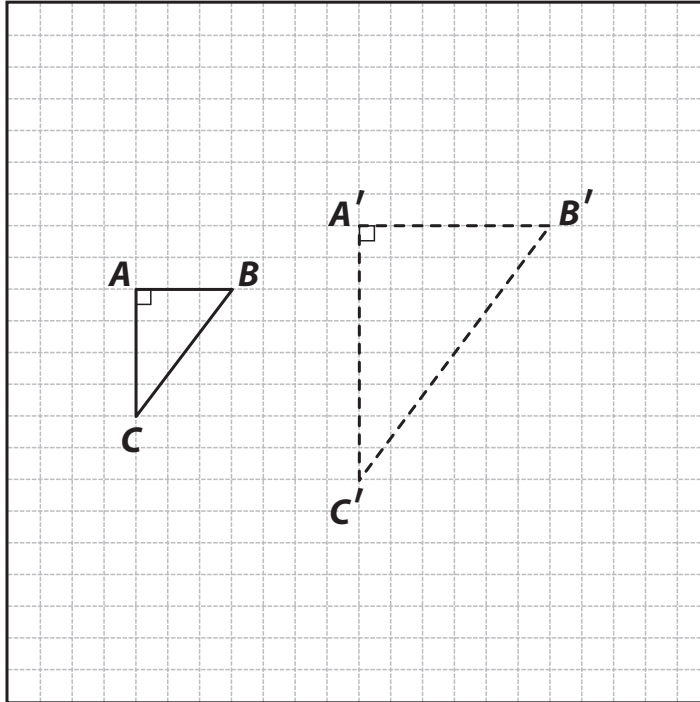


1. Determine the lengths of the sides.
2. Identify the transformations that have occurred.
3. State the conclusion.

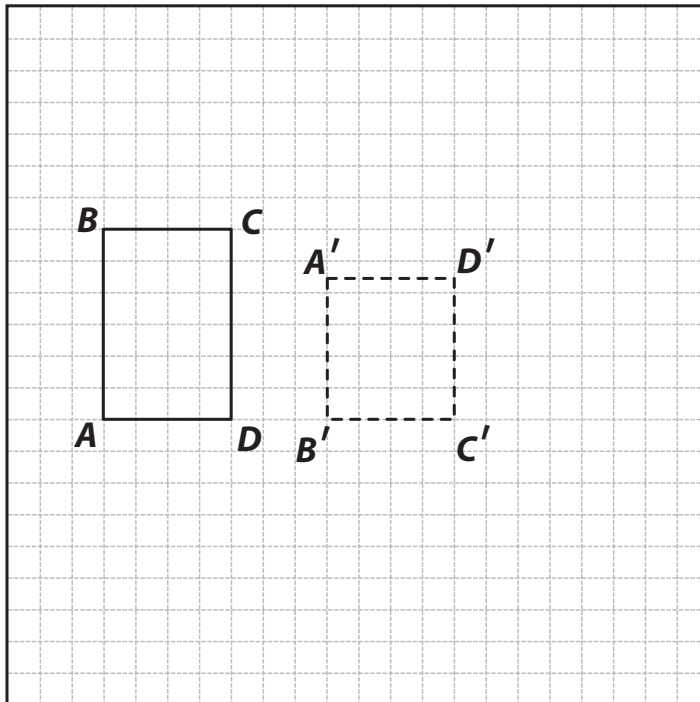
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Example 2**

Determine if the two figures below are congruent by identifying the transformations that have taken place.

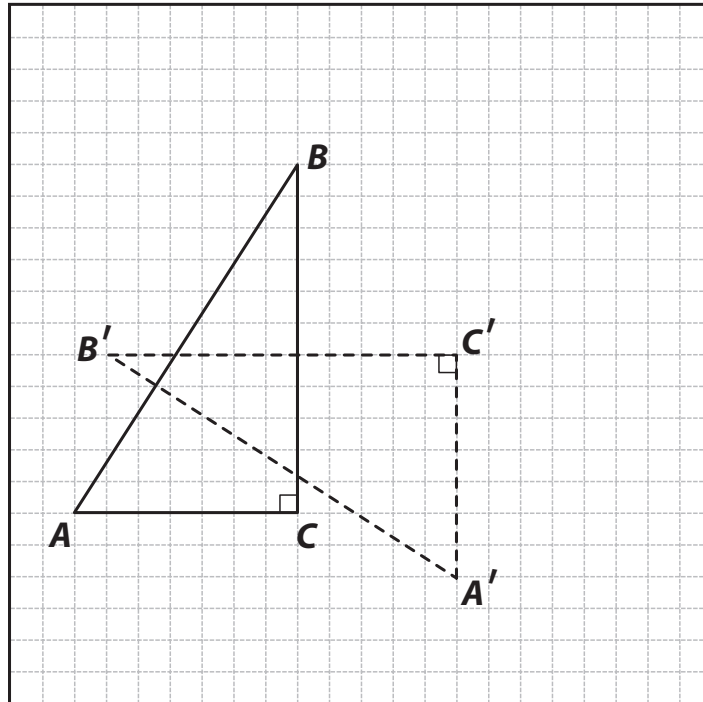
**Example 3**

Determine if the two figures below are congruent by identifying the transformations that have taken place.

*continued*

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Example 4**

Determine if the two figures below are congruent by identifying the transformations that have taken place.



Name: _____

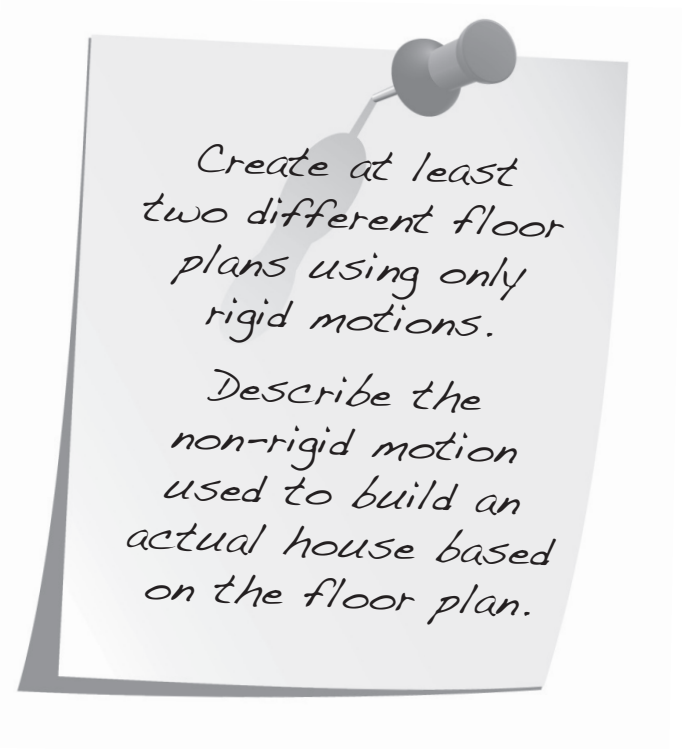
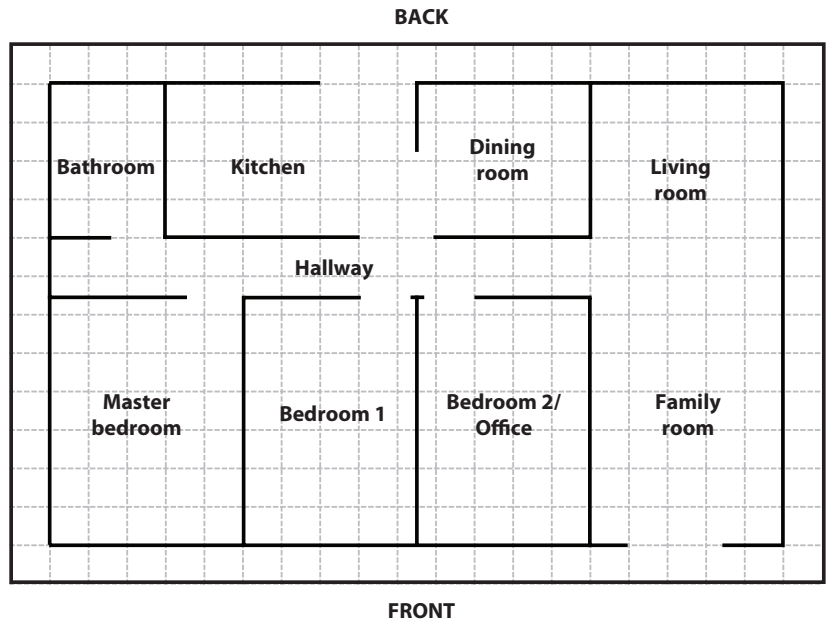
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 5: Exploring Congruence

Problem-Based Task 5.5.2: Architectural Planning

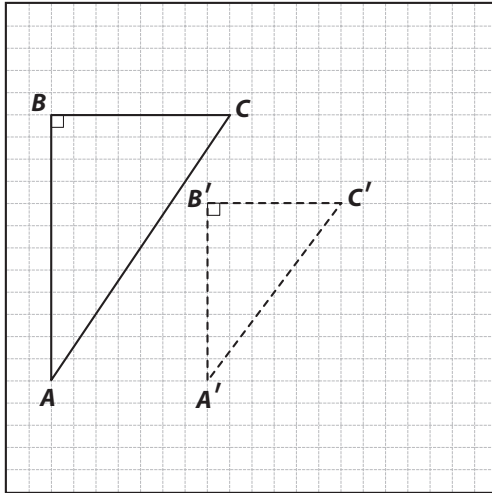
Architects use scale drawings to map out floor plans of houses. In the floor plan below, $\frac{1}{4}$ inch equals 24 inches in the actual house. An architect is creating a housing development of 10 houses. She plans to use one basic floor plan and then use rigid motions to adjust the rooms to create a different look for the 10 houses. Using the floor plan provided to the right, create at least two different floor plans using only rigid motions. Describe the non-rigid motion used to build an actual house based on the floor plan.



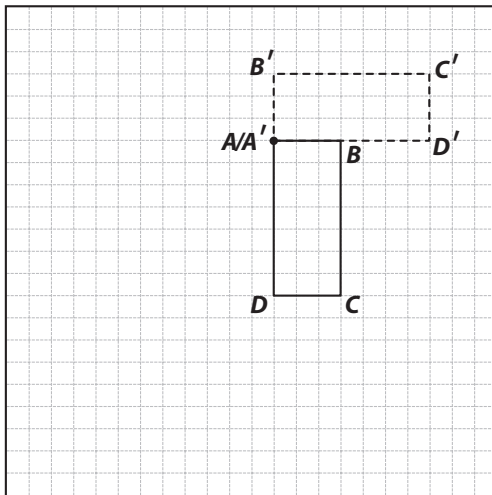
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence****Practice 5.5.2: Defining Congruence in Terms of Rigid Motions**

Determine if the two given figures are congruent by identifying the transformation(s) that occurred. State whether each transformation is rigid or non-rigid.

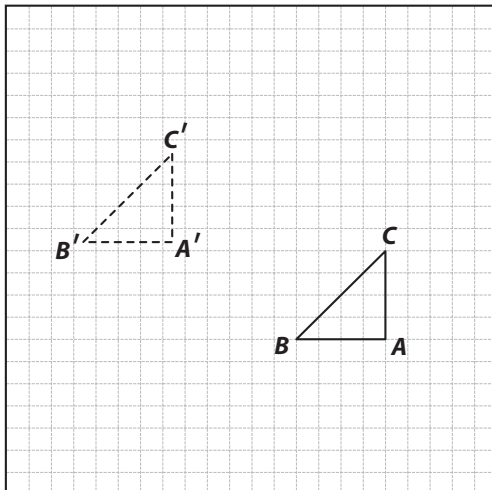
1.



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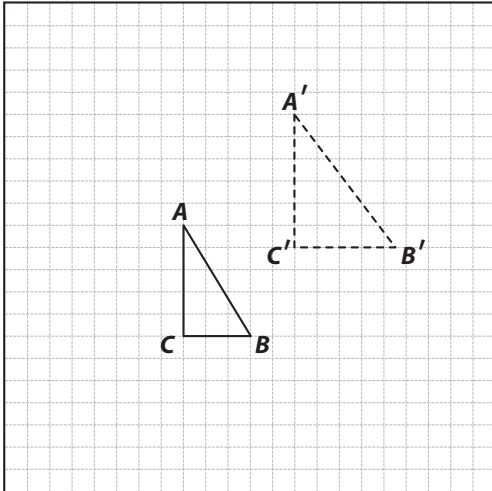
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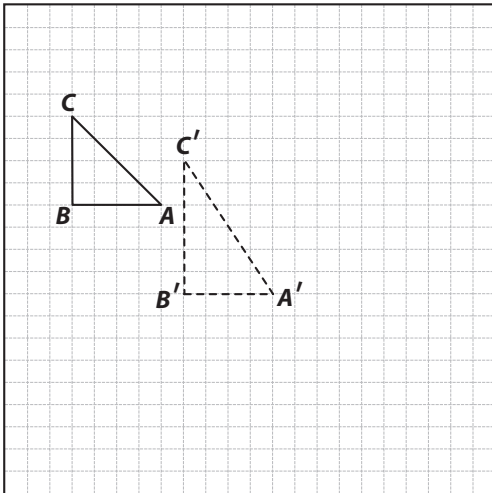
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 5: Exploring Congruence

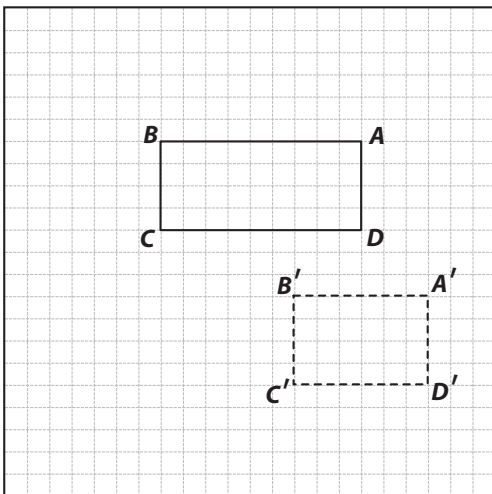
4.



5.



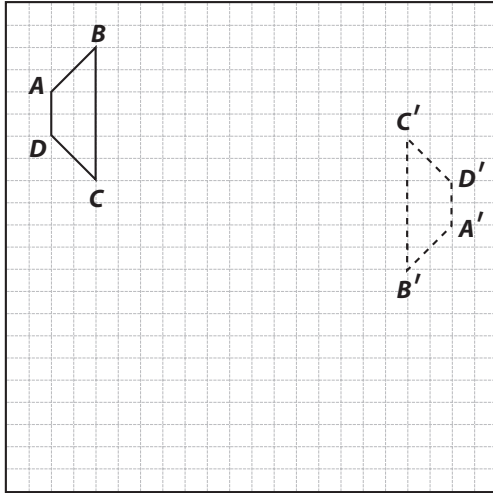
6.



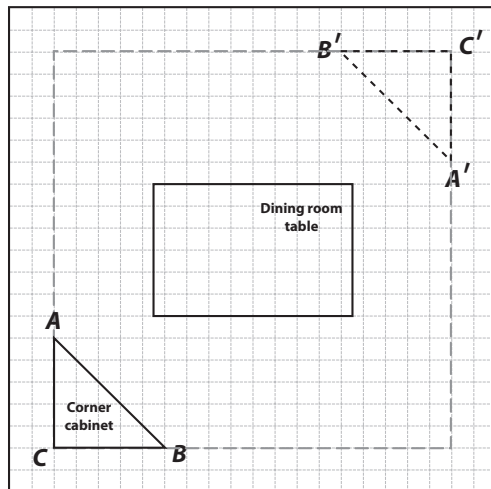
continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

7. Xander is rearranging the setup in the school gym for a large presentation. He has to move the speaker to make room for chairs. The diagram of how the speaker is transformed is pictured below. Describe the transformations that have taken place and determine whether the figures are congruent in terms of rigid and non-rigid motions.

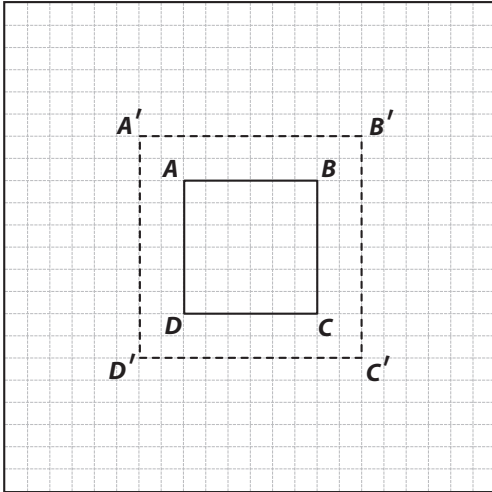


8. A corner cabinet sits in the dining room as pictured below, where the gray line represents the walls of the room. The new location of the corner cabinet is seen as the triangle labeled $A'B'C'$ in the diagram. Describe the transformations that have taken place and determine whether the figures representing the corner cabinet are congruent in terms of rigid and non-rigid motions.

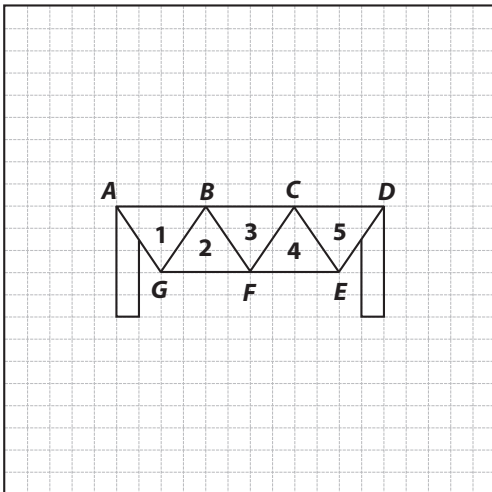
*continued*

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 5: Exploring Congruence**

9. The picture frame pictured below can be thought of as a square inside another square. Describe the transformations that have taken place and determine whether the squares are congruent in terms of rigid and non-rigid motions.



10. A truss is a structure used in building bridges. The bridge truss pictured below is made up of 5 triangles. Describe the transformations that have taken place and determine whether the triangles are congruent in terms of rigid and non-rigid motions.



Name:

Date:

Notes

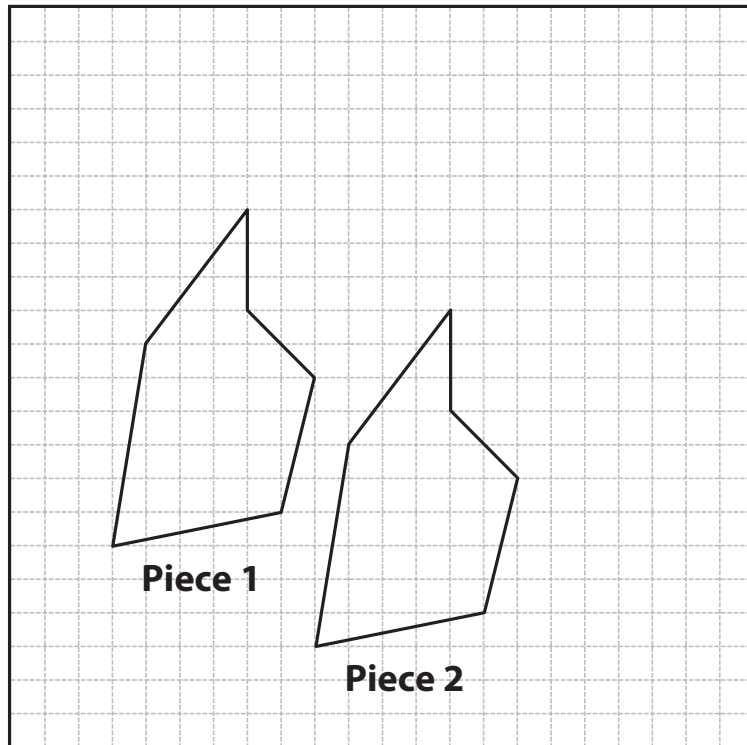
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Lesson 5.6.1: Triangle Congruency****Warm-Up 5.6.1**

Cutting mats used in crafting are similar to coordinate planes, except that the axes are labeled with inches or centimeters, rather than positive and negative numbers. Juliet is in the middle of a sewing project and has laid out two congruent pieces of fabric on her cutting mat.



1. What is the series of transformations that has taken place between Piece 1 and Piece 2?

continued

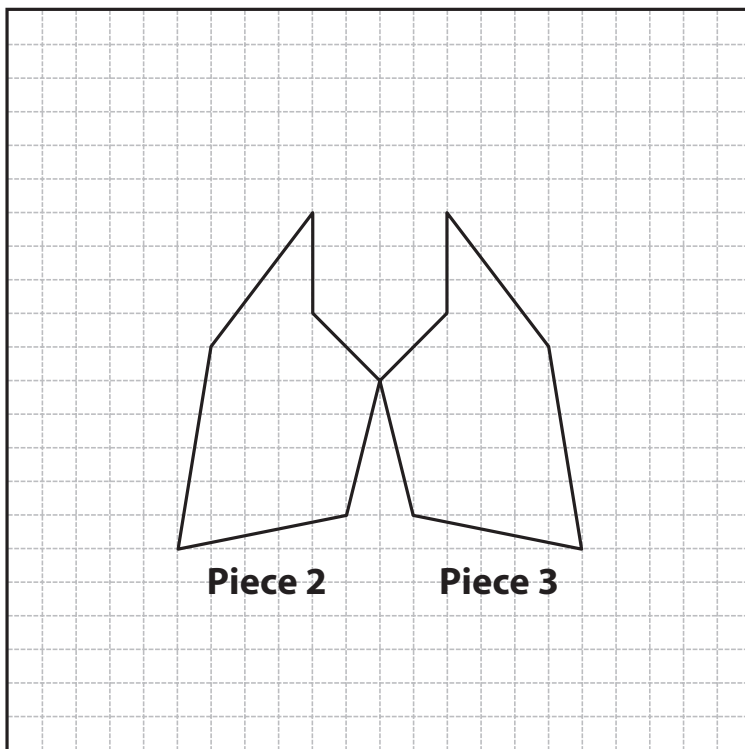
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 6: Congruent Triangles

Juliet takes Piece 1 off the mat. She places a third piece of fabric on the cutting mat.

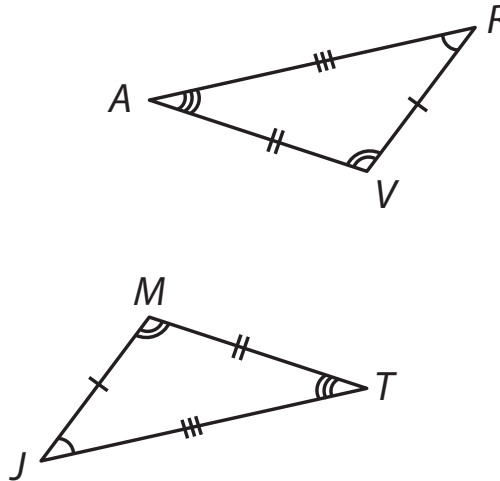


2. What is the series of transformations that has taken place between Piece 2 and Piece 3?

3. Is Piece 3 congruent to Piece 1? Explain your reasoning.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Scaffolded Practice 5.6.1****Example 1**

Use corresponding parts to identify the congruent triangles.



1. Match the number of tick marks to identify the corresponding congruent sides.
2. Match the number of arcs to identify the corresponding congruent angles.
3. Order the congruent angles to name the congruent triangles.

continued

Name: _____

Date: _____

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 6: Congruent Triangles

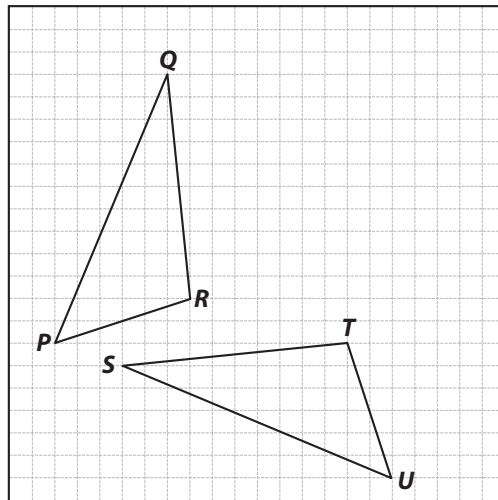
Example 2

$$\triangle BDF \cong \triangle HJL$$

Name the corresponding angles and sides of the congruent triangles.

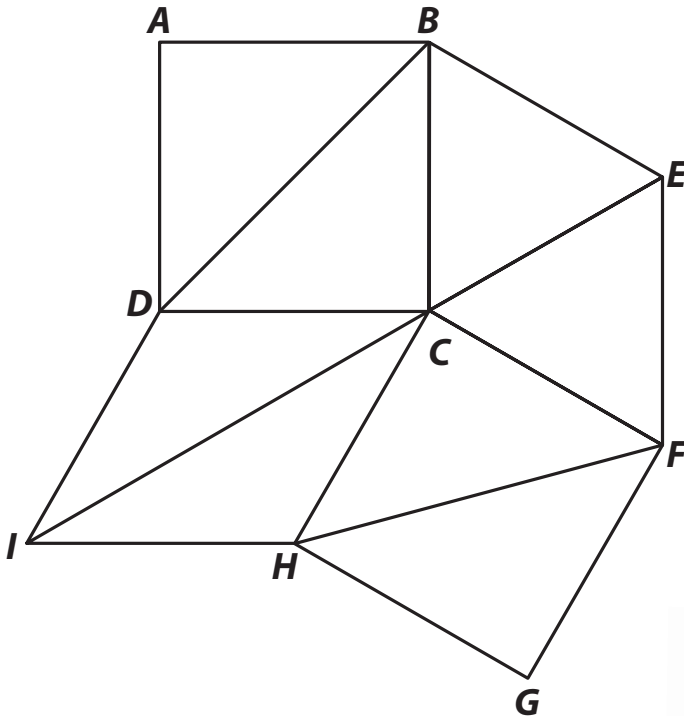
Example 3

Use construction tools to determine if the triangles are congruent. If they are, name the congruent triangles and corresponding angles and sides.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Problem-Based Task 5.6.1: Stained Glass Pattern, Part I**

Mary creates stained glass art. She is in the planning stages of creating a new piece and has found a pattern she really likes. Mary studies the pattern to determine which triangles in the pattern are congruent, so that she can cut the correct size pieces of glass. Pictured below is a portion of the pattern. Use the pattern and the information that follows to determine which triangles are congruent. How could Mary use this information to help plan her project?



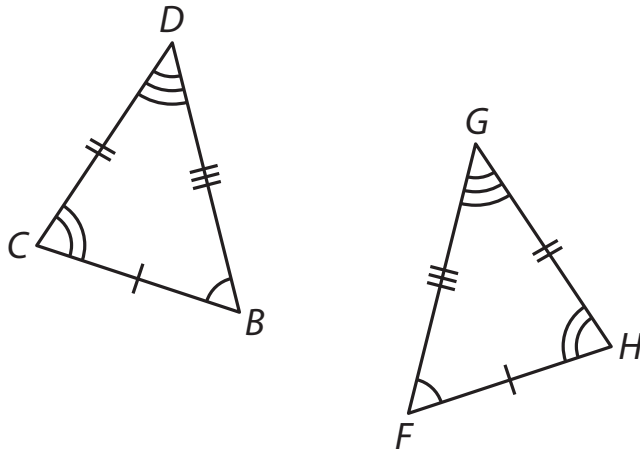
- $\square ABCD$ and $\square CFGH$ are squares. Each diagonal of a square bisects an opposite pair of angles.
- $\square BEFC$ and $\square DCHI$ are rhombuses. The diagonals of a rhombus bisect the opposite pairs of angles. Remember that opposite pairs of angles are congruent.
- $\overline{EC} \cong \overline{BC}$



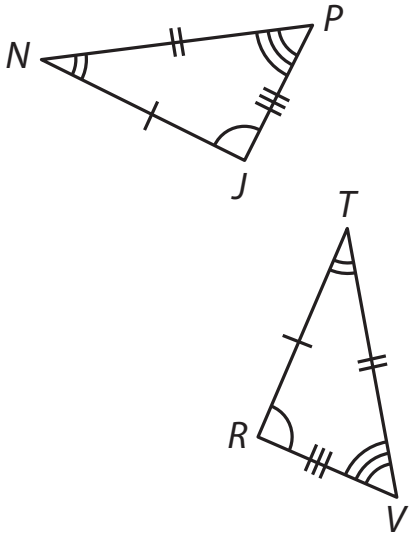
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Practice 5.6.1: Triangle Congruency**

Use the diagrams to correctly name each set of congruent triangles according to their corresponding parts.

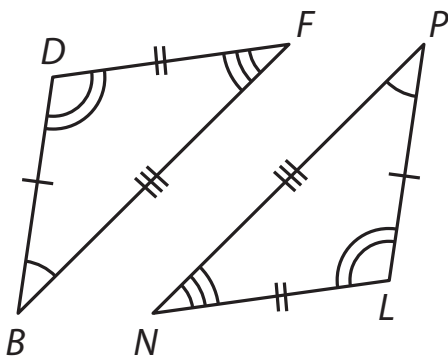
1.



2.



3.

**continued**

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles**

Name the corresponding angles and sides for each pair of congruent triangles.

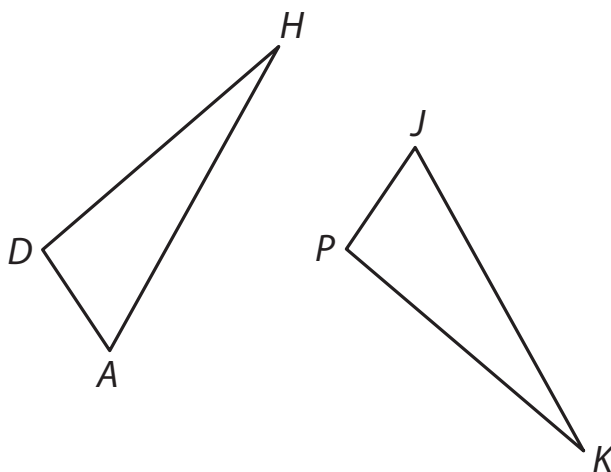
4. $\triangle QRS \cong \triangle WXY$

5. $\triangle AFH \cong \triangle CGJ$

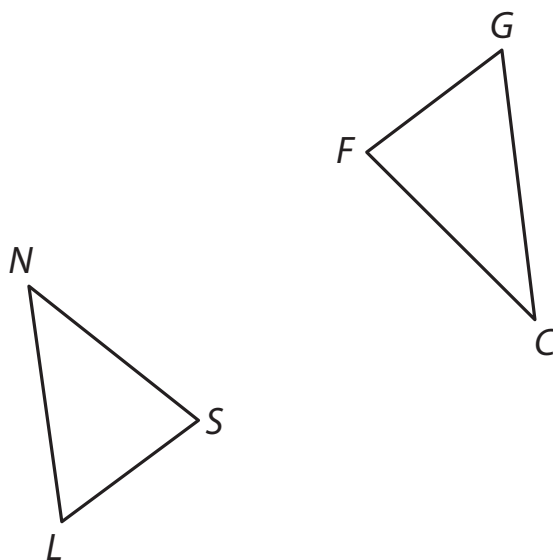
6. $\triangle LPQ \cong \triangle HJK$

Use a ruler and a protractor or construction tools to determine if the triangles are congruent. If they are, name the congruent triangles and their corresponding angles and sides.

7. An architect has two versions of a blueprint. Both blueprints contain a ramp. Are the ramps congruent?

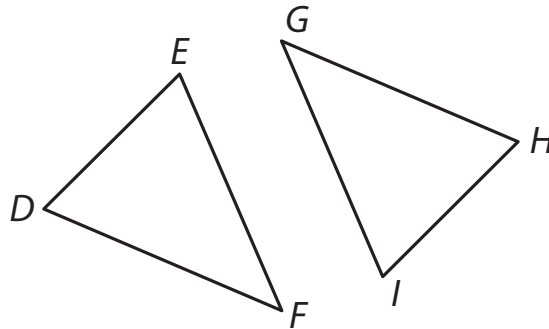


8. A recent delivery to a construction site included several trusses for a new roof structure. Two of the trusses are shown below. Are the trusses congruent?

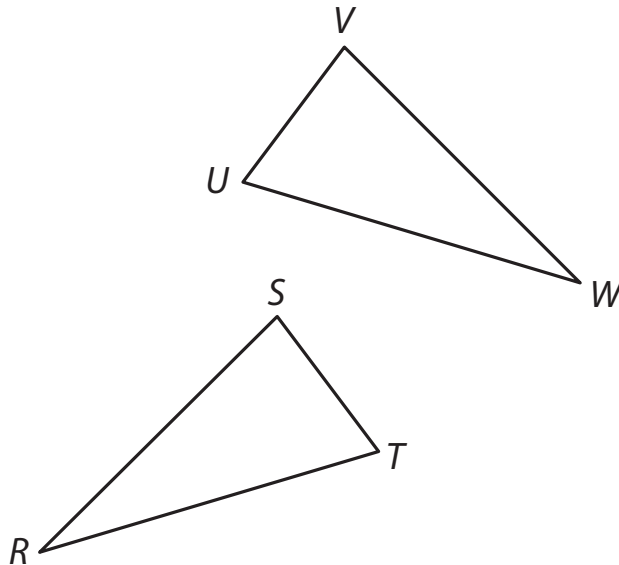
**continued**

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles**

9. Dave is making a blanket out of his old band shirts and has pre-cut several pieces of fabric. Are the T-shirt pieces congruent?



10. A tile installer wants to replace a broken tile with a scrap piece he has from a recent job. Is the scrap piece of tile congruent to the tile that needs replacement?



Name:

Date:

Notes

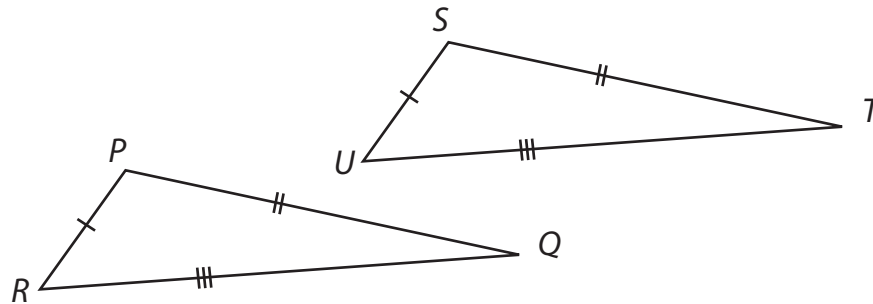
Name: _____

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Scaffolded Practice 5.6.2****Example 1**

Determine which congruence statement, if any, can be used to show that $\triangle PQR$ and $\triangle STU$ are congruent.

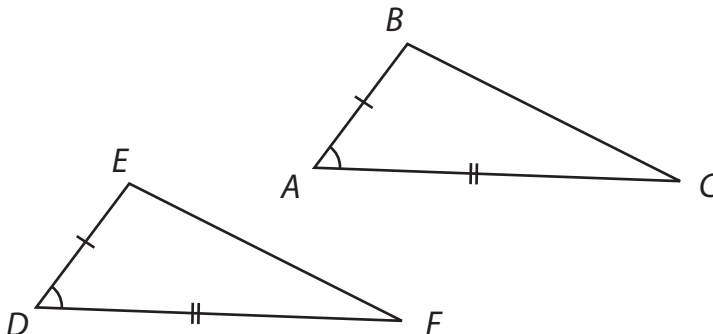


1. Determine which components of the triangles are congruent.
2. Determine if this information is enough to state that all six corresponding parts of the two triangles are congruent.
3. Summarize your findings.

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Example 2**

Determine which congruence statement, if any, can be used to show that $\triangle ABC$ and $\triangle DEF$ are congruent.

**Example 3**

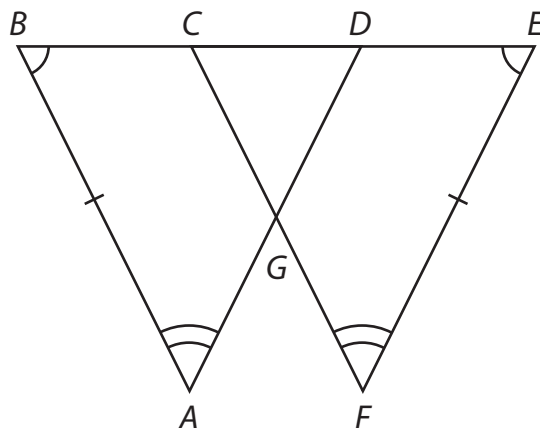
Determine which congruence statement, if any, can be used to show that $\triangle HIJ$ and $\triangle KLM$ are congruent if $\overline{HI} \cong \overline{KL}$, $\angle H \cong \angle K$, and $\angle I \cong \angle L$.

Example 4

Determine which congruence statement, if any, can be used to show that $\triangle PQR$ and $\triangle STU$ are congruent if $\overline{PQ} \cong \overline{ST}$, $\overline{PR} \cong \overline{SU}$, and $\angle Q \cong \angle T$.

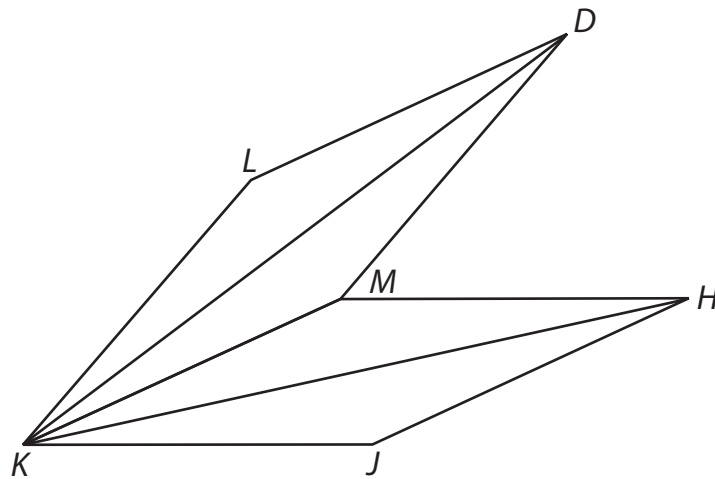
Example 5

Determine which congruence statement, if any, can be used to show that $\triangle ABD$ and $\triangle FEC$ are congruent.



UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Problem-Based Task 5.6.2: Stained Glass Pattern, Part II**

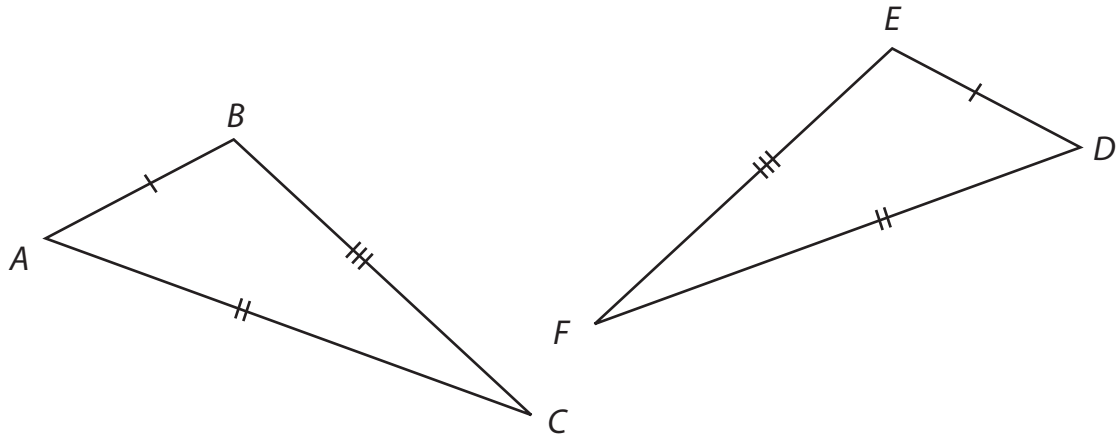
Mary is making a new stained glass art piece, as shown in the diagram below. As she studied the pattern, she recognized two rhombuses, each with a diagonal. She concluded that all the triangles in the pattern are congruent. Can Mary confidently state that all the triangles are congruent without using measuring tools? Use what you know about congruent triangles to prove or disprove her theory, and explain your reasoning. Remember that rhombuses have opposite angles that are congruent. Also, the diagonal of a rhombus bisects opposite angles.



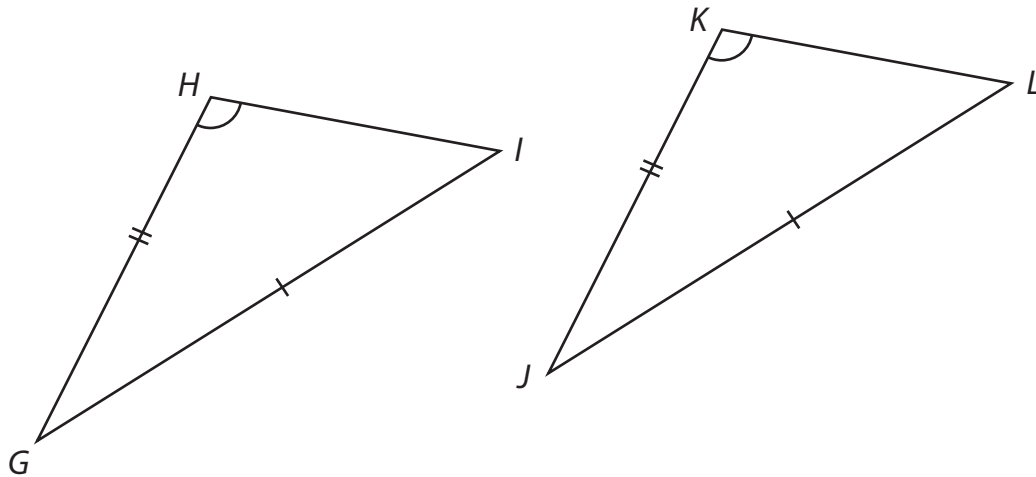
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles****Practice 5.6.2: Explaining ASA, SAS, and SSS**

For each diagram, determine which congruence statement can be used to show that the triangles are congruent. If it is not possible to prove triangle congruence, explain why not.

1.

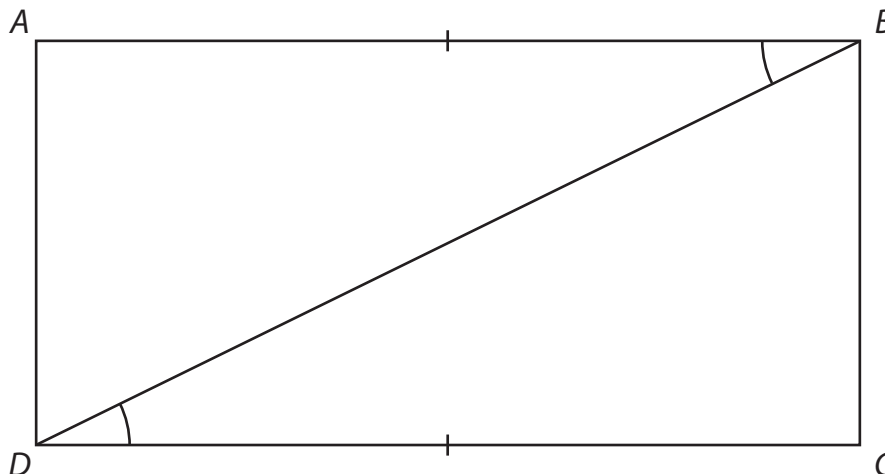


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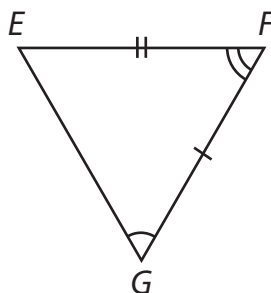
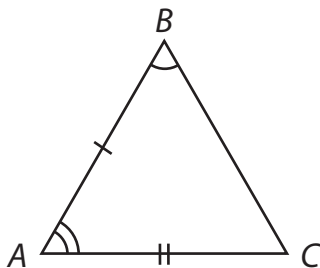
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles**

3. Based on the information in the diagram, is $\triangle ABD$ congruent to $\triangle CDB$?



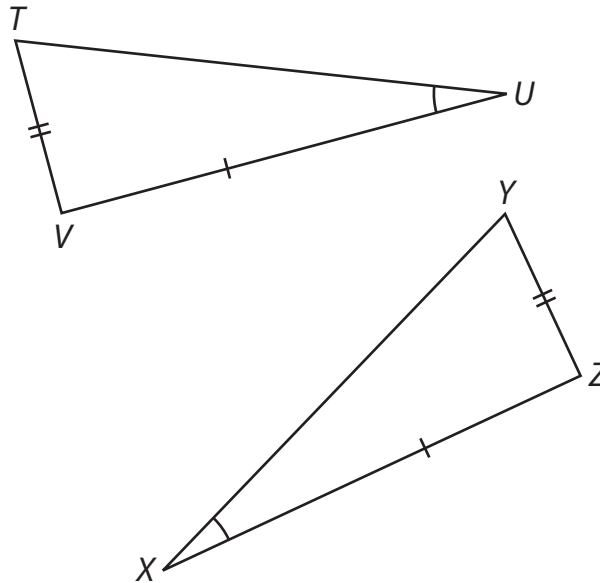
Use the given information to determine which congruence statement can be used to show that the triangles are congruent. If it is not possible to prove triangle congruence, explain why not.

4. $\triangle STU$ and $\triangle VWX$: $\angle S \cong \angle V$, $\angle T \cong \angle W$, and $\overline{ST} \cong \overline{VW}$
5. $\triangle MNO$ and $\triangle PQR$: $\angle O \cong \angle R$, $\overline{MO} \cong \overline{PR}$, and $\overline{NO} \cong \overline{QR}$
6. $\triangle GHI$ and $\triangle JKL$: $\angle G \cong \angle H$, $\overline{HI} \cong \overline{KL}$, $\angle J \cong \angle K$
7. Jessalyn found two vintage road signs at a thrift store. She is re-decorating her room and congruency is important for her decor. Based on the information about each sign shown in the diagram below, determine if the triangles are congruent. If so, name the congruent triangles and identify the congruence statement used.

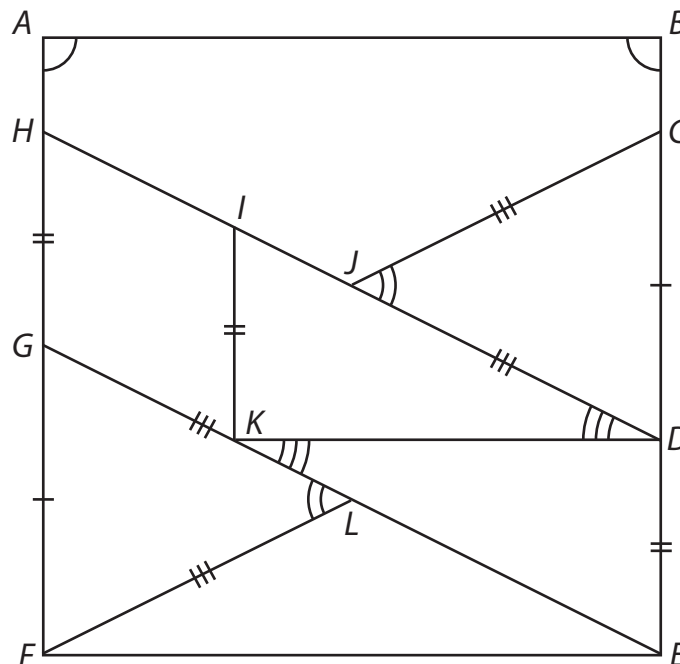
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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Lesson 6: Congruent Triangles**

8. Isaac needs two congruent sails for his sailboat. The boat supply shop has only two sails in stock. Based on the information about each sail, determine if the sails are congruent. If so, name the congruent triangles and identify the congruence statement used.



The diagram below represents a plot of land in the town of Willow Woods. Use this diagram to solve problems 9 and 10.

**continued**

Name: _____

Date: _____

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Lesson 6: Congruent Triangles

9. The Kim family owns the plot of land marked by $\triangle IKD$ and the Reed family owns the plot of land marked $\triangle KDE$. Are the plots of land congruent? Explain your reasoning.

10. The Larsen family owns the plot of land marked by $\triangle FGL$ and the Rodriguez family owns the plot of land marked by $\triangle CDJ$. Are the two plots of land congruent? Explain your reasoning.

Name: _____

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Notes

Name:

Date:

Notes

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Station 1

At this station, you will find white paper, graph paper, scissors, tape, three toothpicks, and a ruler. Work as a group to construct the polygons and answer the questions.

On your graph paper, draw an x - and y -axis with the origin through the center of the paper.

On the white paper, draw an isosceles triangle with side lengths of 2 inches, 2 inches, and 1 inch. Cut the triangle out of the paper.

Tape the toothpick to the base of the triangle to create a triangle “lollipop.”

1. Place the free end of the toothpick on the point $(4, 0)$. Place the triangle so it is in the first quadrant.

What are the vertices of the triangle?

2. Now place the free end of the toothpick on the point $(4, 0)$ again, but place the triangle in the fourth quadrant.

What are the vertices of this triangle?

3. Are the two triangles congruent? Explain your answer.

Are the two triangles symmetric? What is the line of symmetry?

4. What transformation did you perform between the first and second triangle?

continued

Name: _____

Date: _____

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 1: Rotations and Reflections

5. Which axis or point did you perform this transformation across?

6. Work as a group to construct a pentagon “lollipop.” Reflect the pentagon across the y -axis.

What are the vertices of the first pentagon?

What are the vertices of the second pentagon?

Are the two pentagons congruent? Explain your answer.

Are the two pentagons symmetric? What is the line of symmetry?

7. Work as a group to construct a trapezoid. Reflect the trapezoid about the line $y = x$.

What are the vertices of the first trapezoid?

What are the vertices of the second trapezoid?

continued

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 1: Rotations and Reflections

Are the trapezoids congruent? Explain your answer.

Are the trapezoids symmetric? What is the line of symmetry?

8. Based on your observations in problems 1–7, do reflections create congruent figures? Do reflections create symmetric figures? Explain your answer to each question.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Station 2

At this station, you will find white paper, graph paper, a cork board, scissors, push pins, a protractor, and a ruler. Work as a group to construct the polygons and perform the transformations.

On your graph paper, draw an x - and y -axis with the origin through the center of the paper.

1. On the white paper, draw an equilateral triangle with side lengths of 1 inch. Cut the triangle out of the paper.

Place one vertex of the triangle at the point $(5, 5)$. Use the push pin and cork board to secure the vertex at this point.

What are the vertices of the triangle?

2. Rotate the triangle 90° using the push pin as the point of rotation.

What are the vertices of the triangle?

Are the two triangles congruent? Explain your answer.

Remove the push pin.

3. Poke the push pin through the center of the triangle. Then push the pin into the coordinate $(5, 5)$.

Rotate the triangle 90° using the push pin as the point of rotation.

Does the triangle look the same as it did before you rotated it?

Rotate the triangle another 90° using the push pin as the point of rotation.

Does the triangle look the same as it did before you rotated it?

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Rotate the triangle 90° using the push pin as the point of rotation.

Does the triangle look the same as it did before you rotated it?

Rotate the triangle another 90° using the push pin as the point of rotation.

Does the triangle look the same as it did before you rotated it?

How many times would the triangle match itself during a 360° rotation?

At what degrees of rotation would the triangle match itself?

Does the equilateral triangle have rotational symmetry? If so, what order? Explain your answer.

4. Repeat problem 3 for a rectangle.

How many times did the rectangle match itself during the 360° rotation?

At what degrees of rotation did the rectangle match itself?

Does the rectangle have rotational symmetry? If so, what order? Explain your answer.

5. Does a square have rotational symmetry? If so, what order? Explain your answer.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Station 3

At this station, you will find graph paper and a ruler. Work as a group to construct the polygons and answer the questions.

On your graph paper, draw an x - and y -axis with the origin through the center of the paper.

On your graph paper, construct an irregular hexagon that has vertices $(1, 1)$, $(5, 1)$, $(6, 3)$, $(5, 5)$, $(1, 5)$, and $(0, 3)$.

1. Reflect the figure across the y -axis.

What are the vertices of this figure?

Are the two figures congruent?

2. Reflect the original figure across the x -axis.

What are the vertices of this figure?

Are the three figures congruent?

3. Katy says that the vertices of the figure from problem 1 reflected across the x -axis are $(1, 1)$, $(5, 1)$, $(6, -3)$, $(5, -5)$, $(1, -5)$, and $(0, -3)$. Is she correct?

If not, what are the correct vertices?

If Katy didn't reflect the figure across the x -axis, what line of symmetry did she use?

Perform this reflection on your graph paper to justify your answer.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Station 4

At this station, you will find graph paper, a protractor, and a ruler. Work together to construct the polygons and answer the questions.

On your graph paper, draw an x - and y -axis with the origin through the center of the paper.

1. On your graph paper, construct an octagon in the first quadrant.

What are the vertices of the octagon?

How many units on the graph paper can you shade in the octagon?

2. Rotate the octagon 180° about the origin.

What are the vertices of this octagon?

How many units on the graph paper can you shade in this octagon?

3. Should the number of units on the graph paper shaded in for each octagon be equal? Why or why not?

4. Construct a regular pentagon with side lengths of 5 units. (Each interior angle is 108° .)

What are the vertices of this regular pentagon?

Rotate the pentagon about its center.

How many times does the pentagon match in rotational symmetry?

continued

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 1: Rotations and Reflections

5. Construct an irregular pentagon in the second quadrant.

What are the vertices of this irregular pentagon?

Rotate the pentagon about its center.

How many times does the pentagon match in rotational symmetry?

6. Based on your observations in problems 4 and 5, what can you say about rotational symmetry for regular polygons?

What can you say about rotational symmetry for irregular polygons?

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 1: Rotations and Reflections**

Station 5

At this station, you will find graph paper and a ruler. Work as a group to construct the polygons and answer the questions.

On your graph paper, draw an x - and y -axis with the origin through the center of the paper.

1. On your graph paper, construct a triangle with vertices $(-5, 2)$, $(-1, 4)$, and $(-5, 5)$.

What type of triangle have you created?

Is this triangle a regular polygon? Why or why not?

2. Translate the triangle 6 units to the right.

What are the vertices of this triangle?

Are the two triangles congruent?

3. On a new graph, construct a square with vertices $(1, 1)$, $(5, 1)$, $(1, 5)$, and $(5, 5)$.

Is this square a regular polygon? Why or why not?

4. Translate the square 10 units down and 4 units to the left.

What are the vertices of this square?

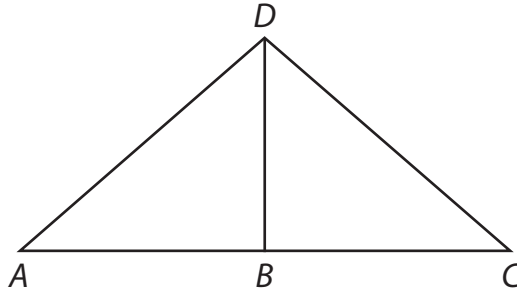
Are the two squares congruent?

5. Based on your observations in problems 1–4, do translations yield congruent figures? Justify your answer.

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 2: Corresponding Parts, Transformations, and Proof****Station 1**

At this station, you will find a ruler and a protractor. Work as a group to answer the questions.

Amir is building a doghouse. He sketched this diagram of the roof:



It is important that the roof is symmetrical. Therefore, $\triangle DBA \cong \triangle DBC$.

1. How can you use your ruler to show that $\triangle DBA \cong \triangle DBC$ and $\overline{AB} \cong \overline{BC}$?

2. How can you use your protractor to show that $\triangle DBA \cong \triangle DBC$ and $\overline{AB} \cong \overline{BC}$?

3. What if you didn't have a ruler or protractor? How could you use the angle and side properties of triangles to prove that $\triangle DBA \cong \triangle DBC$ and $\overline{AB} \cong \overline{BC}$?

For example, if it is given that $\overline{DC} \cong \overline{DA}$ and $\overline{DB} \perp \overline{AC}$, how can you prove that $\triangle DBA \cong \triangle DBC$ and $\overline{AB} \cong \overline{BC}$?

continued

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 2: Corresponding Parts, Transformations, and Proof**

Station 2

At this station, you will find graph paper, a ruler, push pins, cardboard, and rubber bands. Mount the graph paper on cardboard. Create an x - and y -axis on your graph paper.

1. As a group, construct a triangle on your graph paper by placing push pins at the points $(-7, -7)$, $(7, -7)$, and $(7, 9)$. Place a rubber band around pairs of push pins to create a triangle.
2. Construct a second triangle on your graph paper by placing push pins at the points $(-8, -2)$, $(6, -2)$, and $(6, 14)$. Place a rubber band around pairs of push pins to create a triangle.

Is this triangle congruent to the triangle in problem 1? Why or why not?

If the two triangles are not congruent, how can you modify the second triangle so it is congruent to the first triangle?

3. Construct a third triangle on your graph paper by placing push pins at the points $(-14, 4)$, $(7, 4)$, and $(7, 20)$. Place a rubber band around pairs of push pins to create a triangle.

Is this triangle congruent to the triangle in problem 1? Why or why not?

continued

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 2: Corresponding Parts, Transformations, and Proof

If the two triangles are not congruent, how can you modify the third triangle so it is congruent to the first triangle?

Remove all the push pins and rubber bands from the graph.

4. On your graph paper, construct a triangle by placing push pins at the points $(0, -5)$, $(8, -5)$, and $(0, 5)$. Place one rubber band around all of the push pins to create a triangle.
5. Construct a second triangle by dilating the first triangle to twice its size about the origin, $(0, 0)$.
At what points did you place the push pins for this new triangle?
6. Are the triangles you created in problems 4 and 5 congruent? Why or why not?

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 2: Corresponding Parts, Transformations, and Proof****Station 3**

At this station, you will find graph paper, a ruler, and a cardboard triangle.

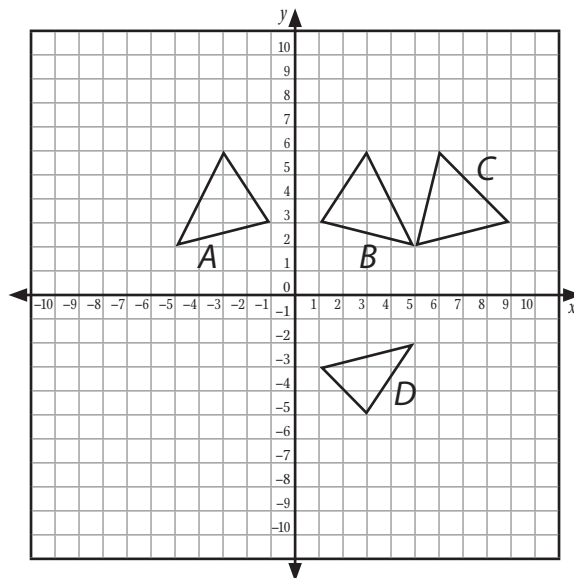
Create an x - and y -axis on your graph paper and work together to answer the questions.

1. On your graph paper, construct a triangle that has vertices $(4, 2)$, $(7, 2)$, and $(7, 7)$.
Reflect this triangle across the y -axis. What are the vertices of this new triangle?

Reflect this second triangle across the x -axis. What are the vertices of this new triangle?

Are the three triangles congruent? Why or why not?

Use the following diagram to answer question 2.



2. Which triangles are congruent? Explain your answer.

continued

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UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 2: Corresponding Parts, Transformations, and Proof

3. On a new graph, place the cardboard triangle so its vertices are at $(4, 4)$, $(10, 4)$, and $(6, 12)$. Trace the cardboard triangle.

Rotate the cardboard triangle 90° about the point $(4, 4)$. Trace the cardboard triangle. Are the triangles congruent?

4. Based on your observations in problems 1–3, when properly reflecting or rotating triangles, they are congruent if they:

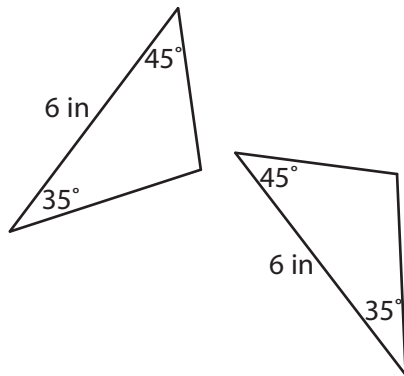
UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS**Station Activities Set 2: Corresponding Parts, Transformations, and Proof****Station 4**

At this station, you will find four index cards with the following written on them:

SSS; SAS; ASA; AAS

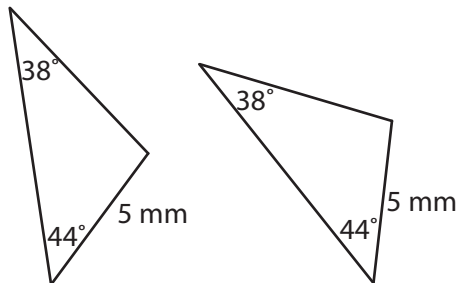
Work as a group to match each index card to the following real-world situations described.

1. A stained glass window contains two triangles.



Matching index card: _____

2. Anna creates earrings in the shape of scalene triangles.



Matching index card: _____

continued

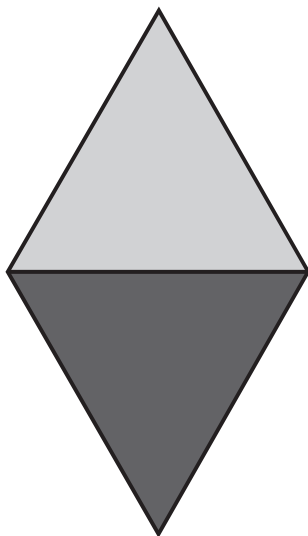
Name: _____

Date: _____

UNIT 5 • CONGRUENCE, PROOF, AND CONSTRUCTIONS

Station Activities Set 2: Corresponding Parts, Transformations, and Proof

3. Peter designed a logo for his design company. Each triangle has side lengths of 3 inches, 3 inches, and 3 inches.



Matching index card: _____

4. Janice designed two new buttons for her website. One button was a purple isosceles triangle with a 30° angle between the congruent sides. The other button was a green isosceles triangle with a 30° angle between the congruent sides.

Matching index card: _____

5. What strategy did you use to match the cards?

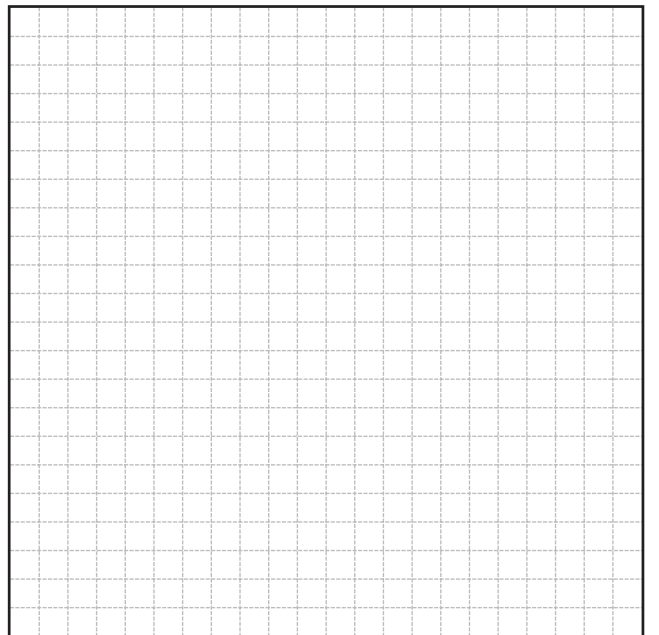
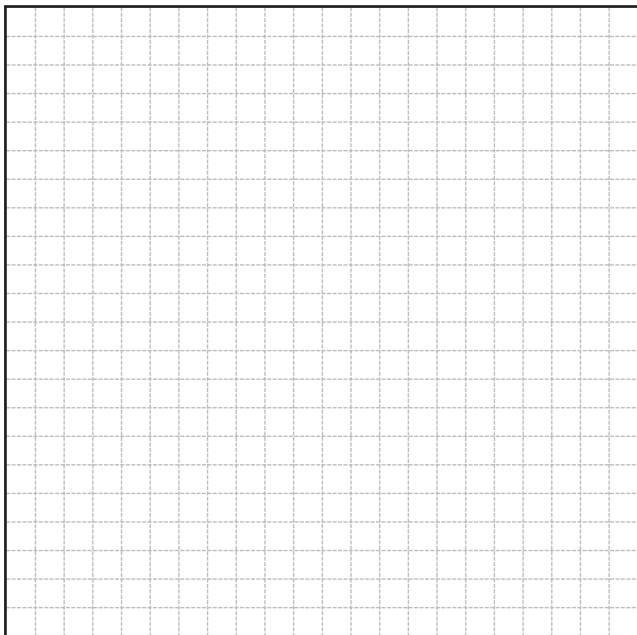
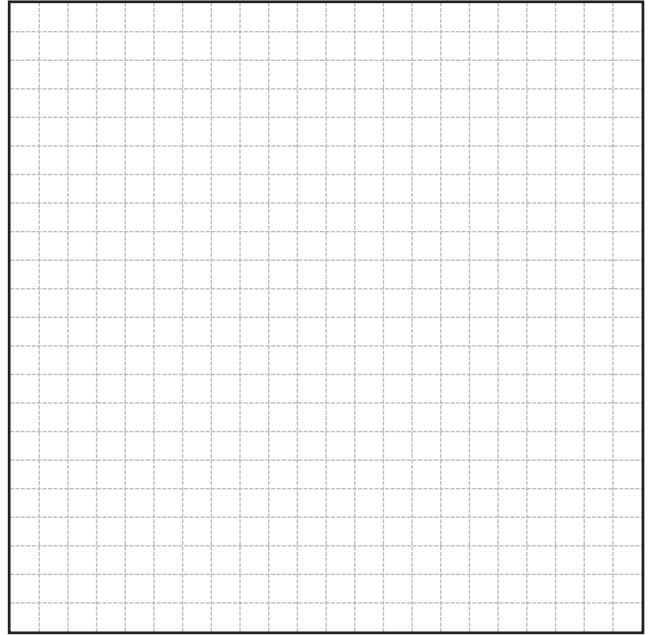
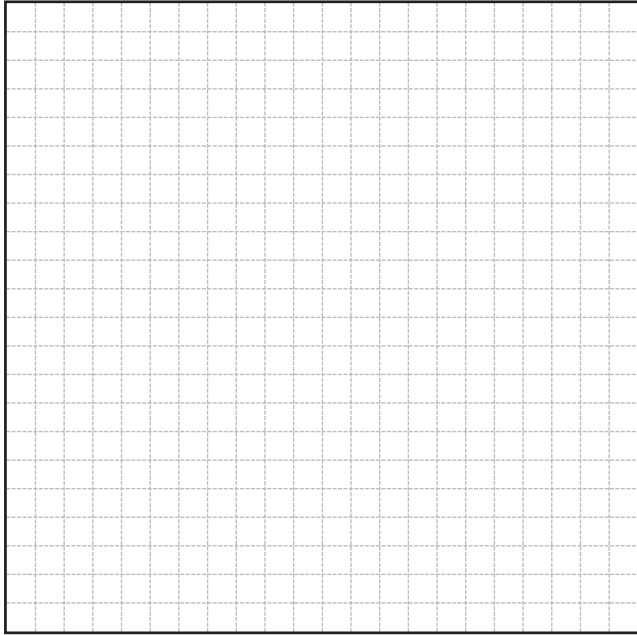
6. Based on your observations in problems 1–4, what do you think each index card stands for in regard to congruent triangles?

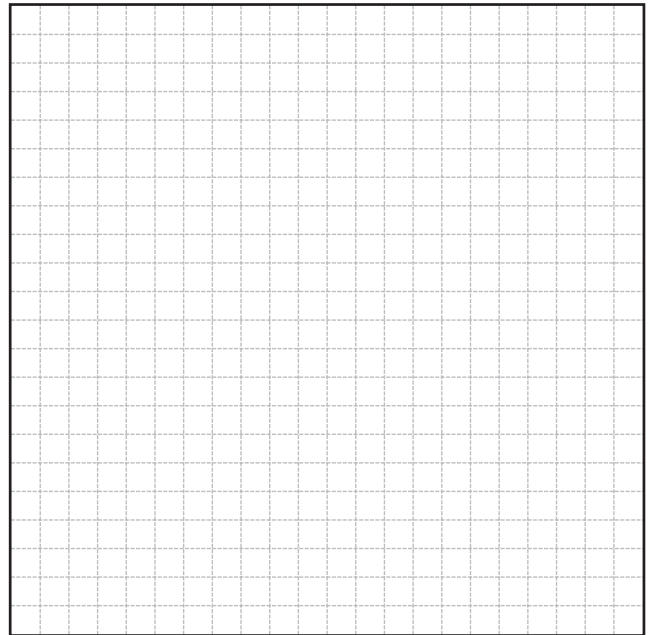
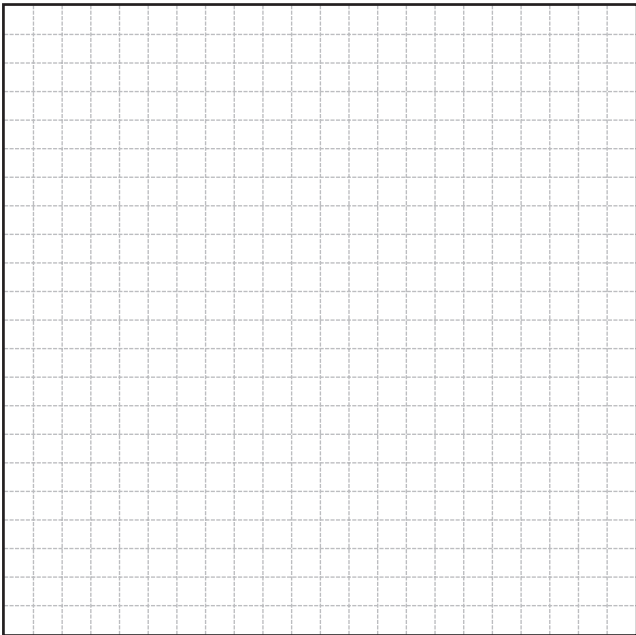
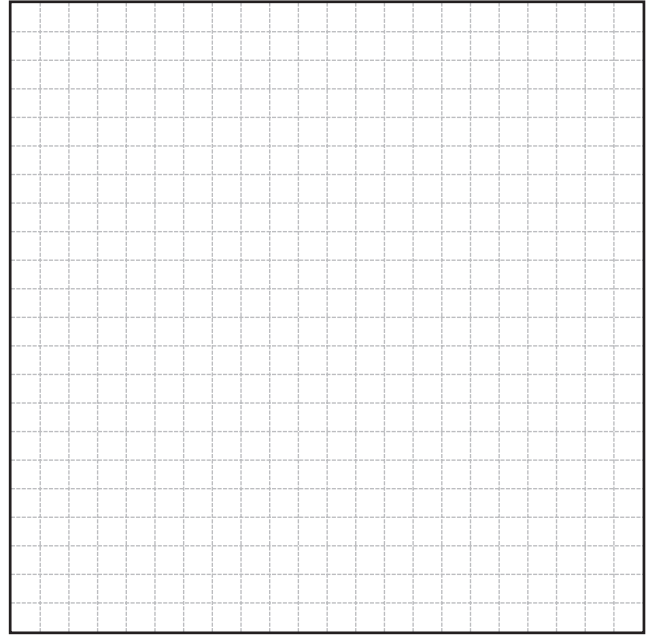
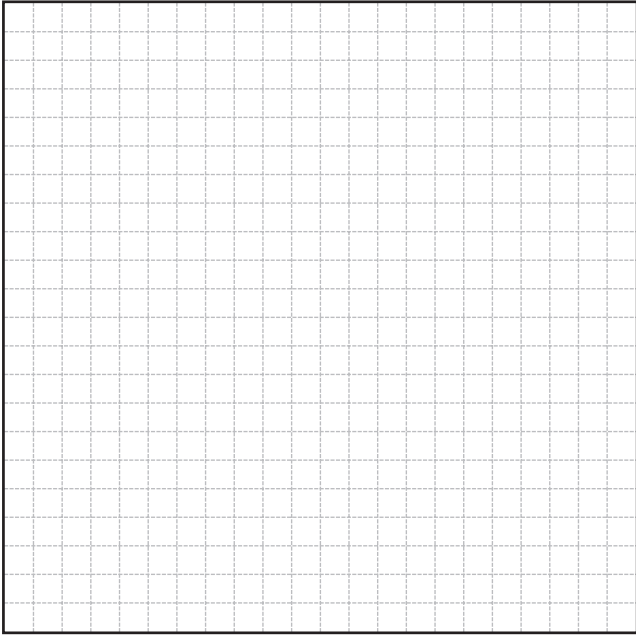
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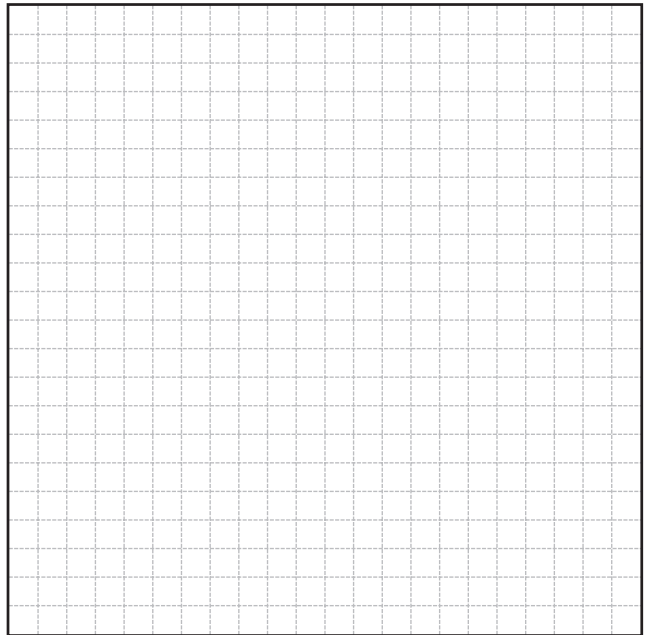
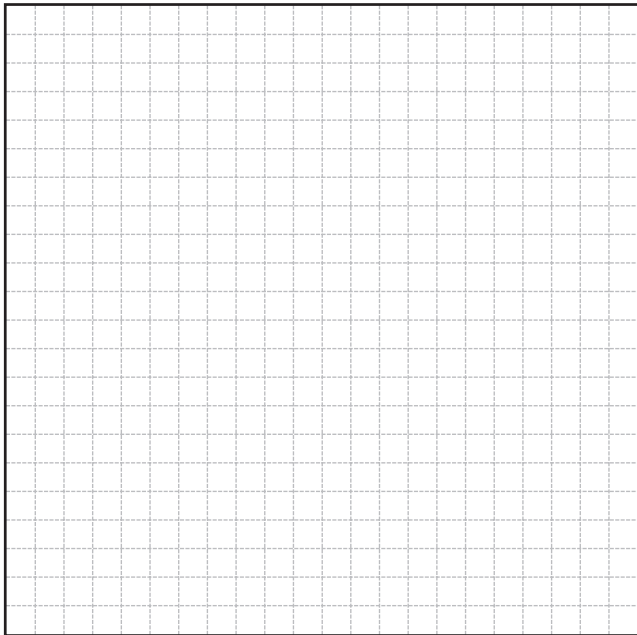
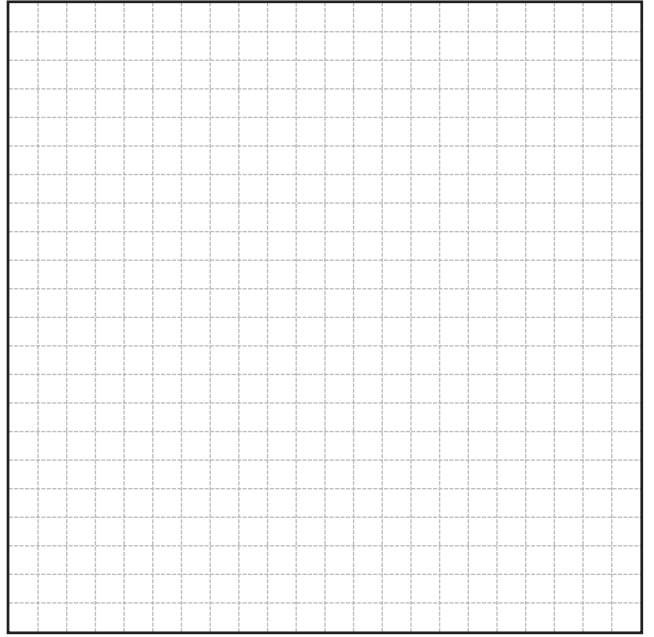
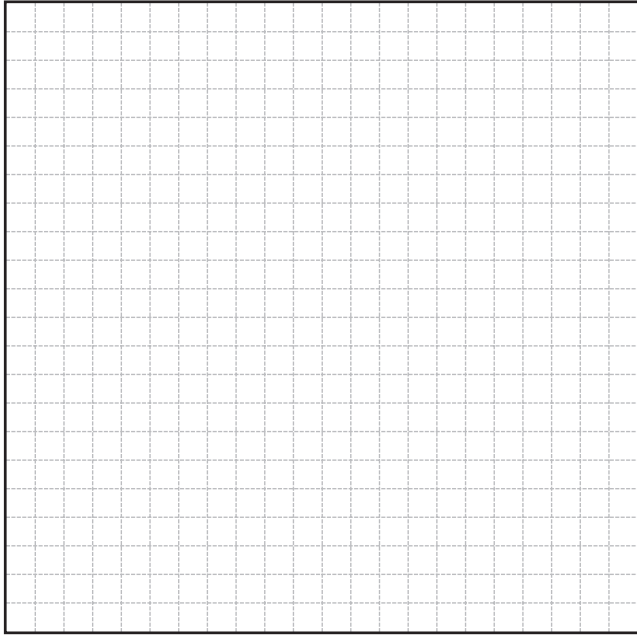
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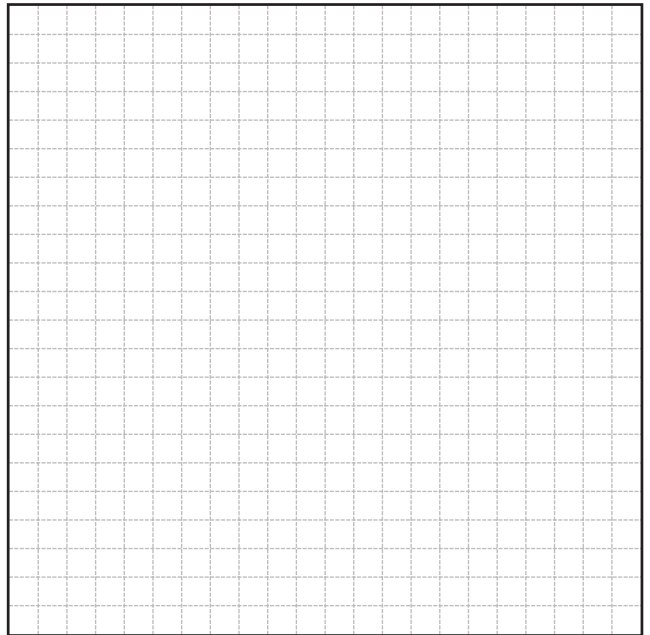
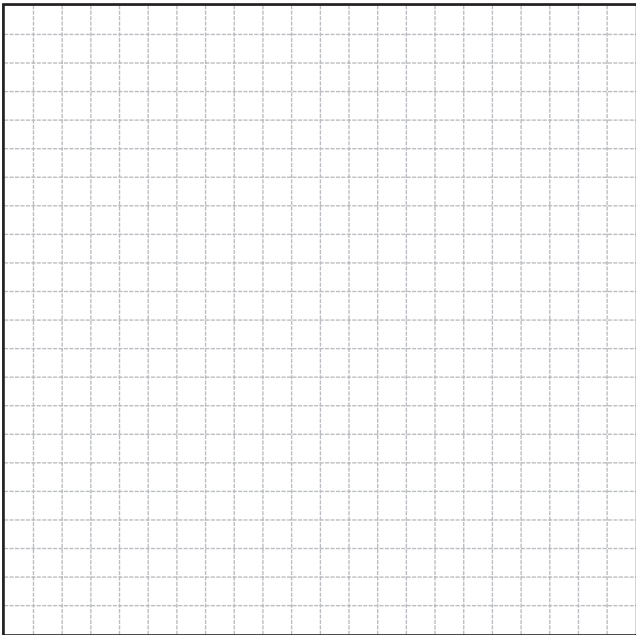
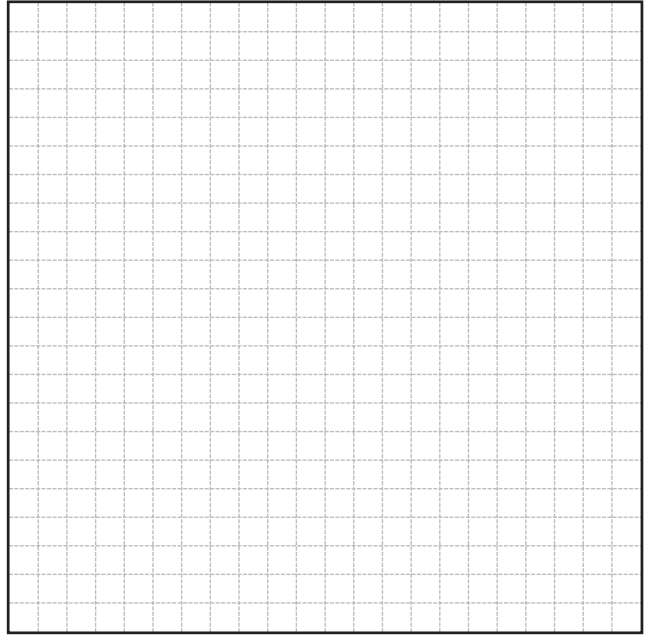
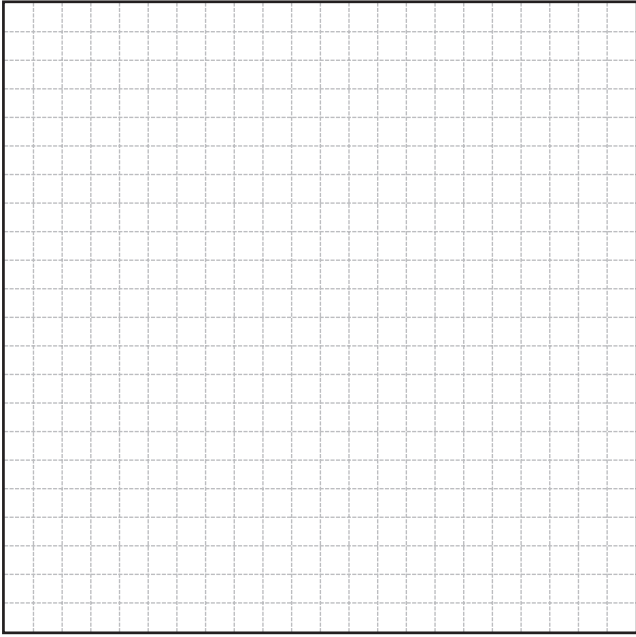
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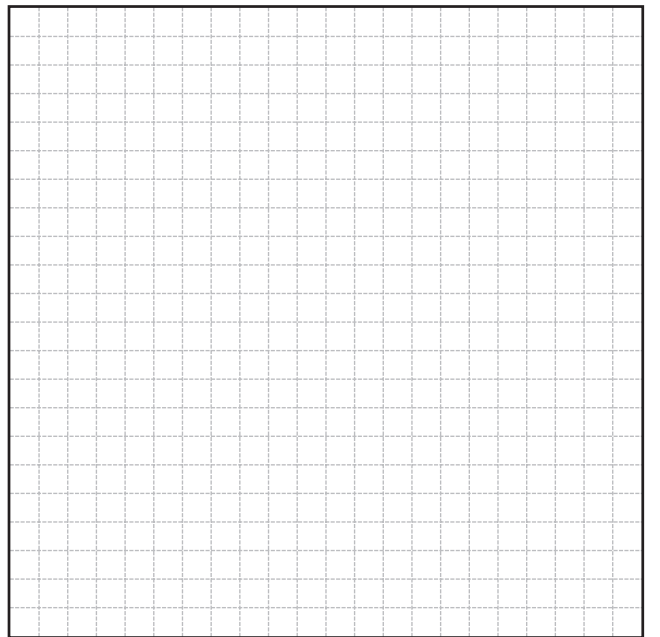
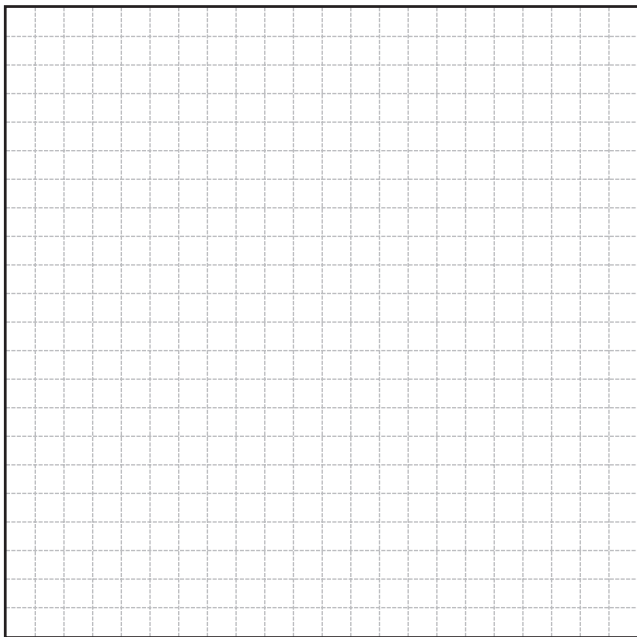
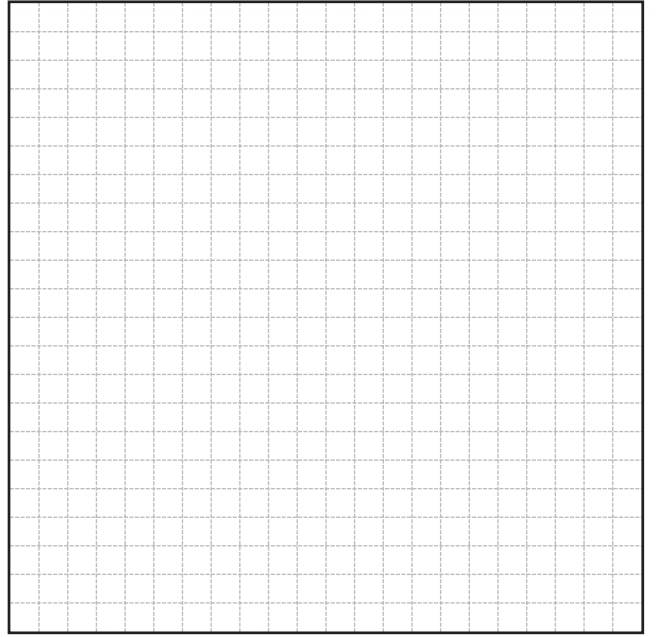
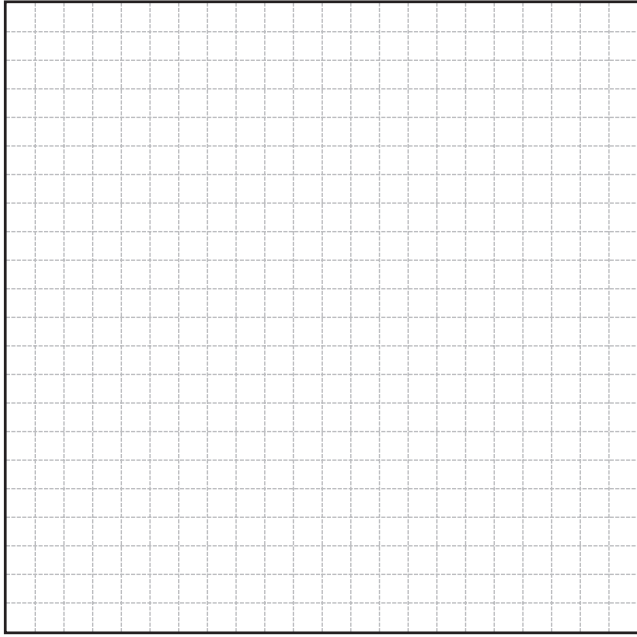
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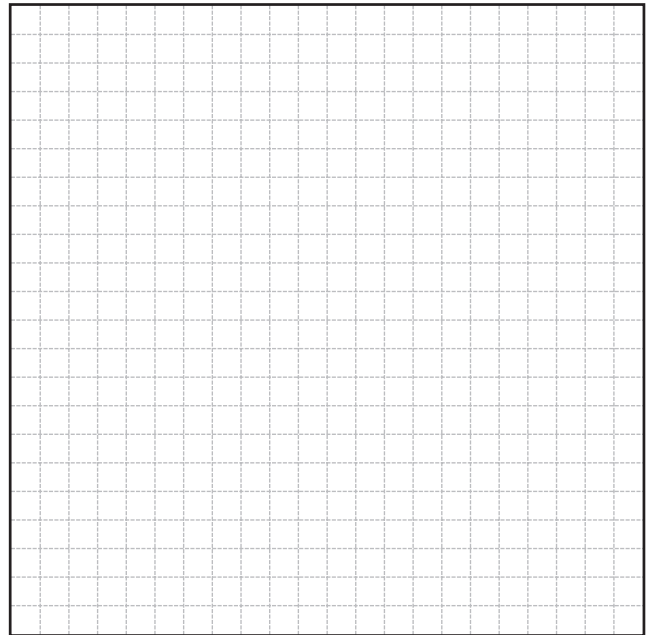
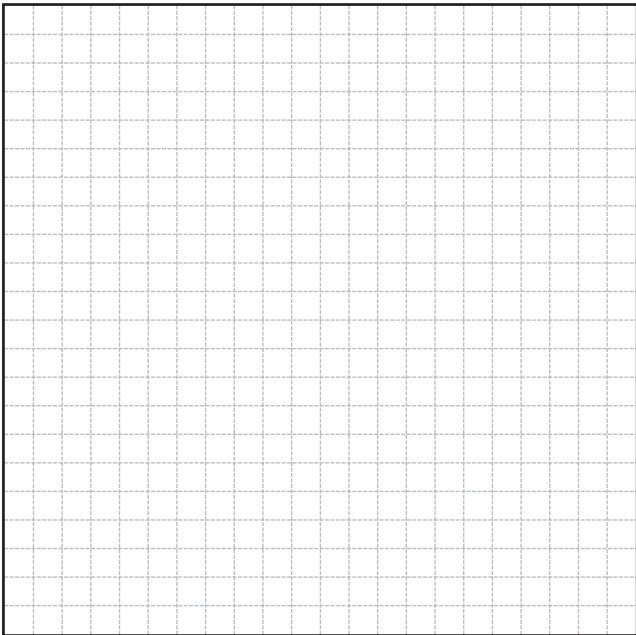
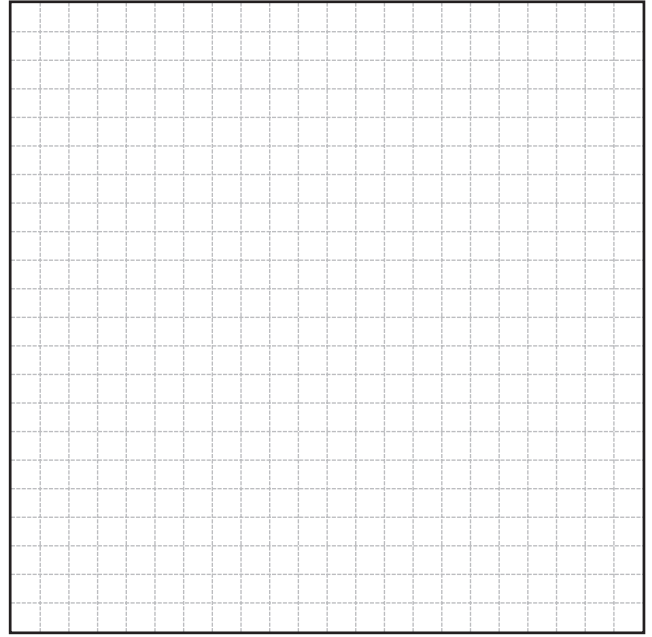
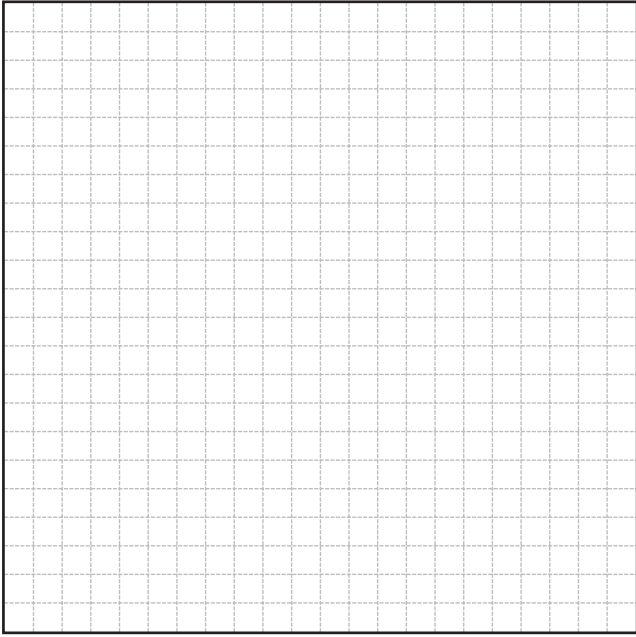


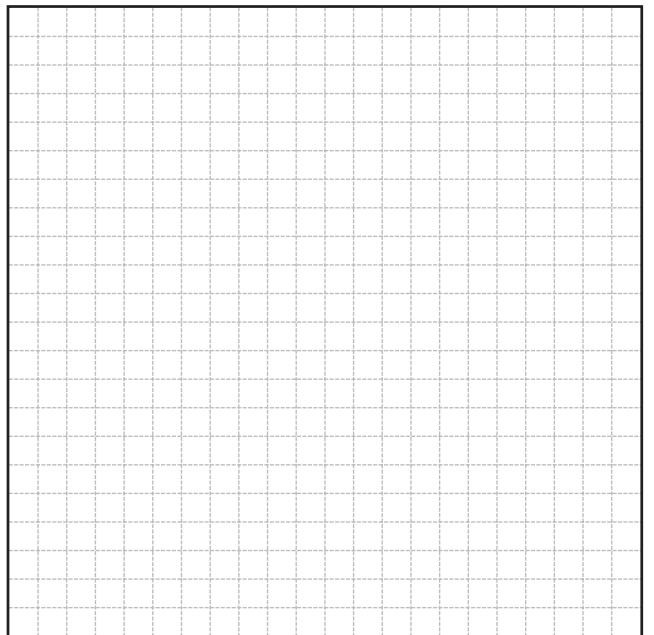
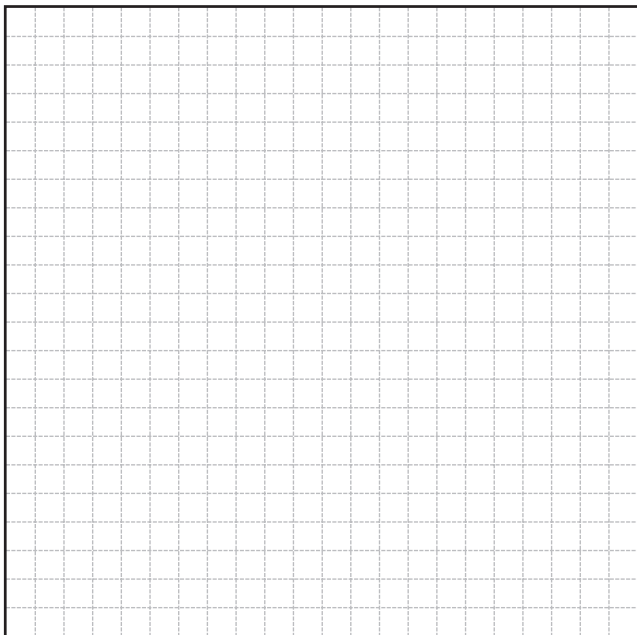
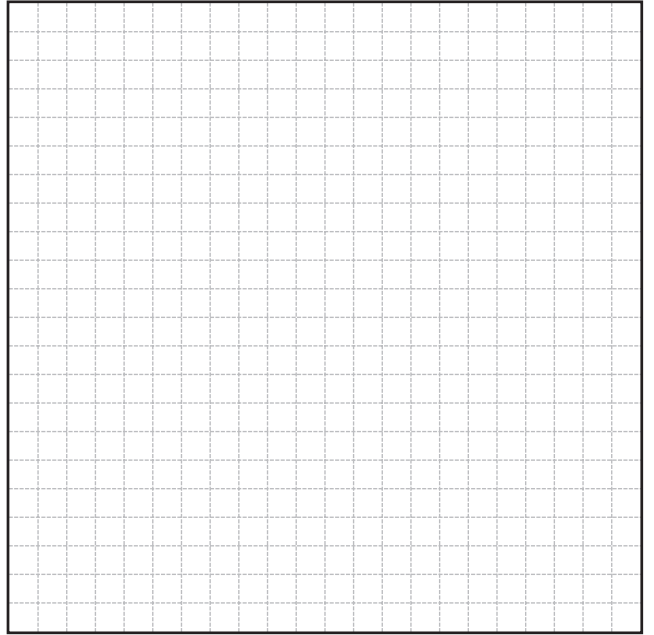
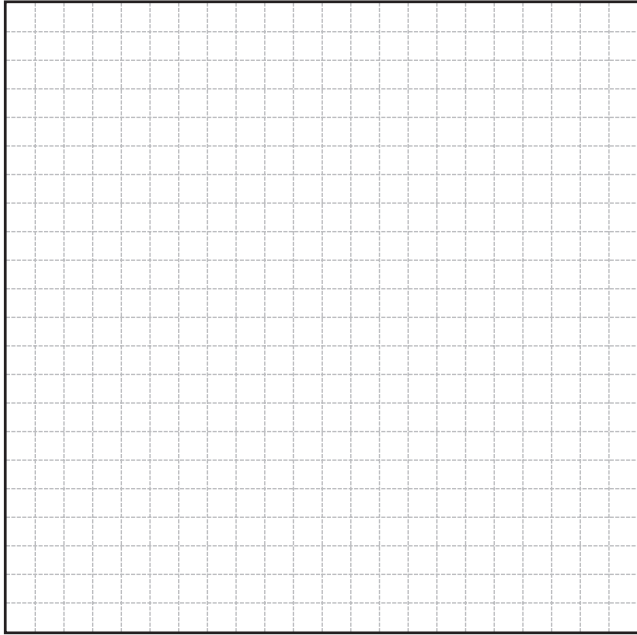


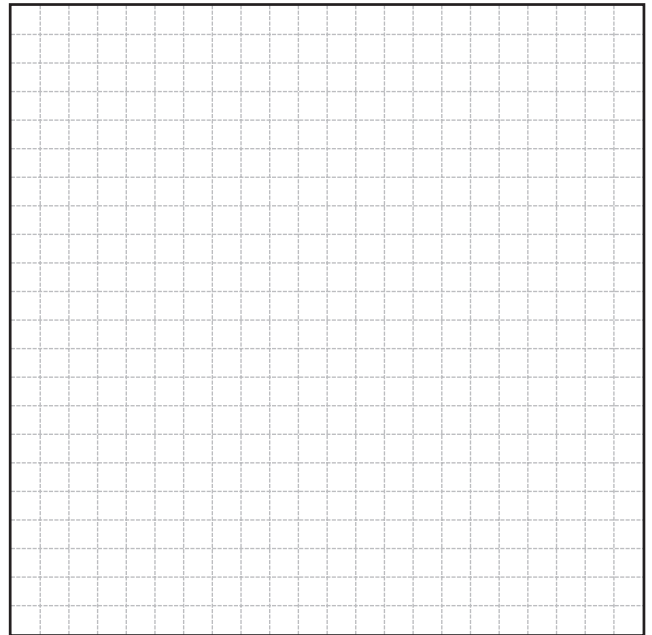
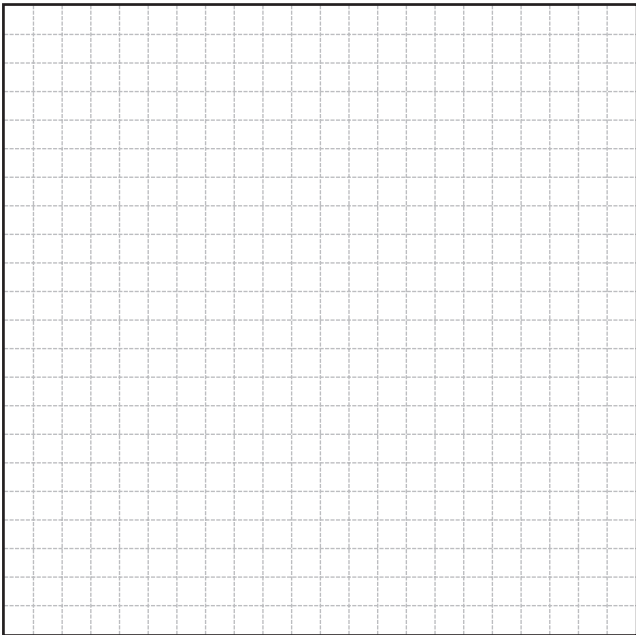
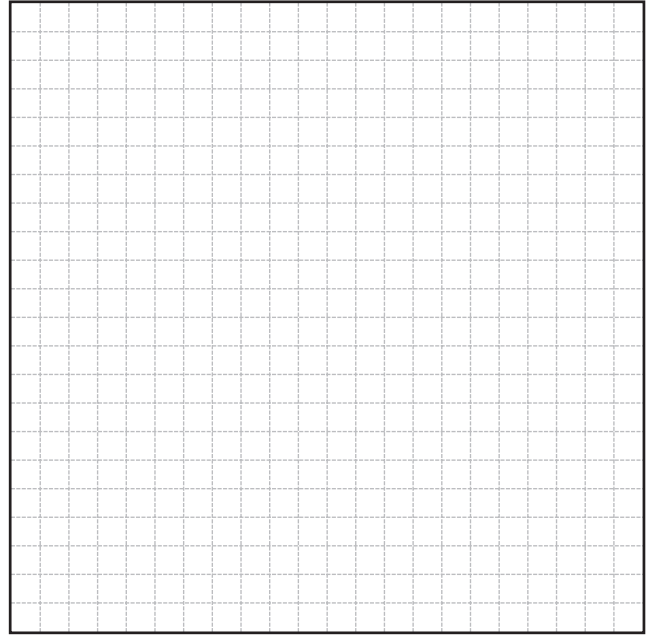
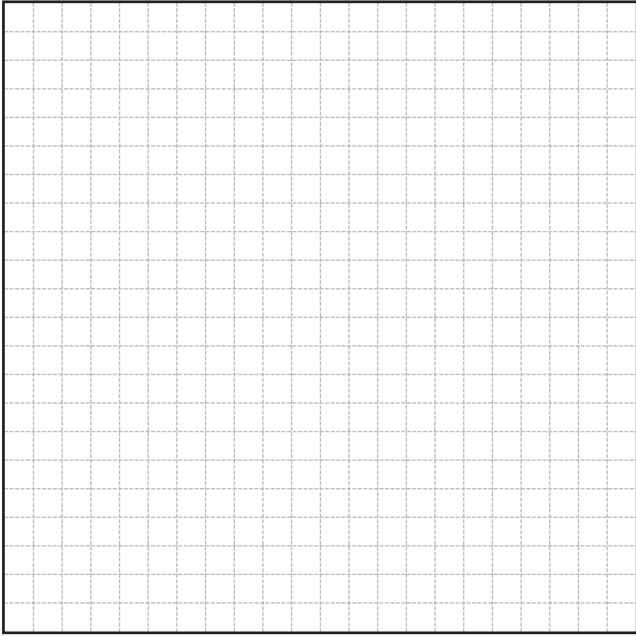


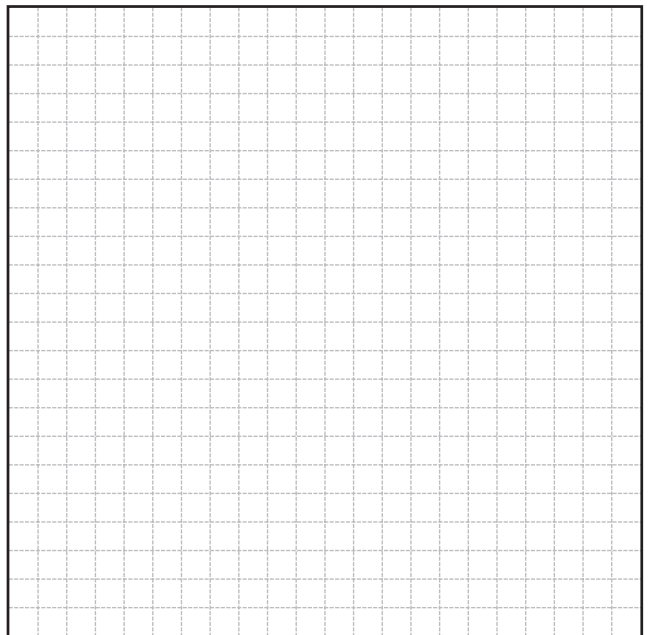
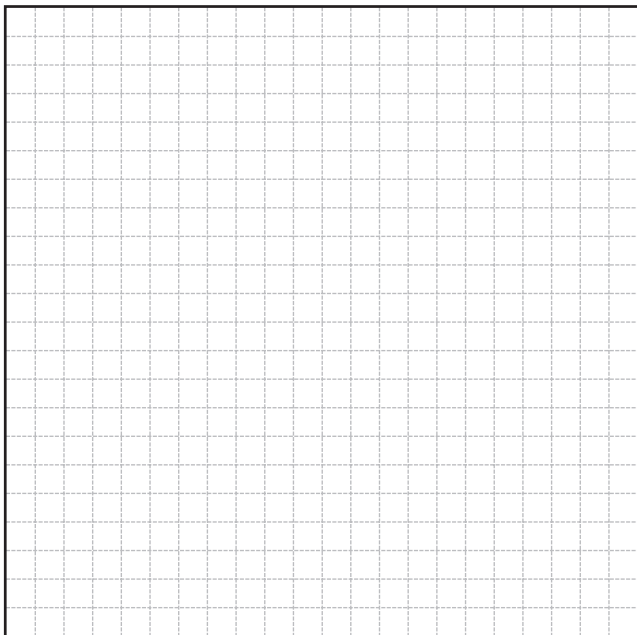
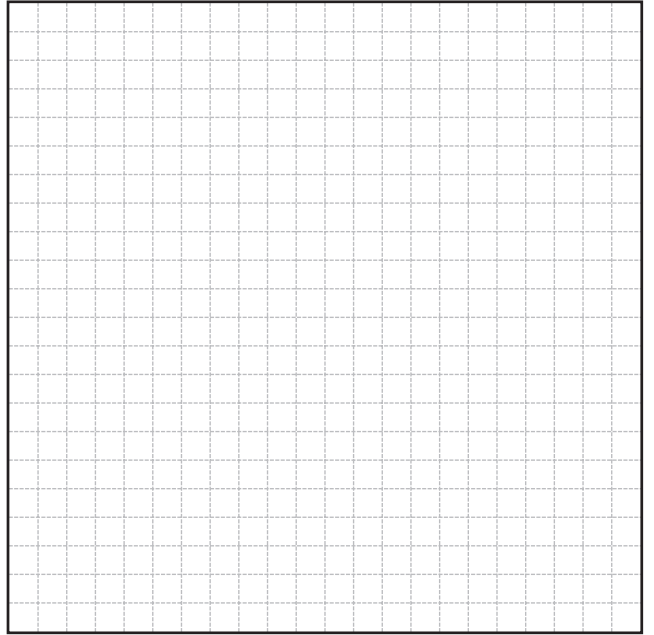
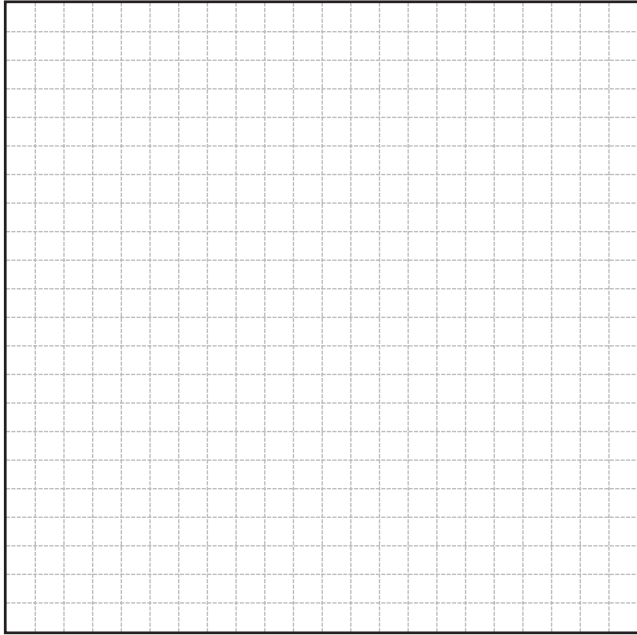


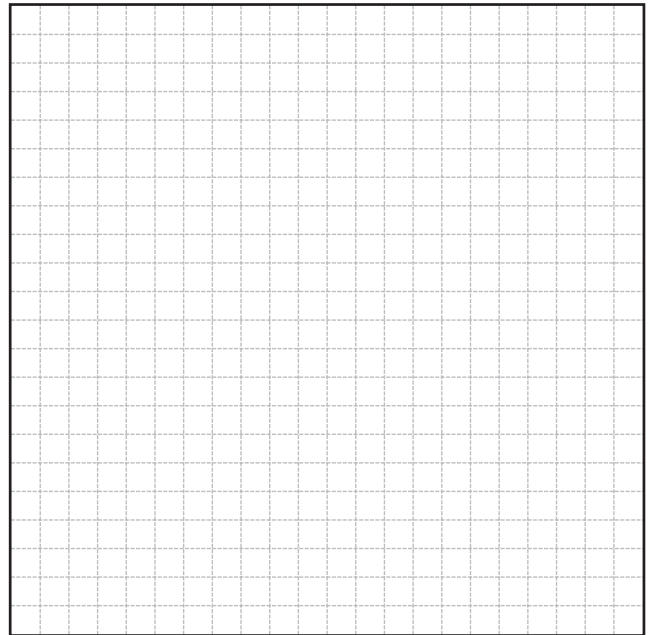
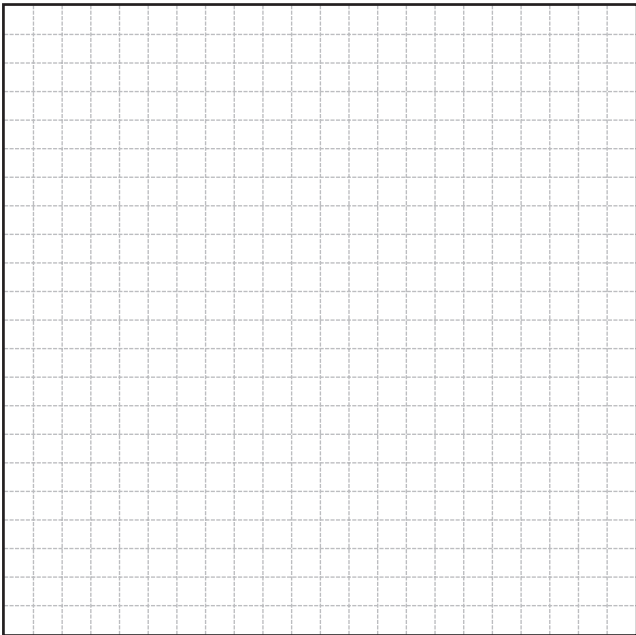
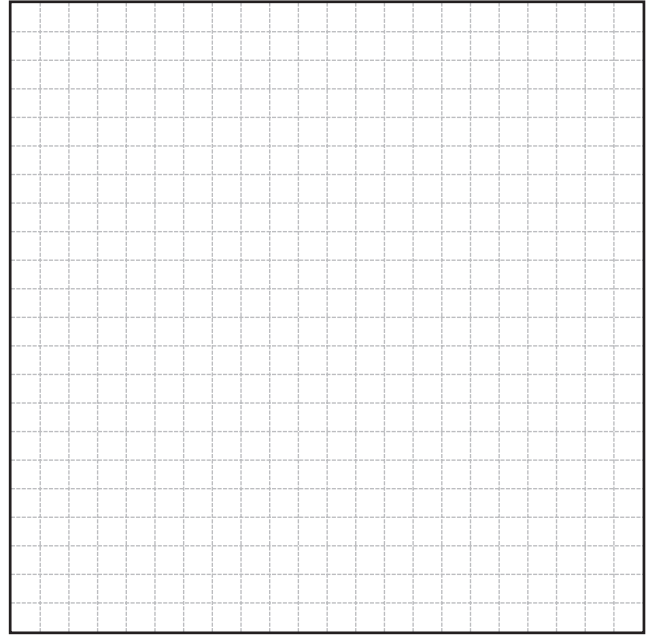
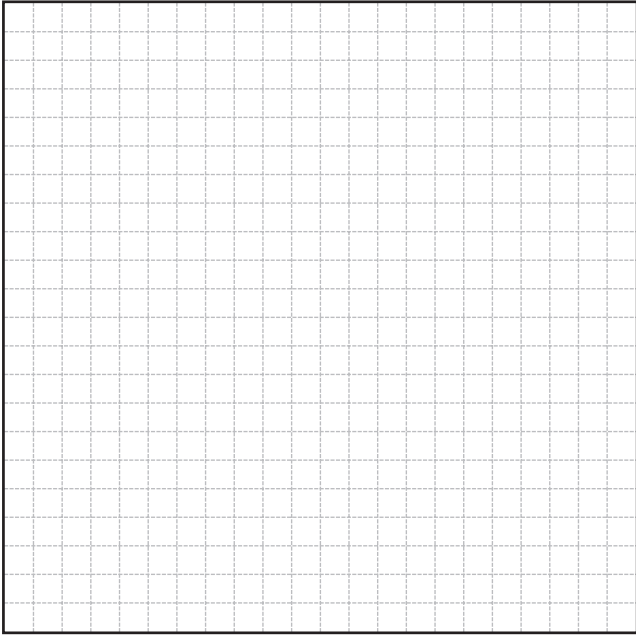


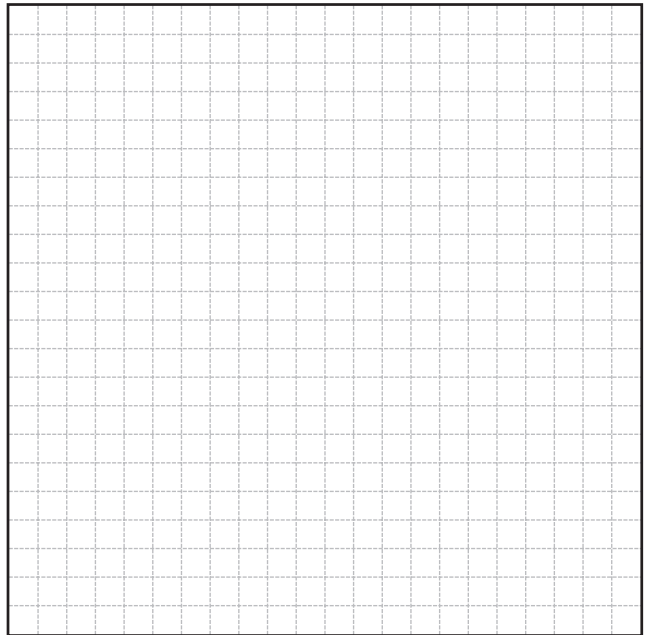
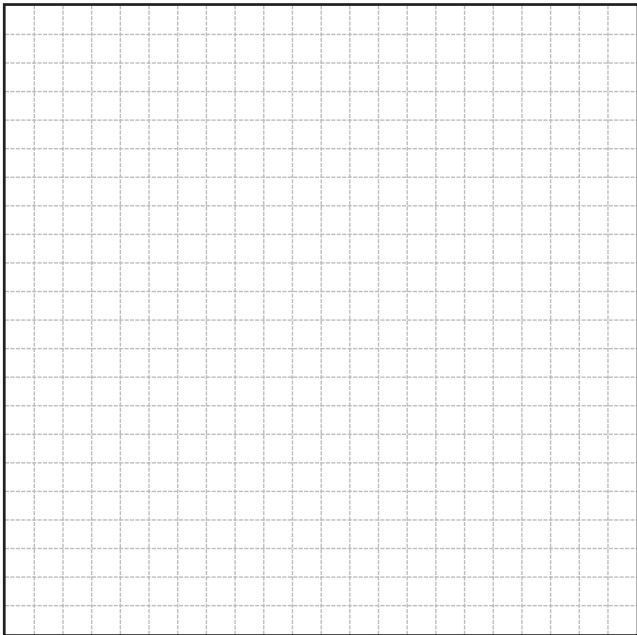
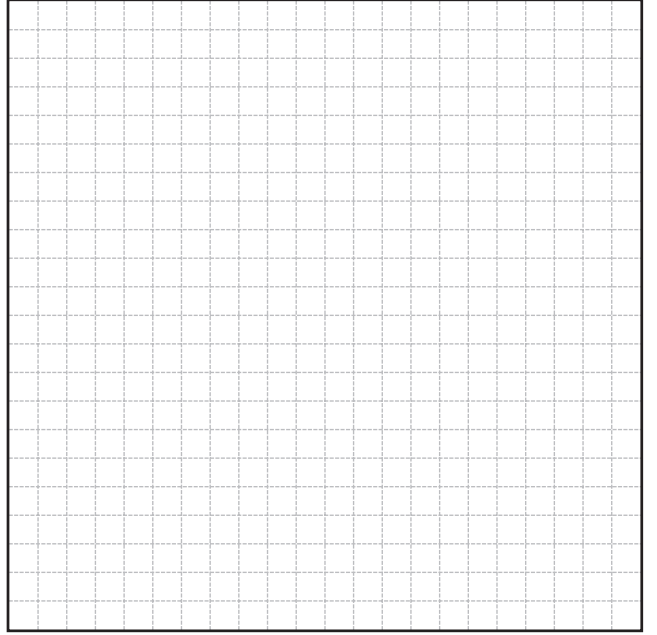
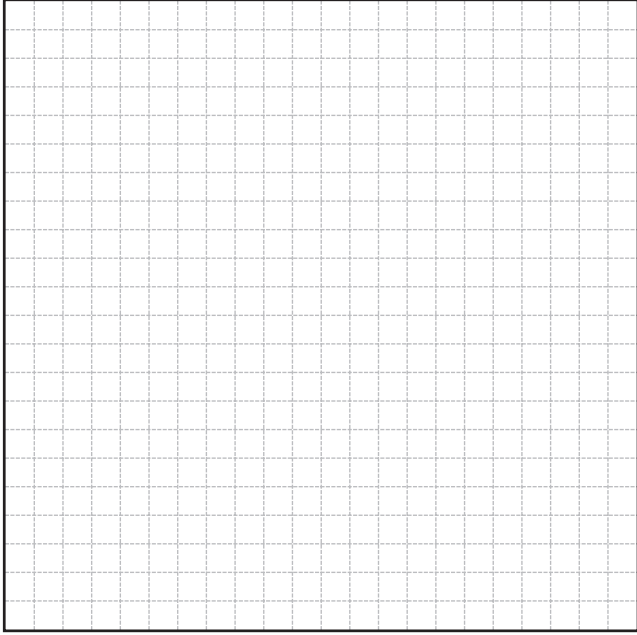


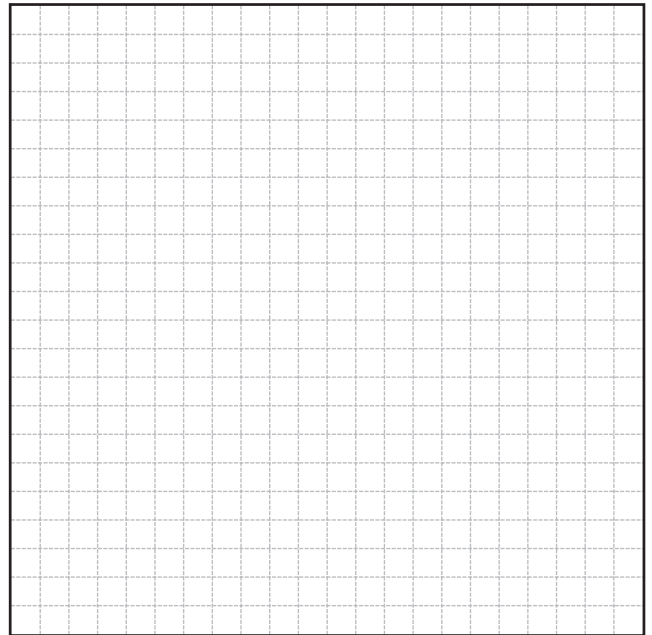
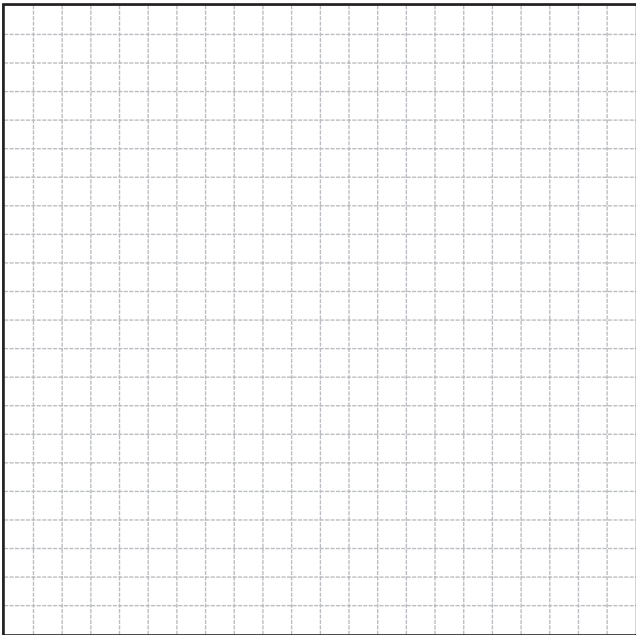
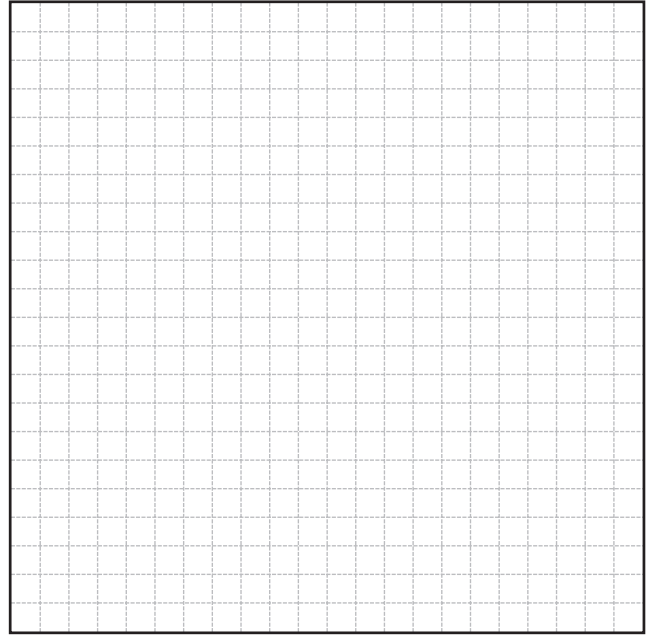
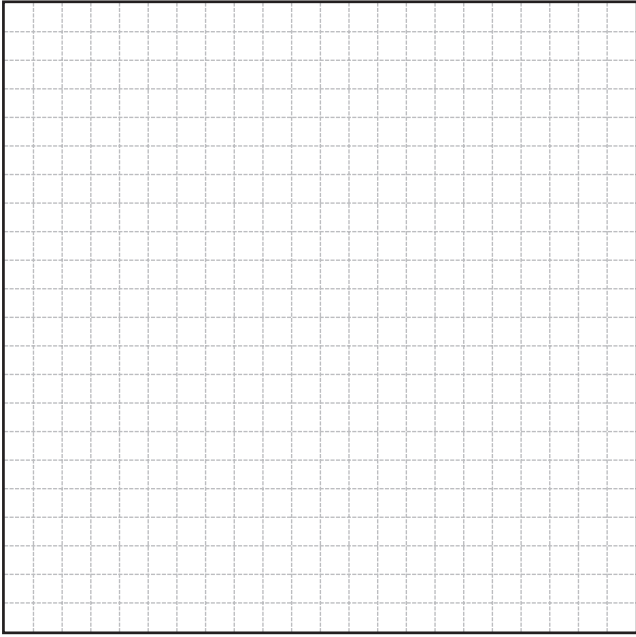


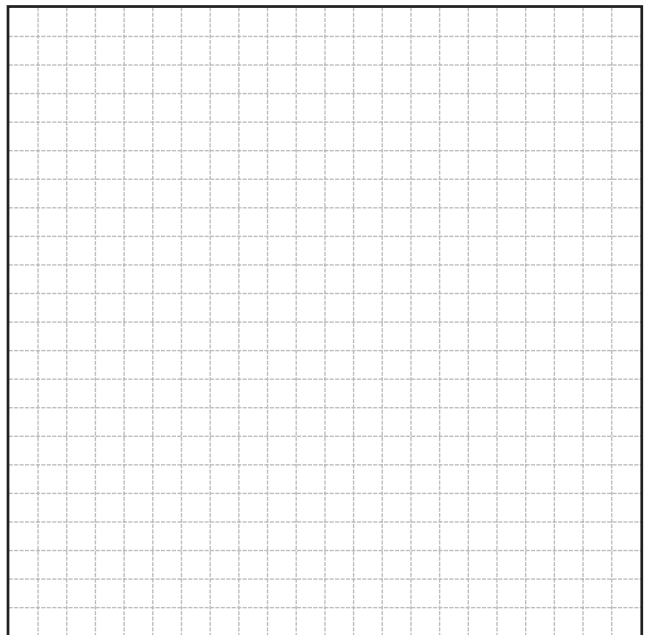
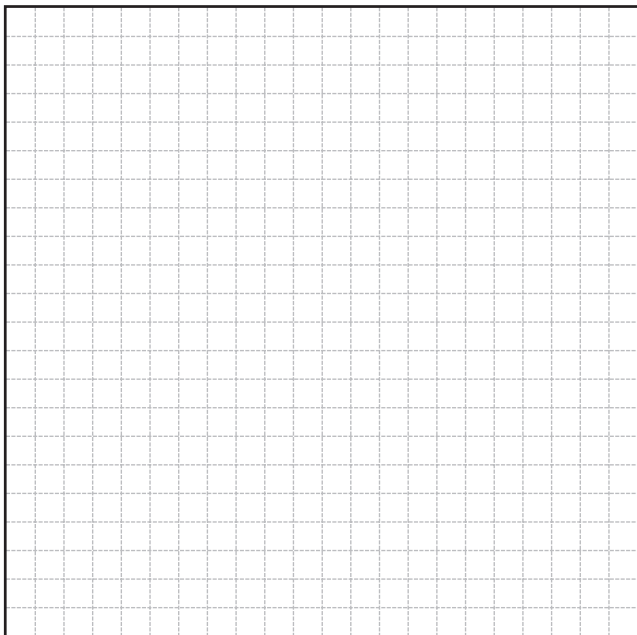
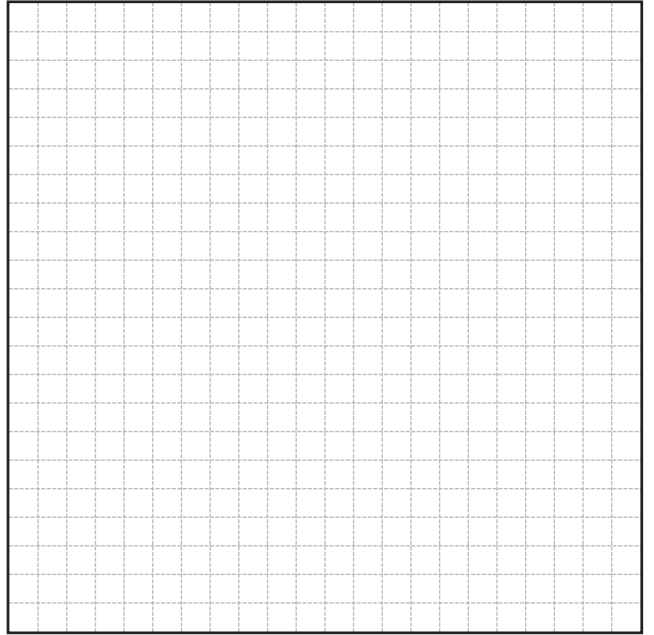
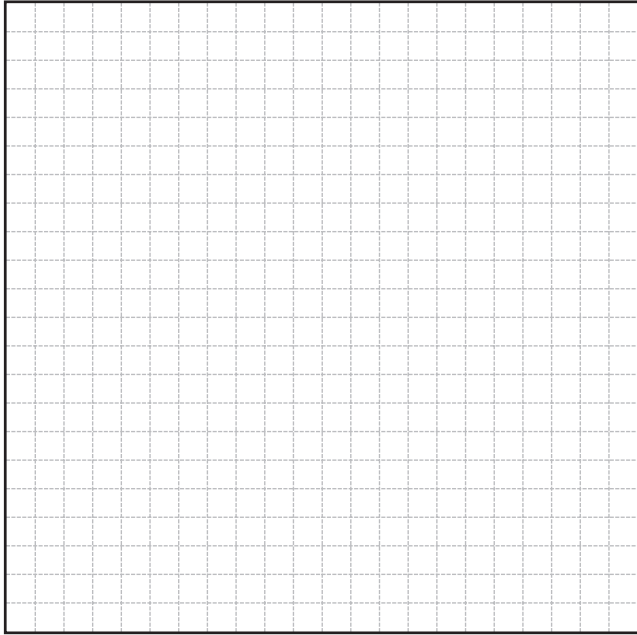


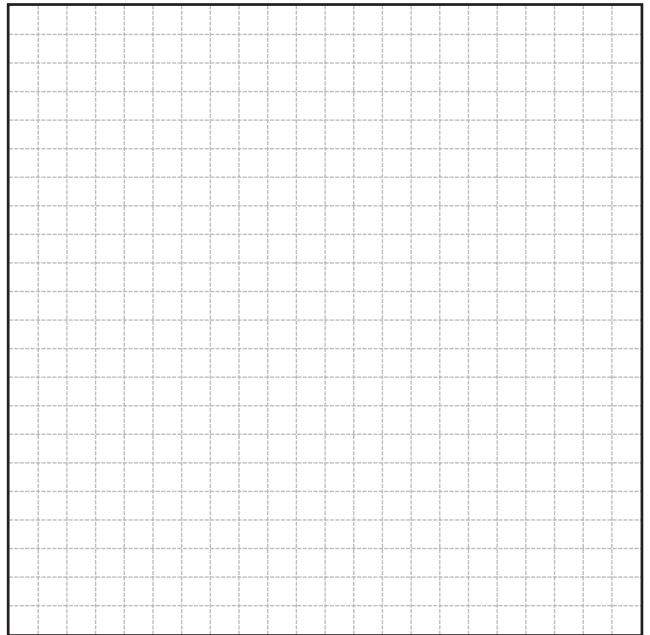
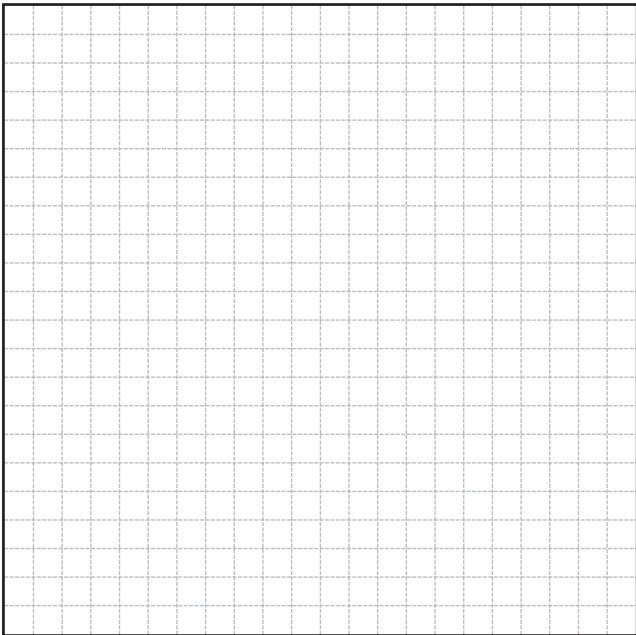
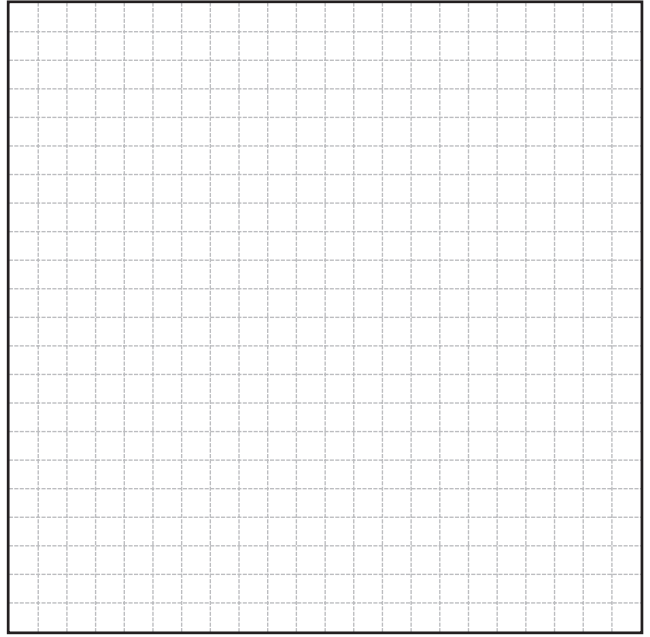
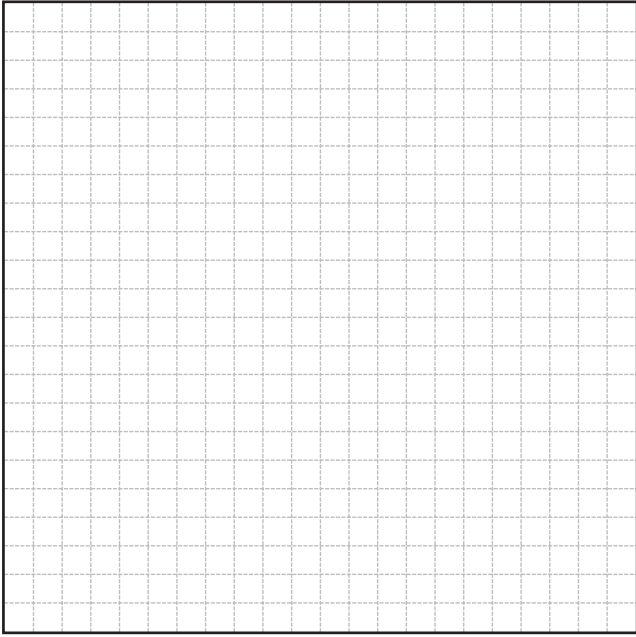


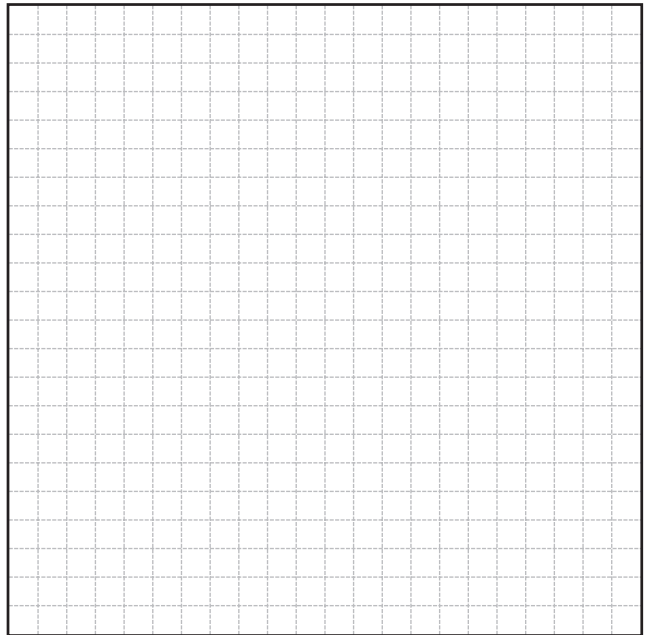
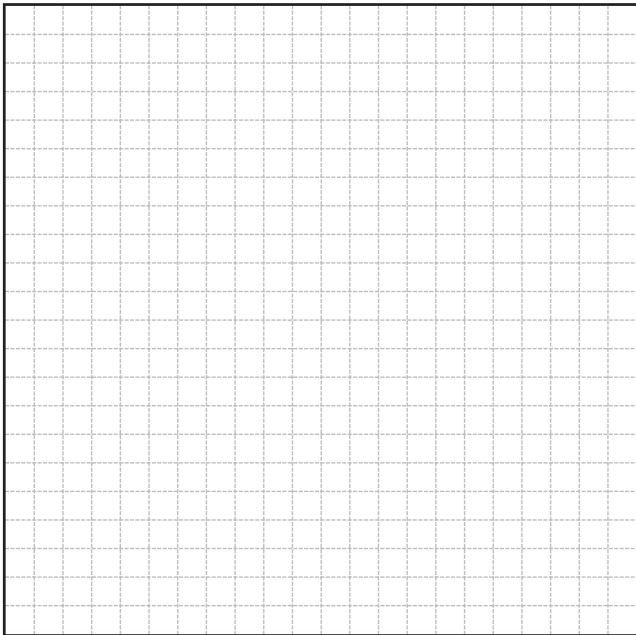
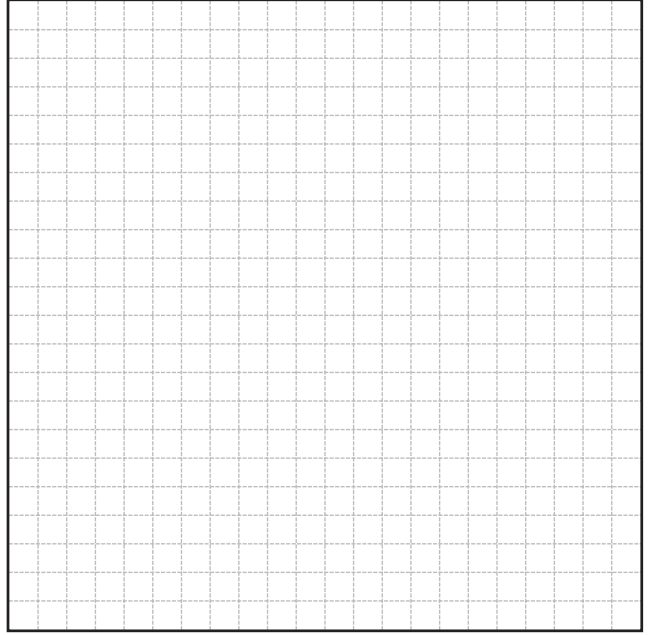
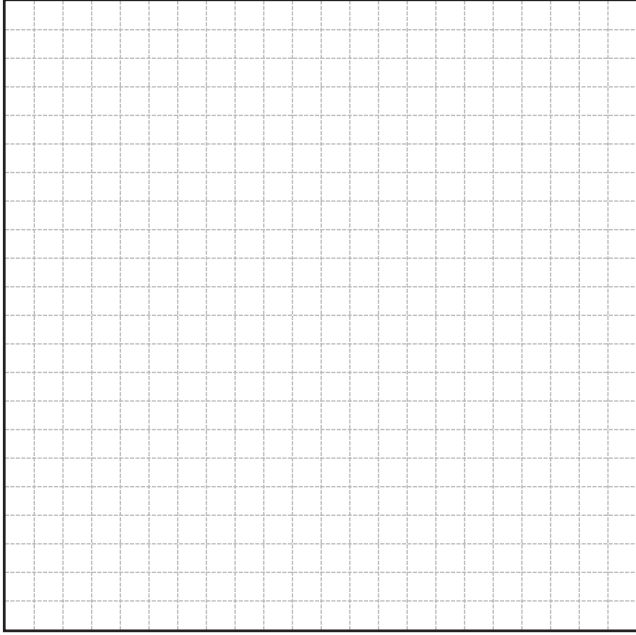


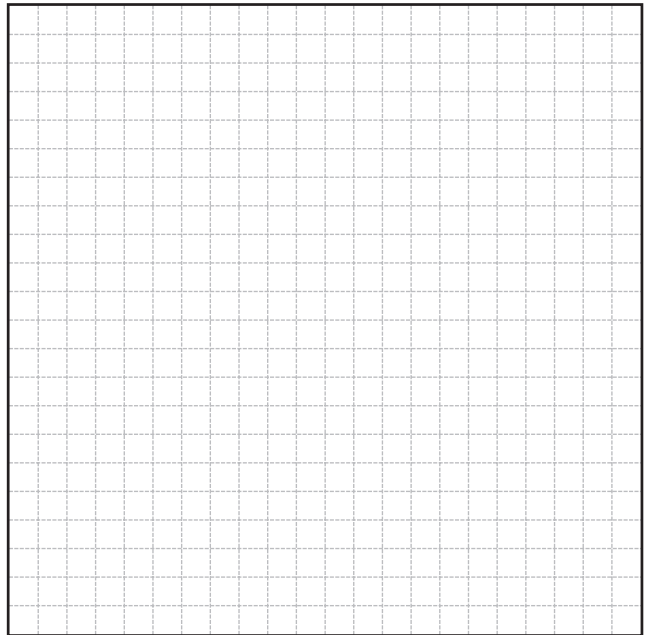
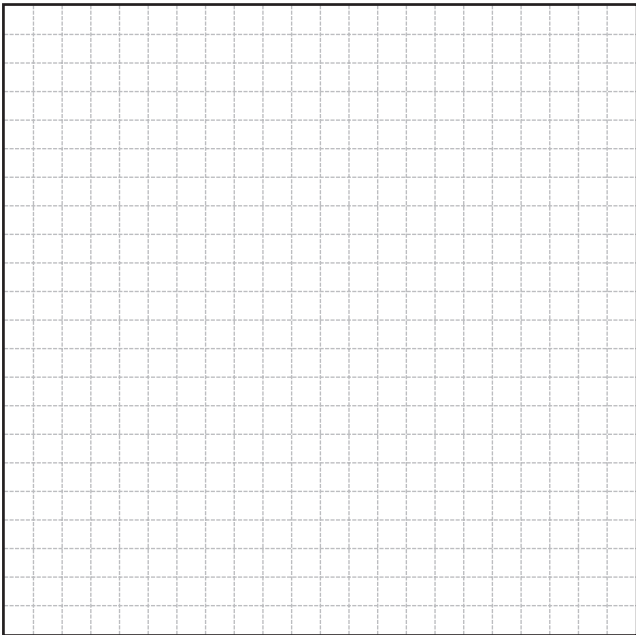
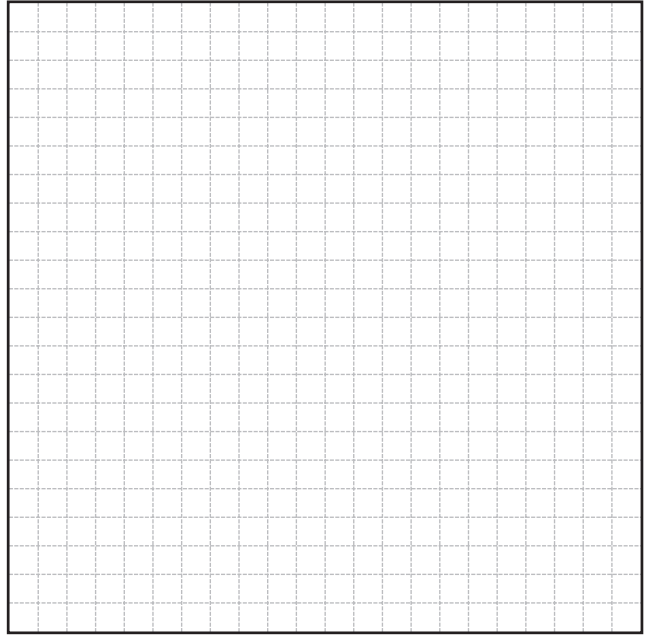
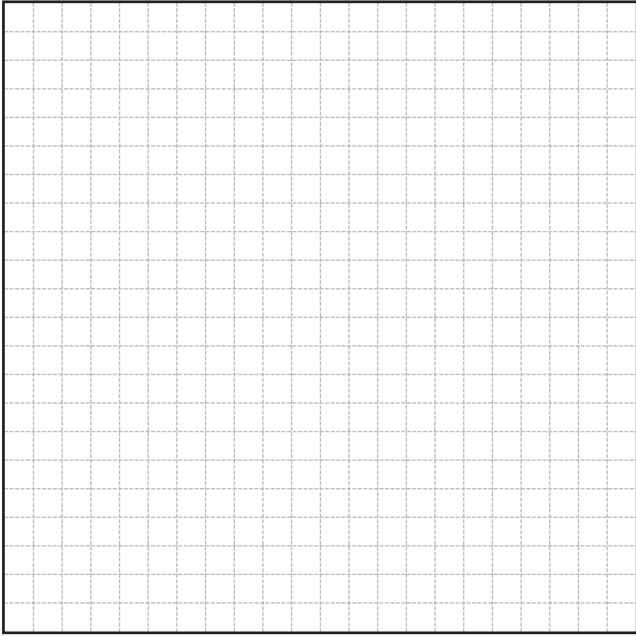


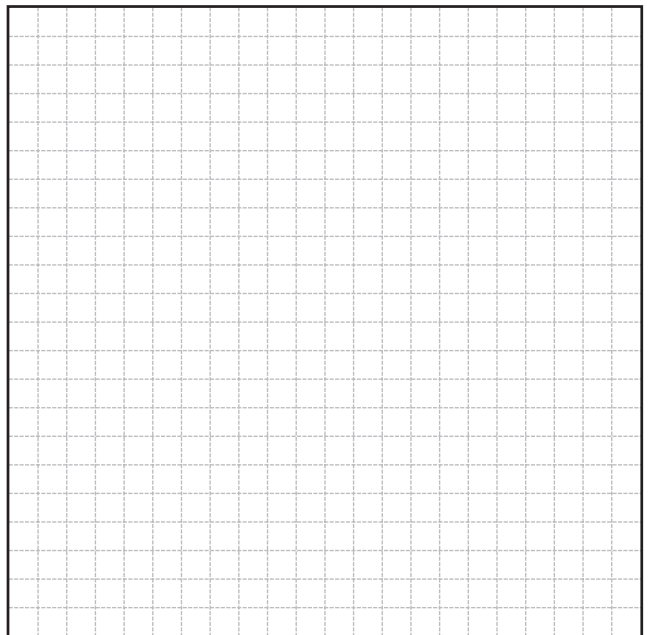
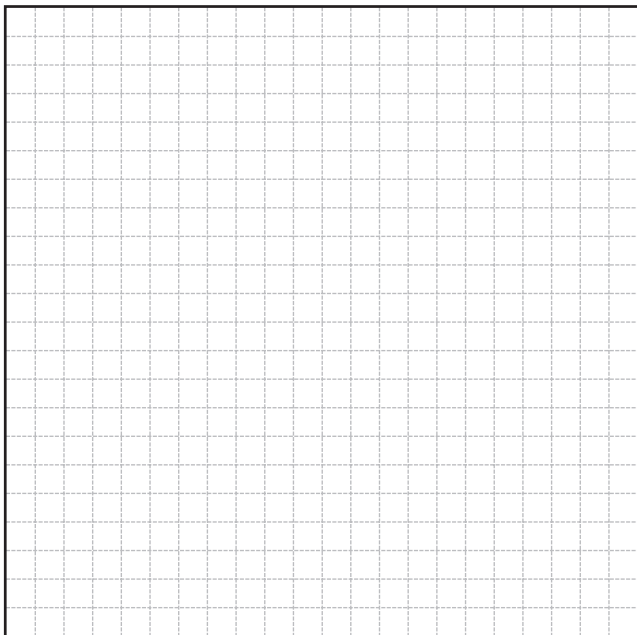
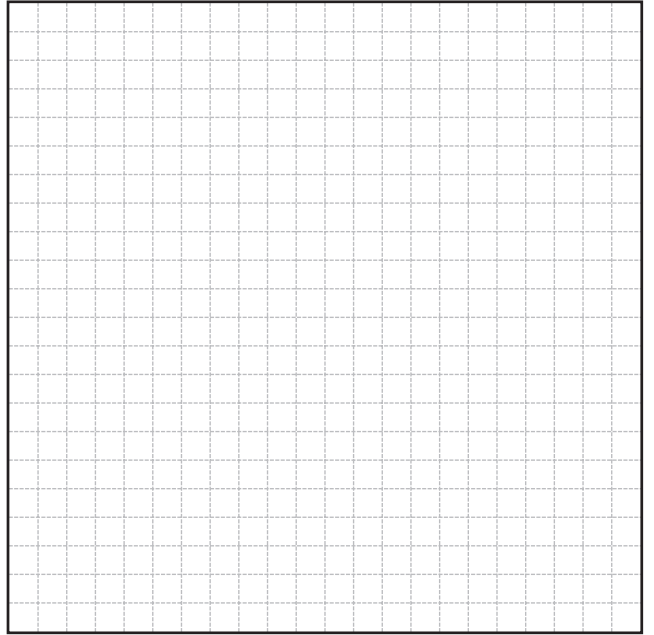
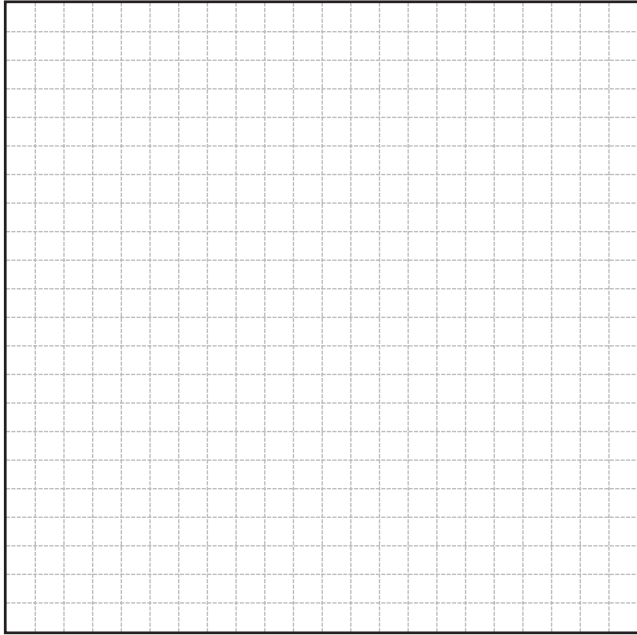


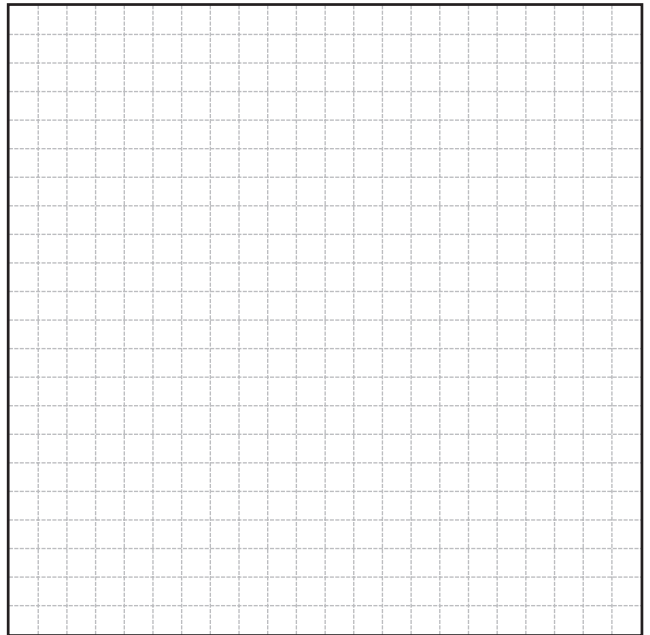
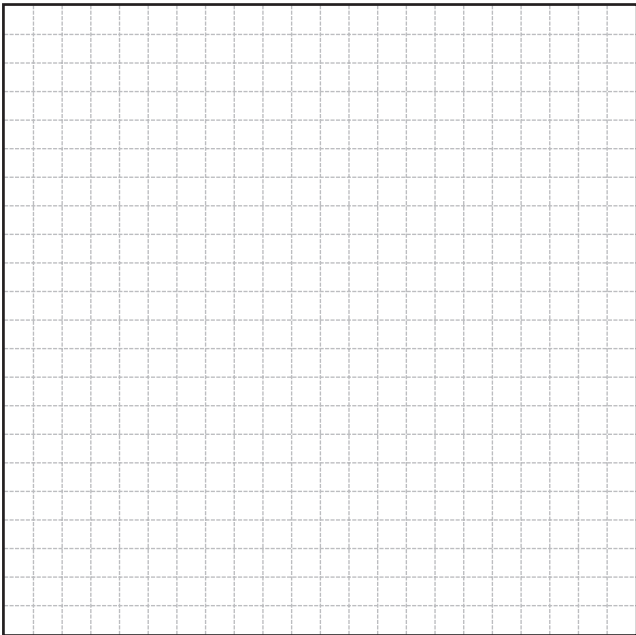
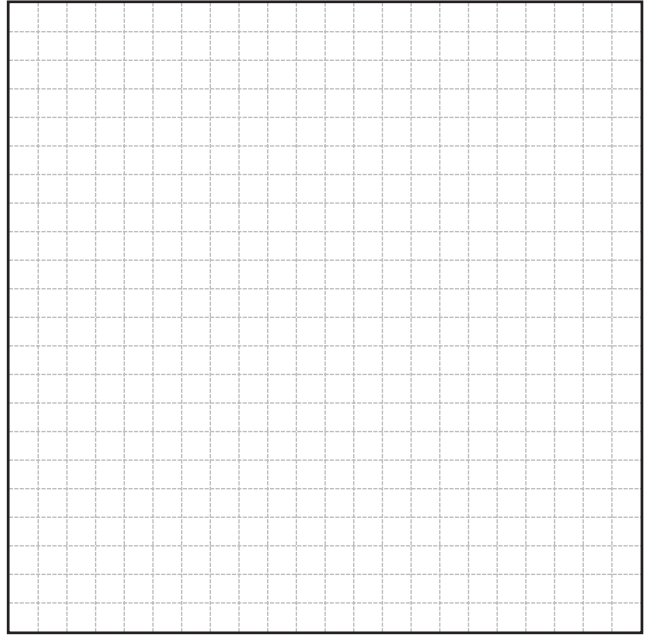
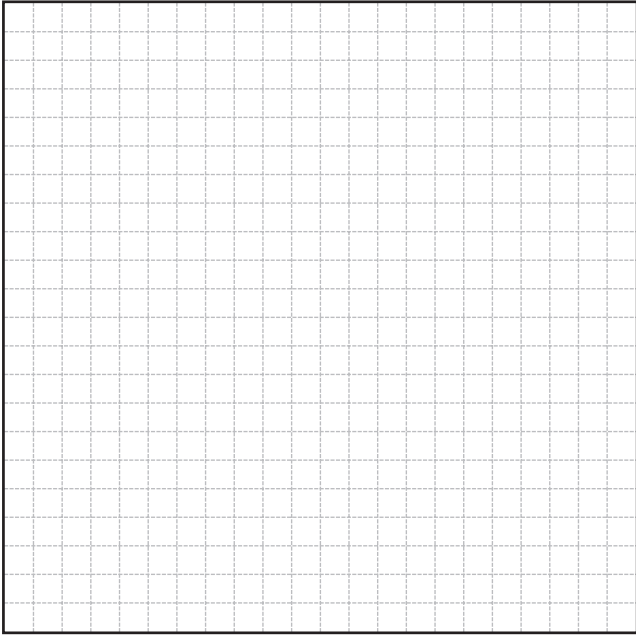


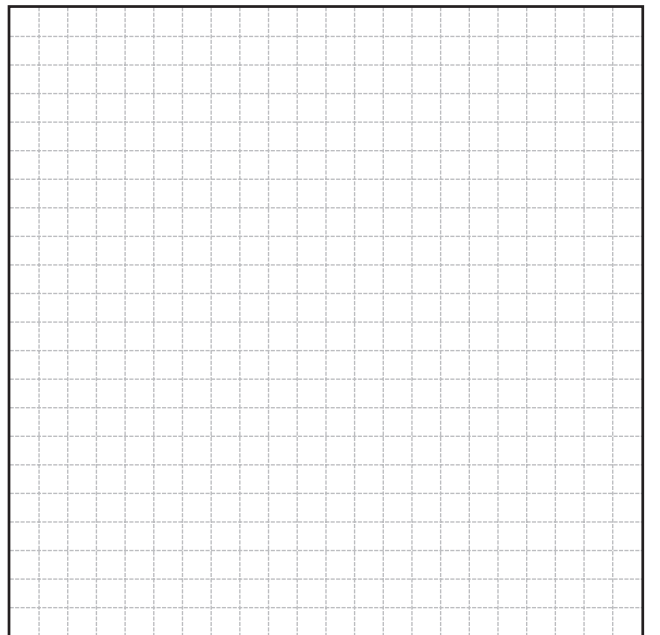
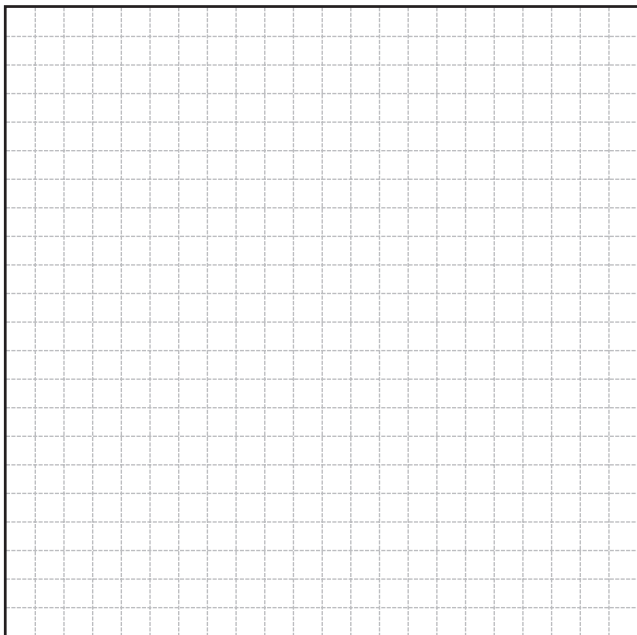
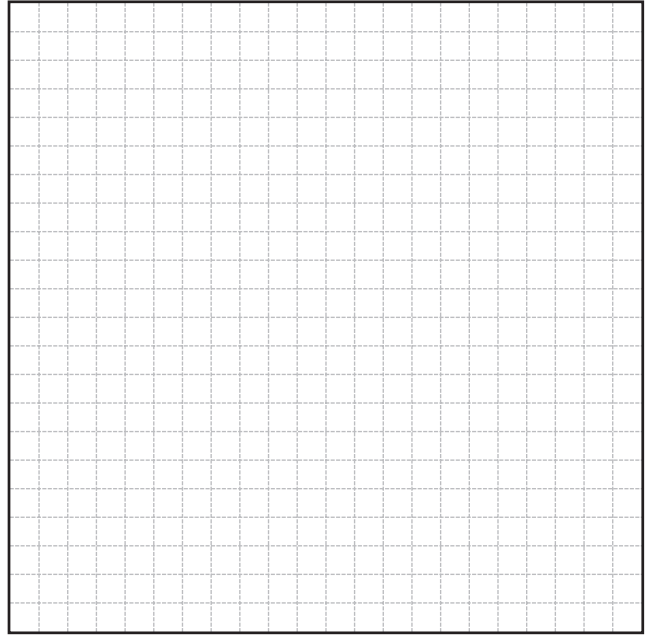
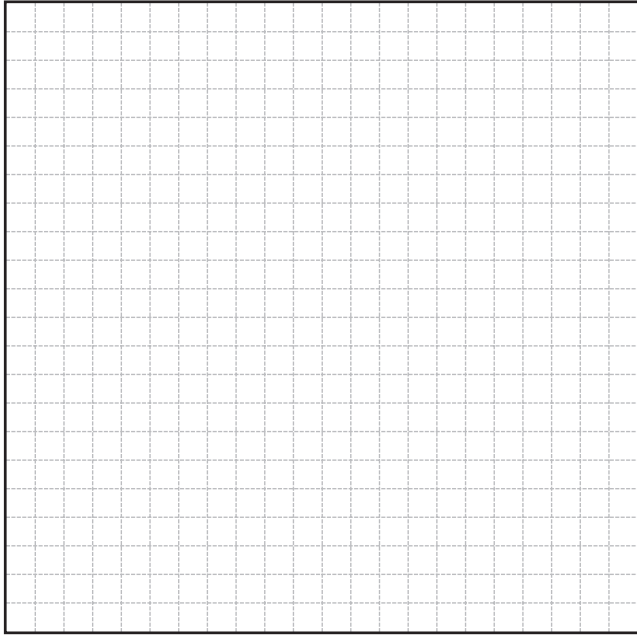


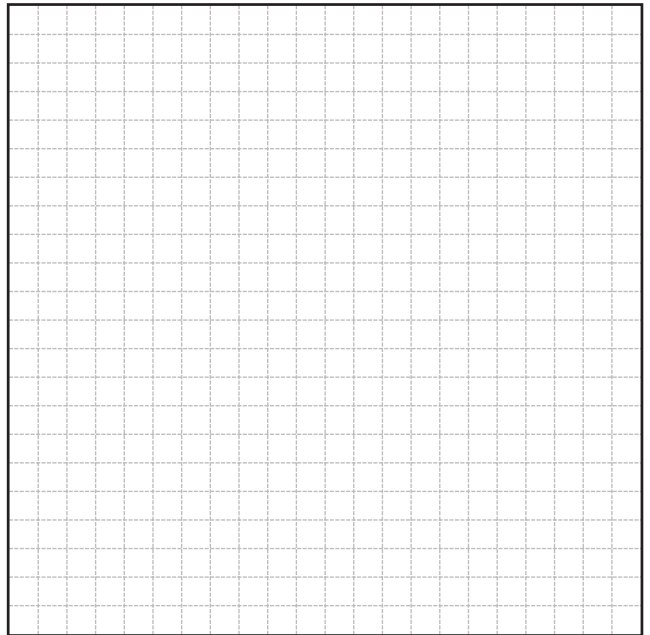
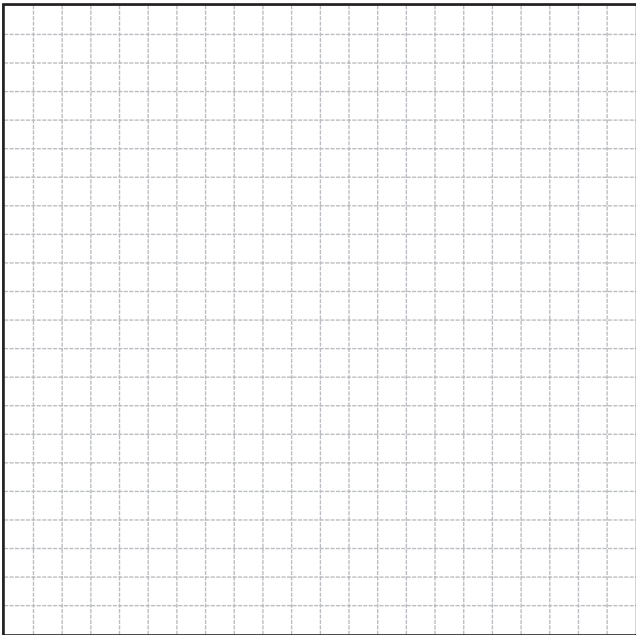
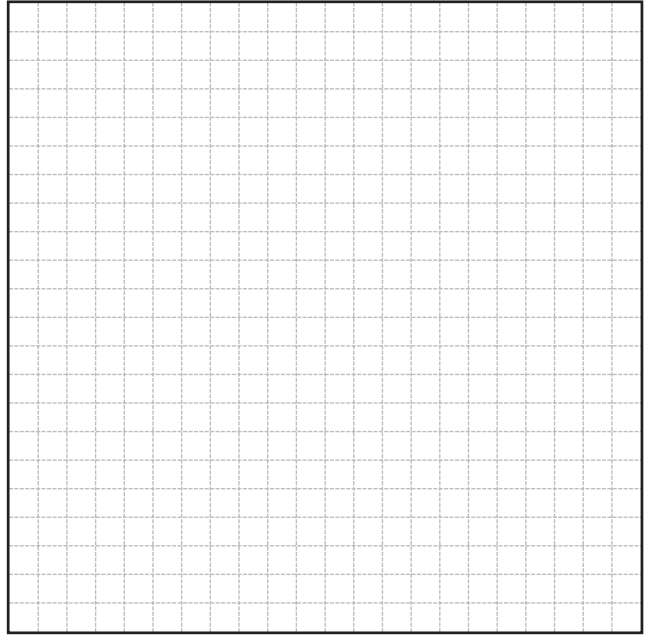
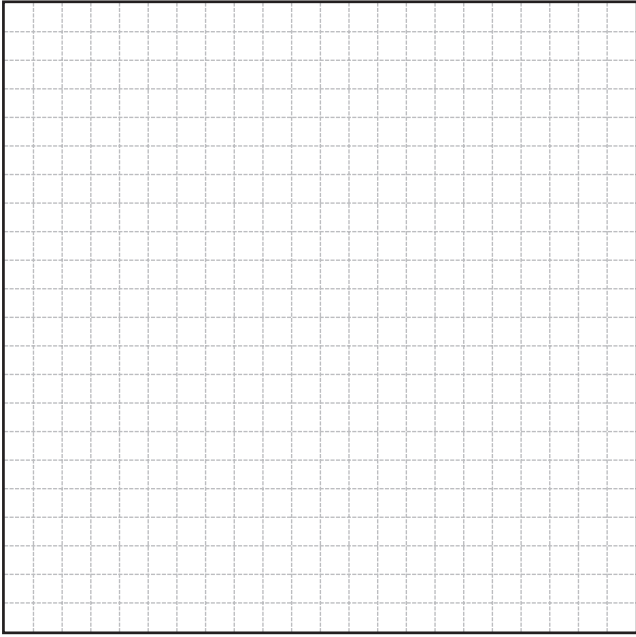


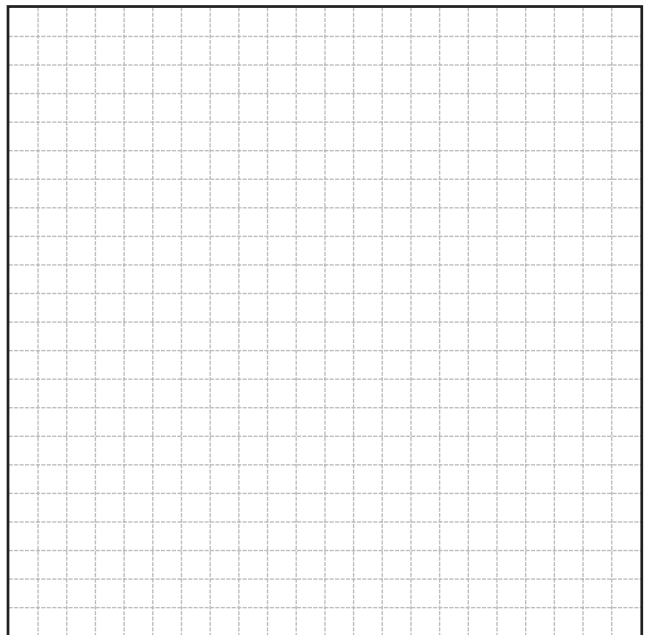
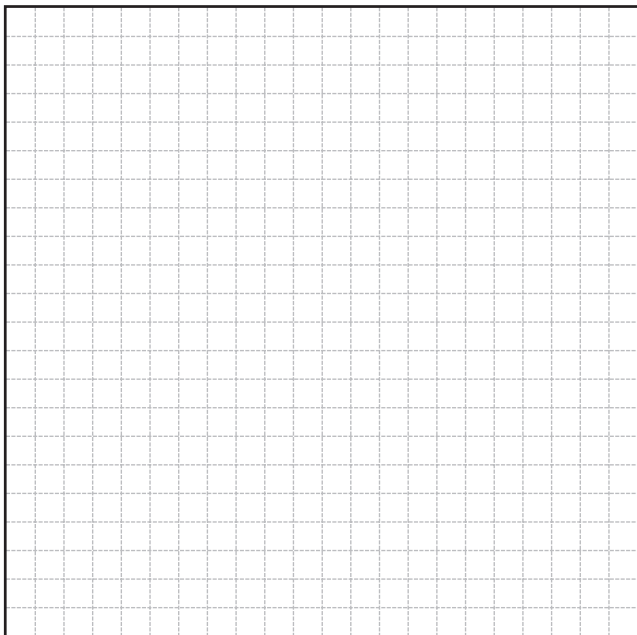
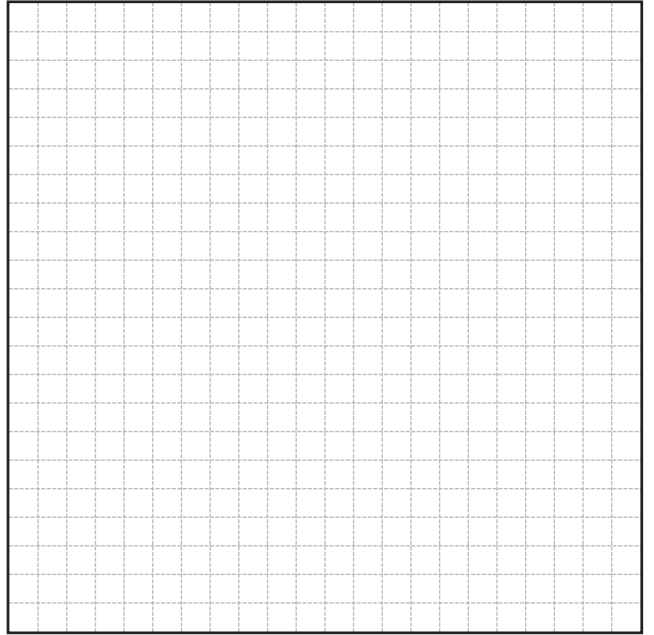
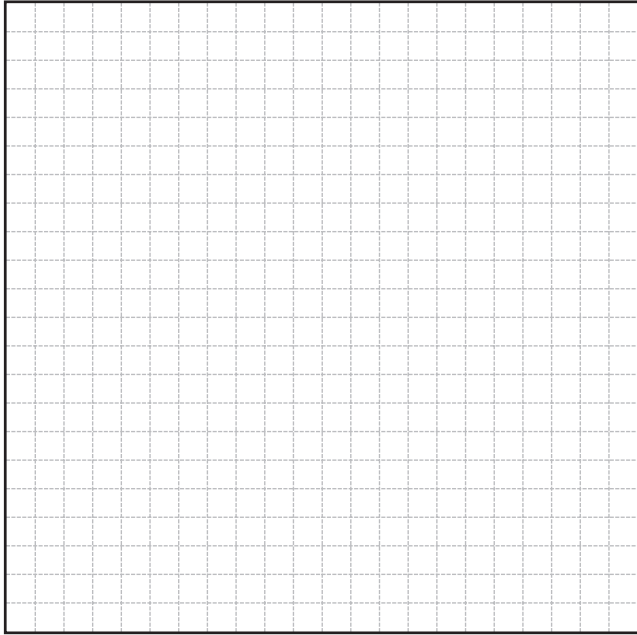


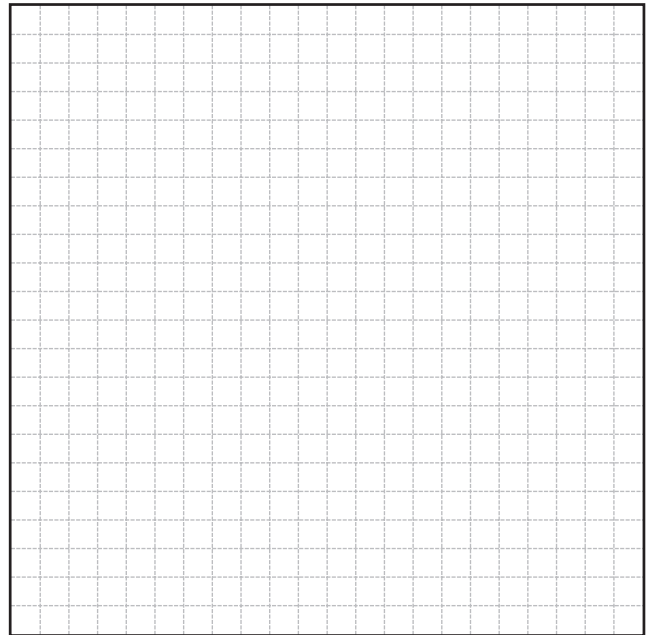
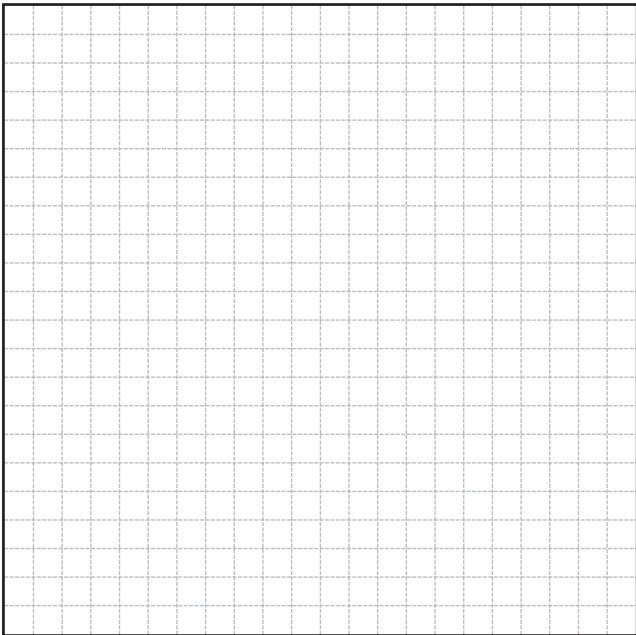
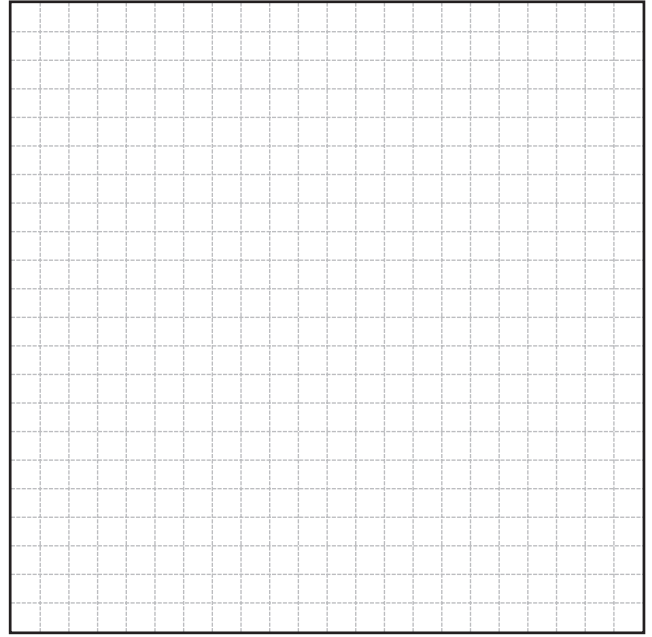
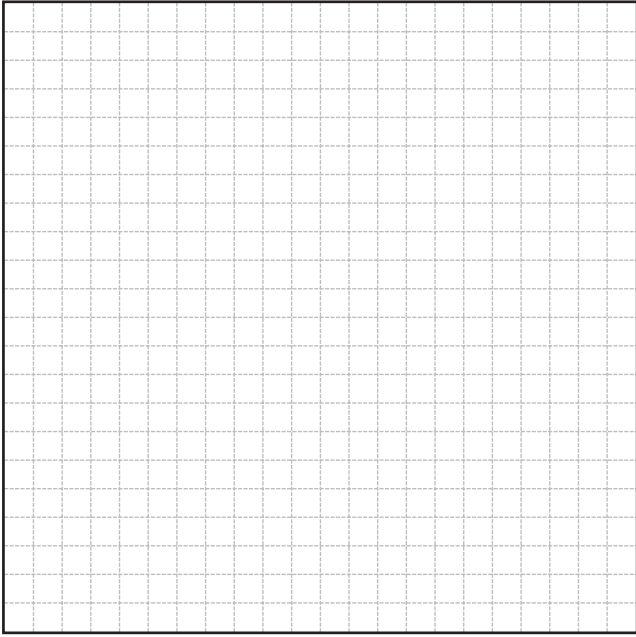


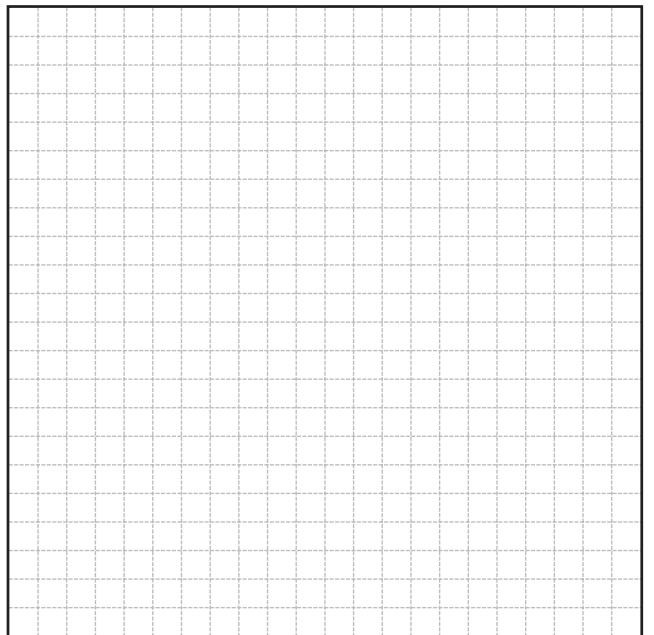
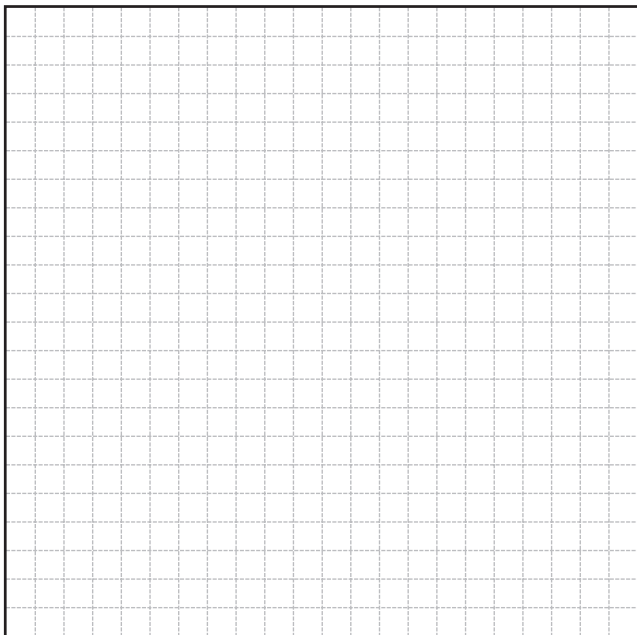
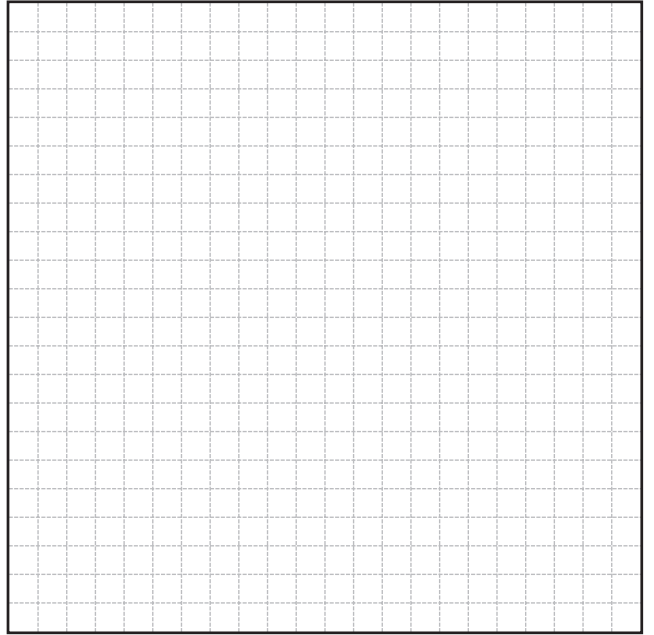
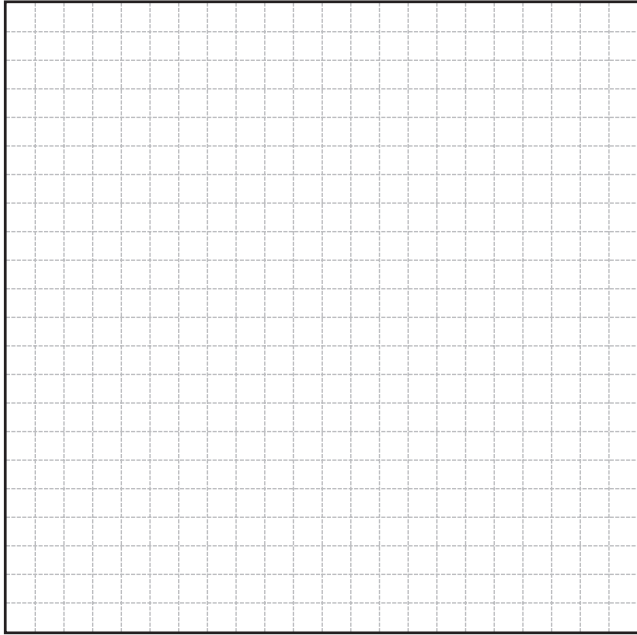


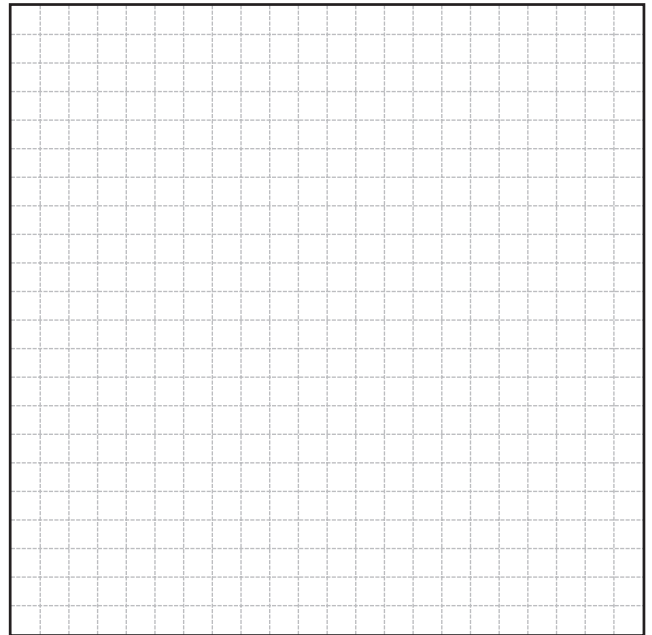
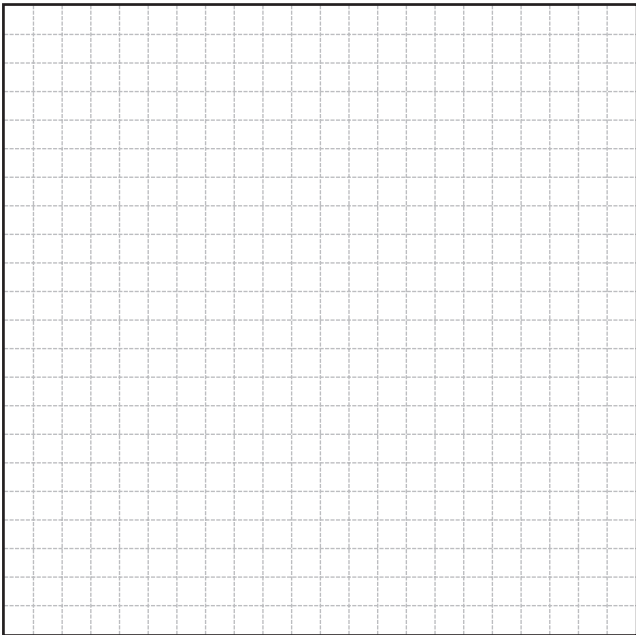
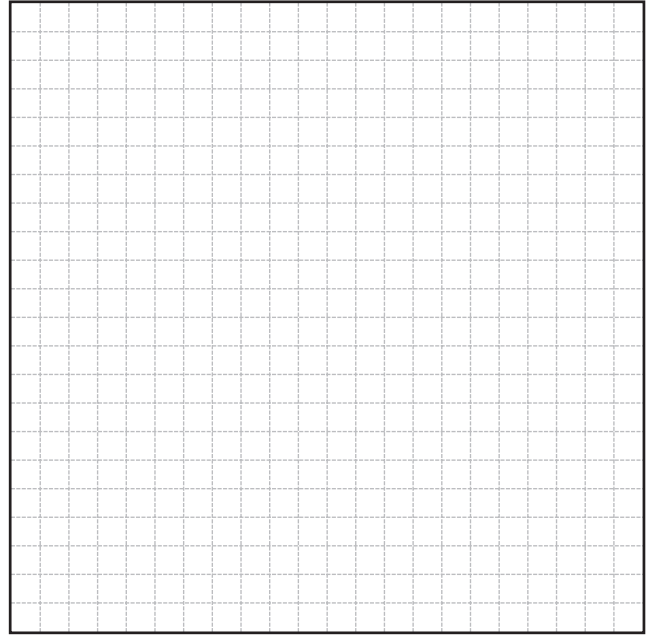
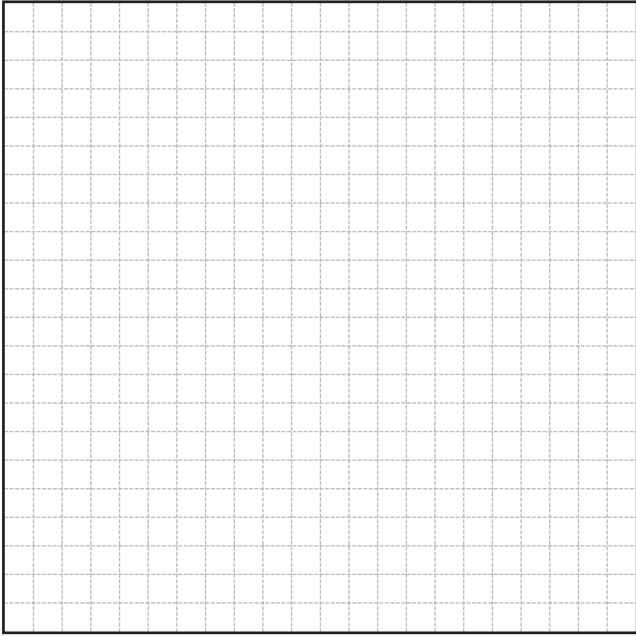


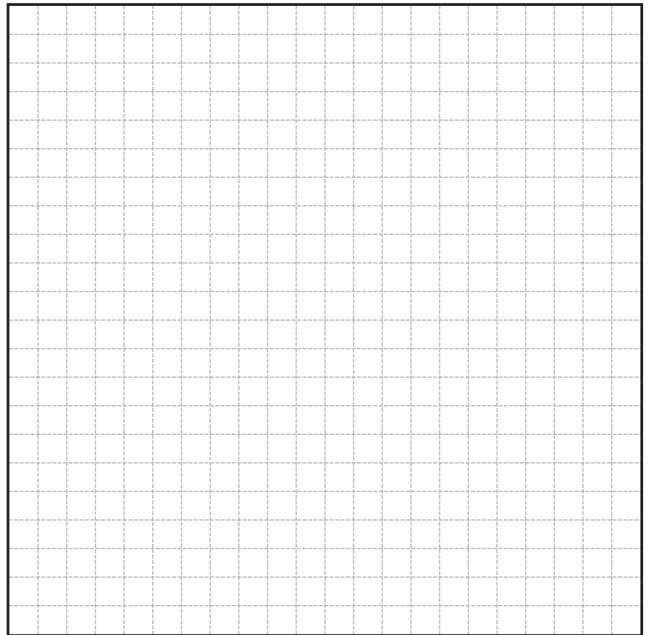
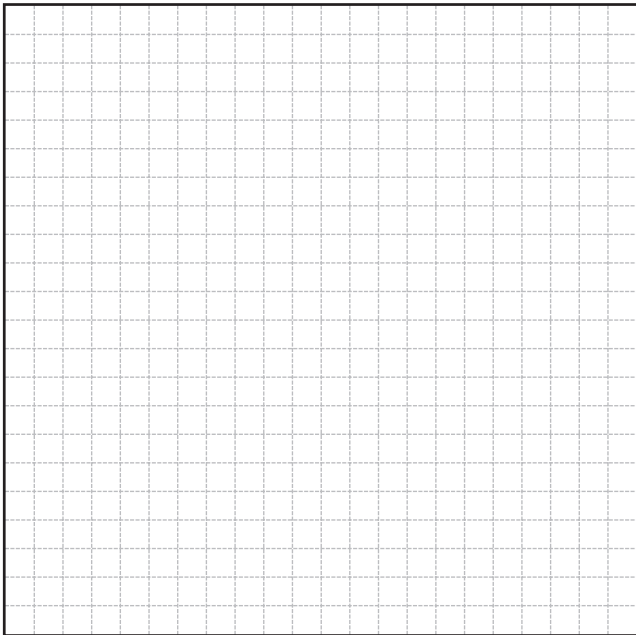
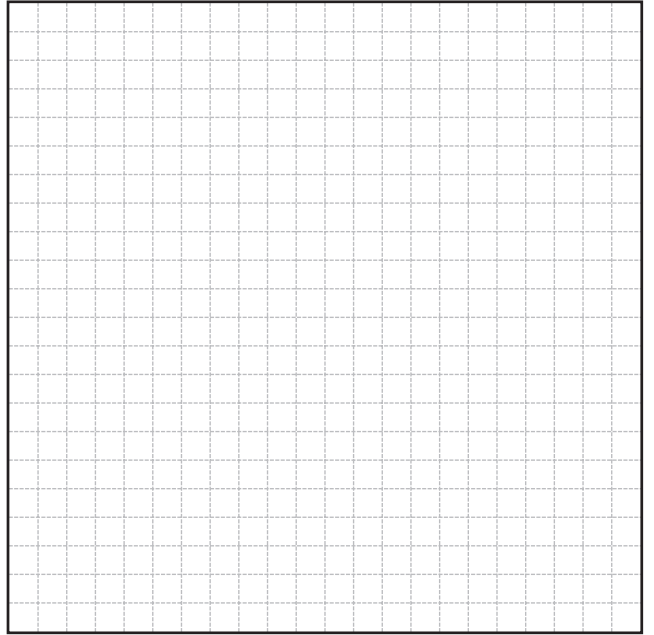
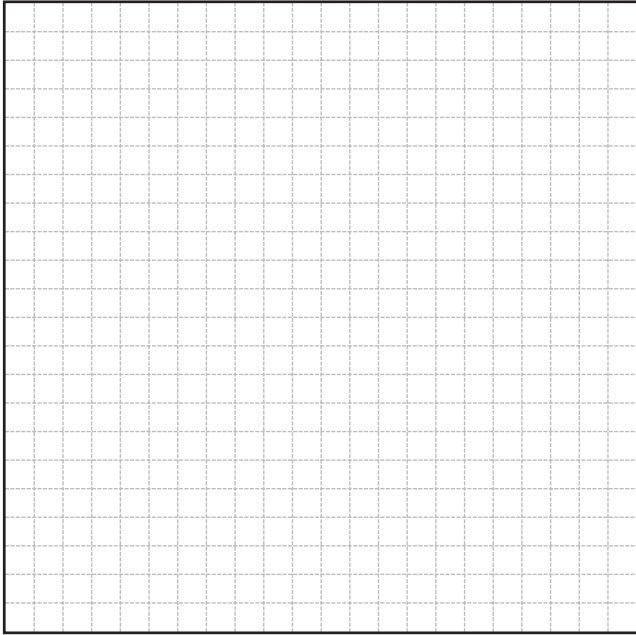


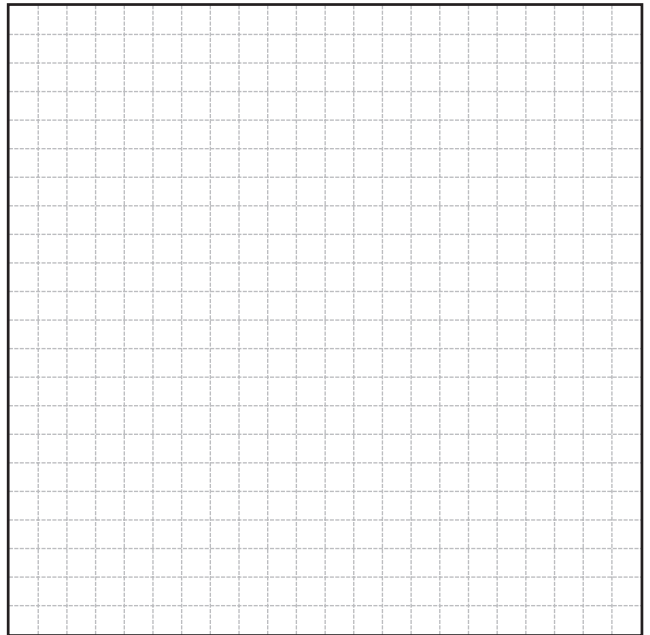
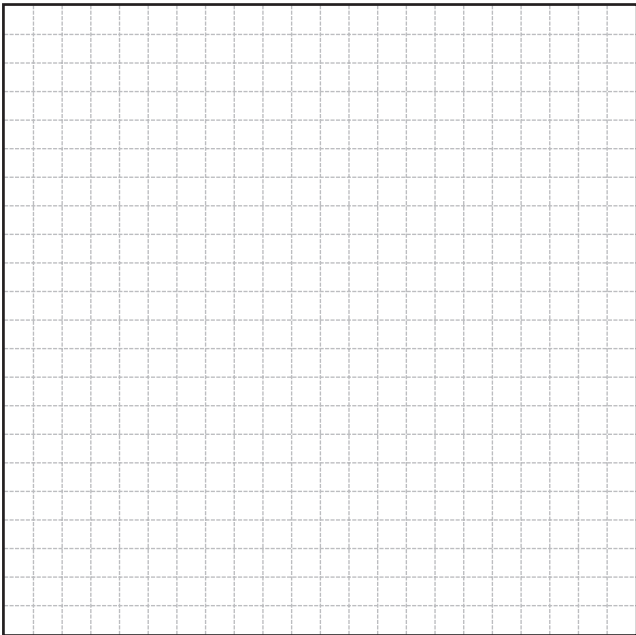
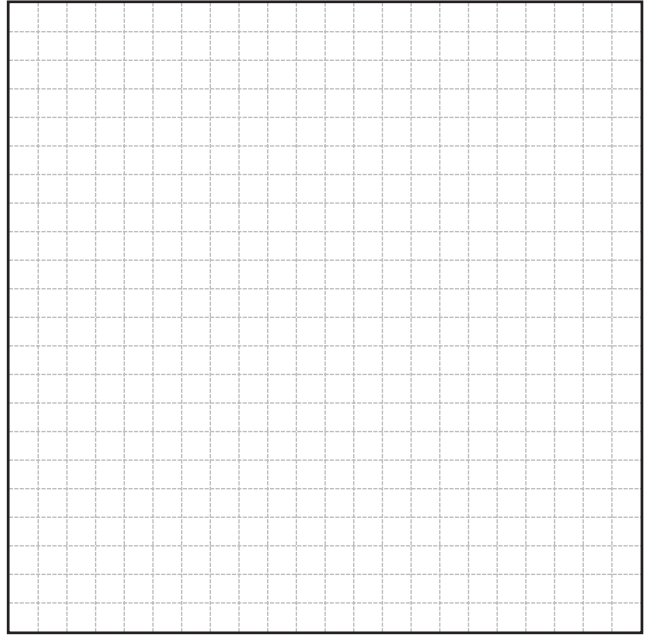
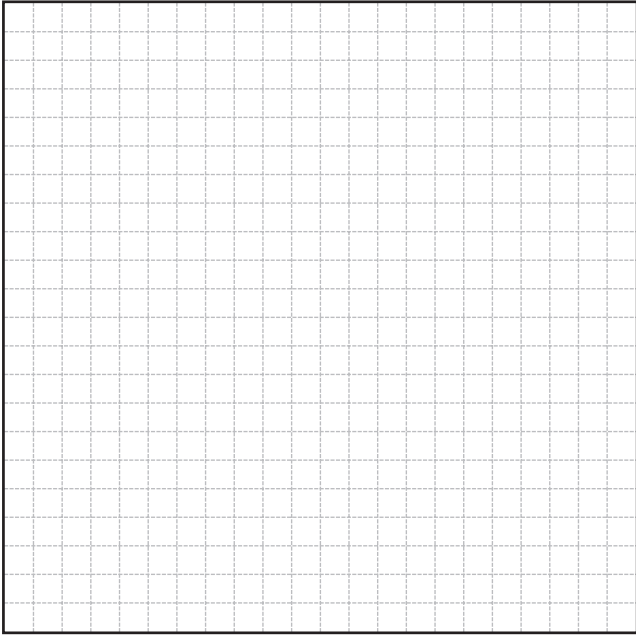


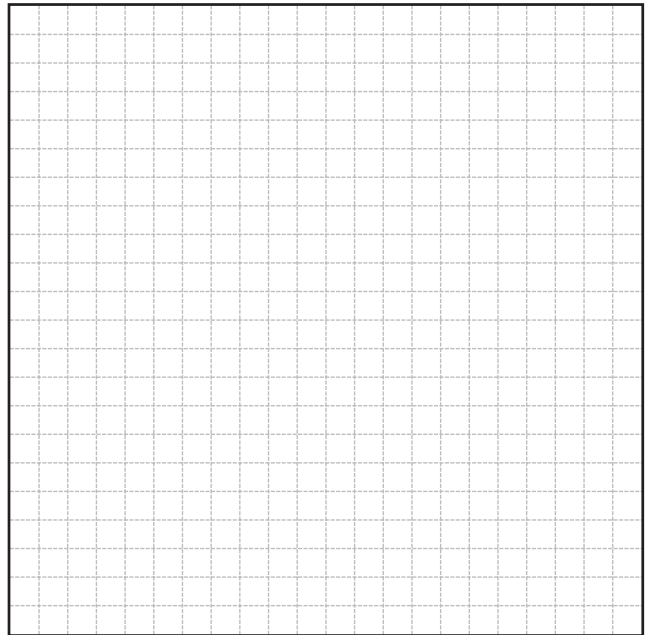
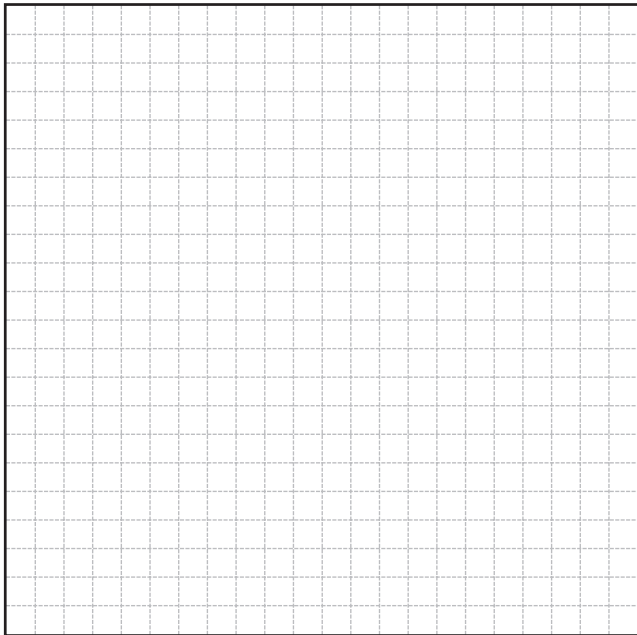
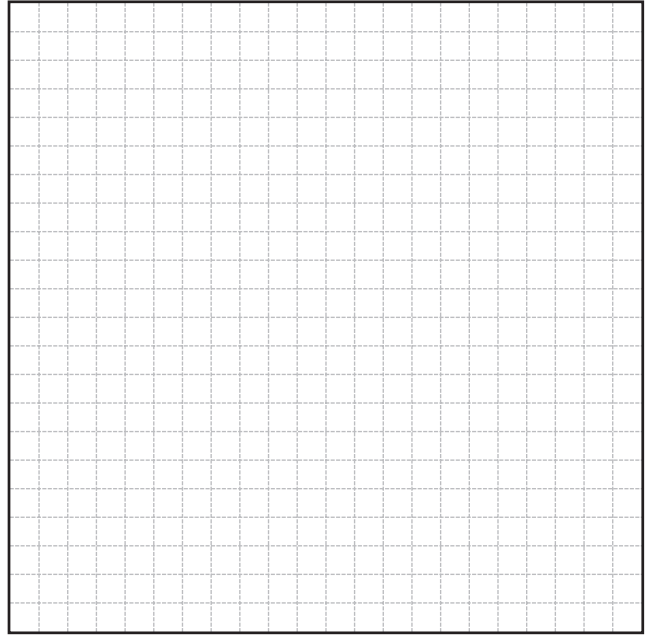
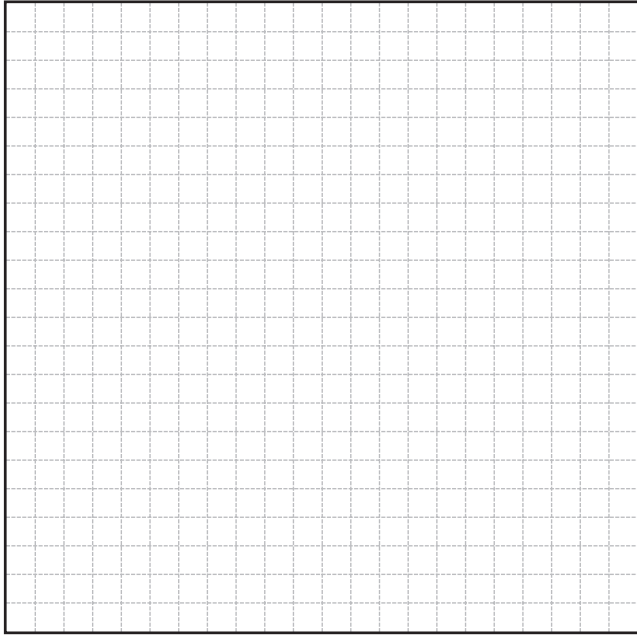


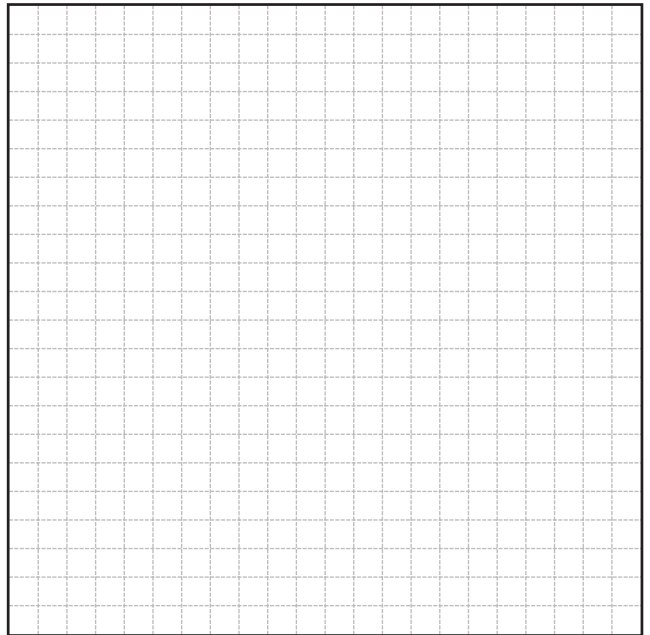
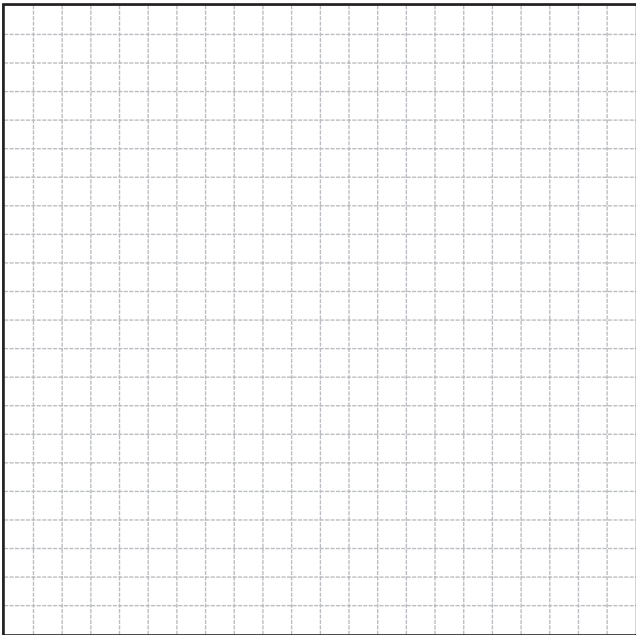
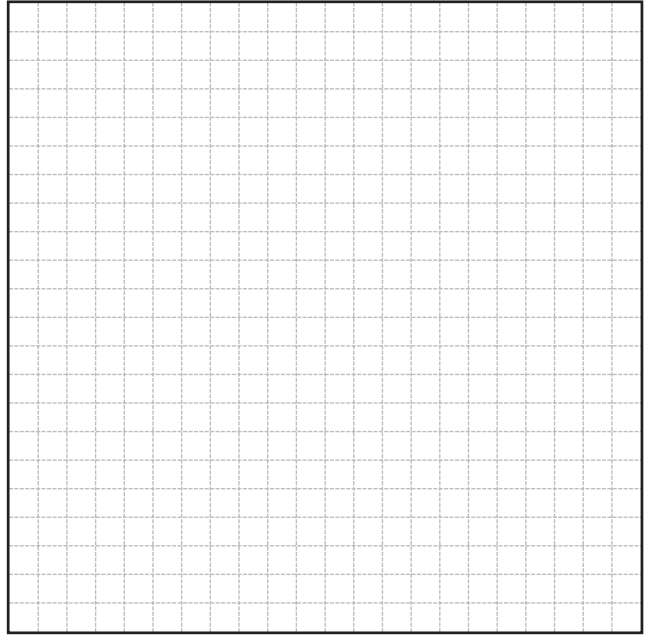
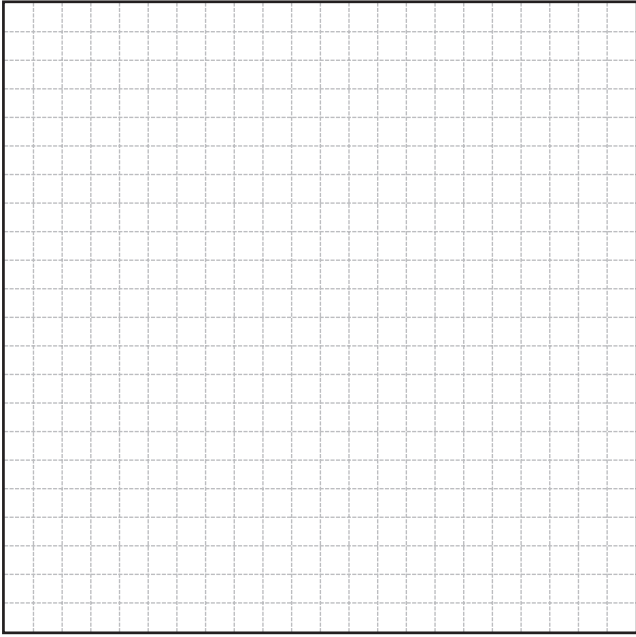


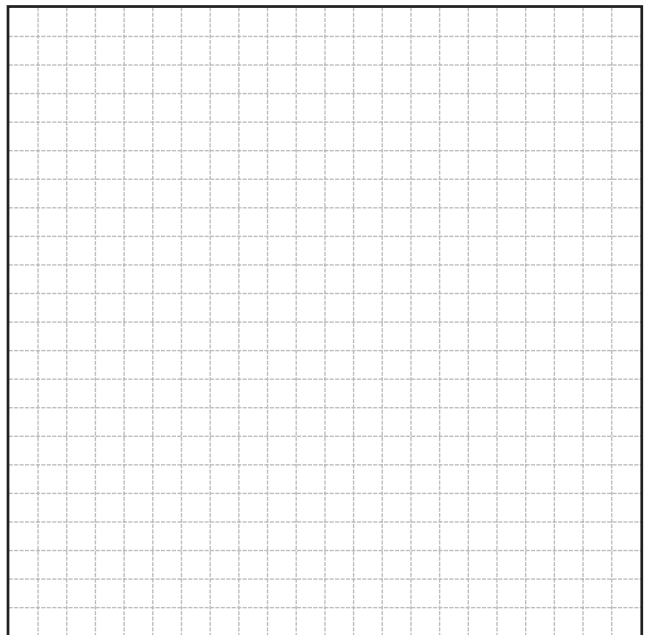
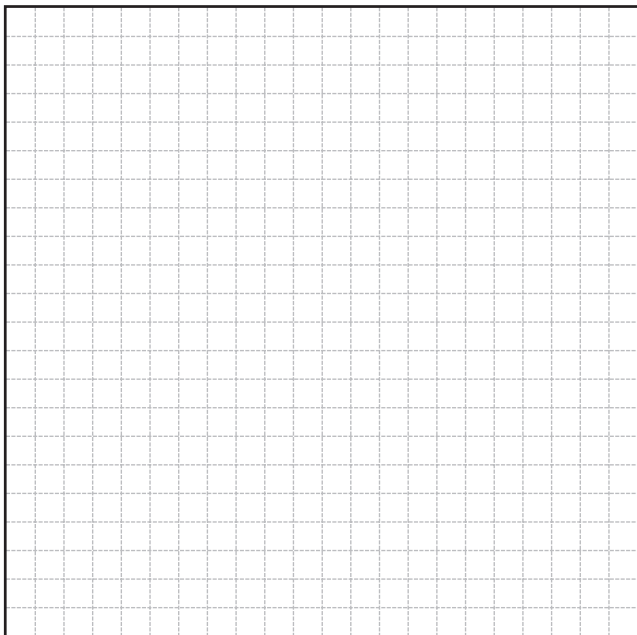
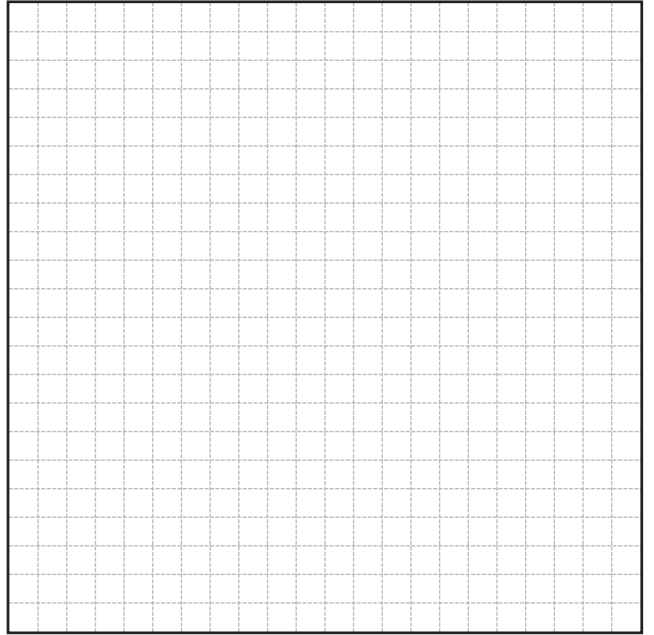
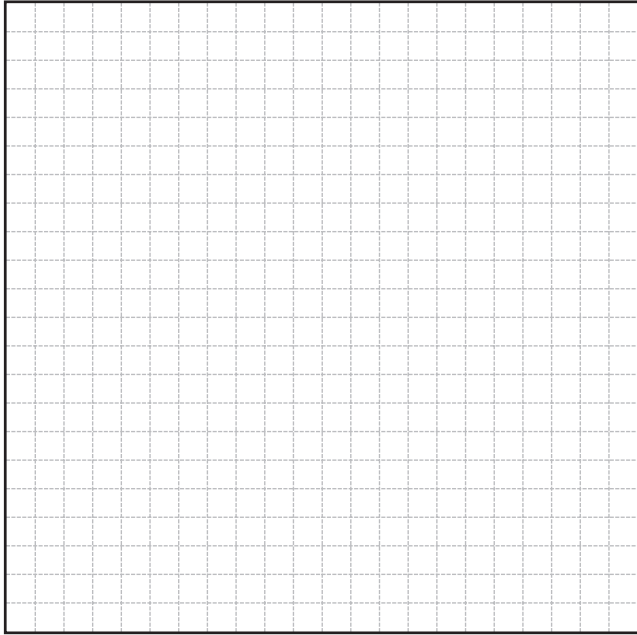


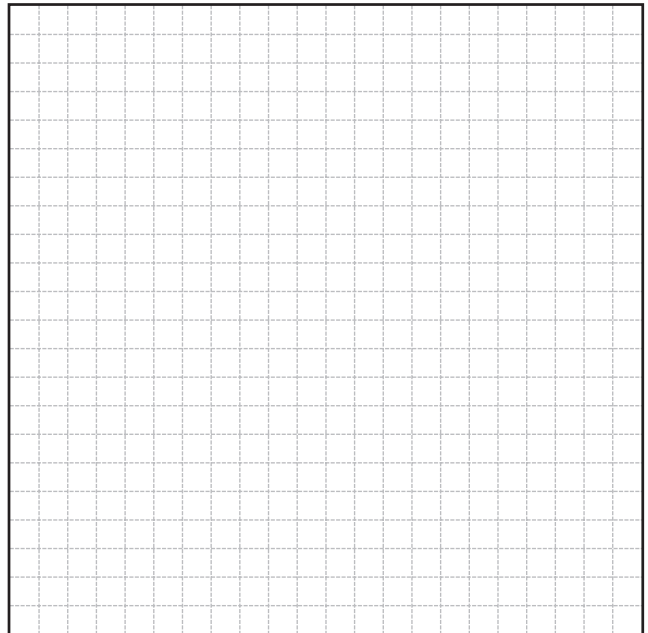
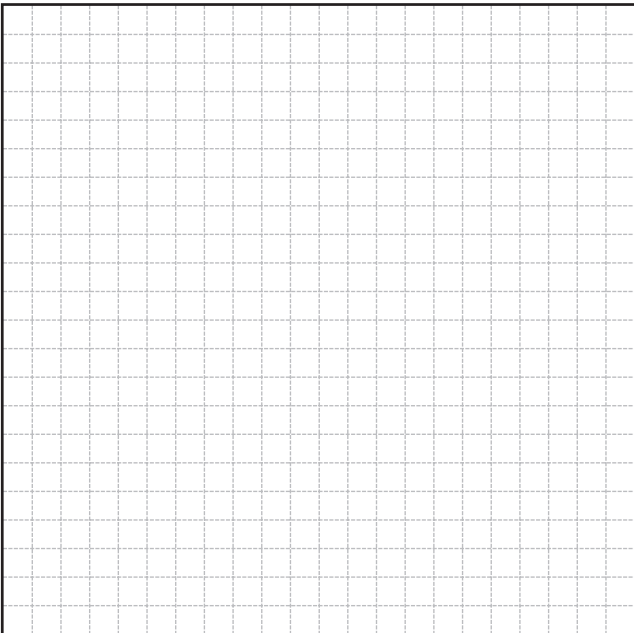
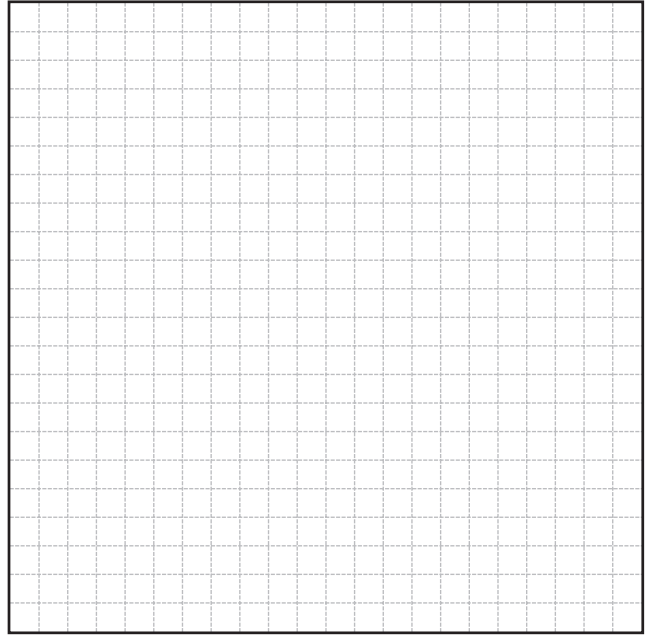
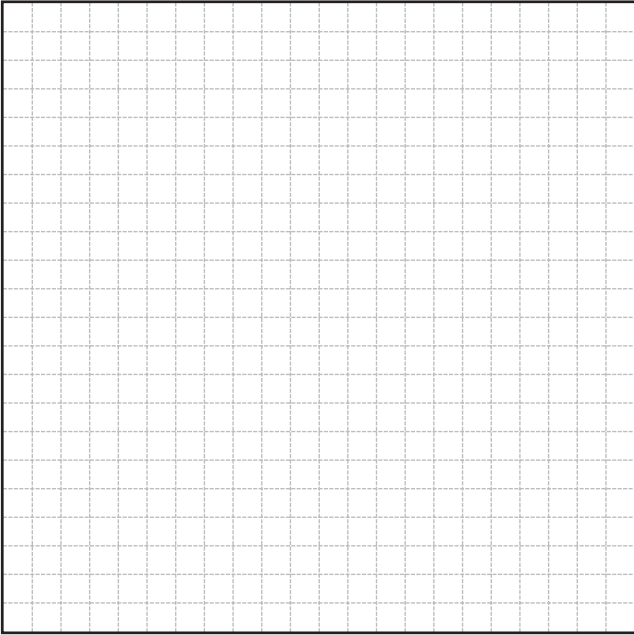












Formulas

ALGEBRA

General	
(x, y)	Ordered pair
$(x, 0)$	x -intercept
$(0, y)$	y -intercept

Symbols	
\approx	Approximately equal to
\neq	Is not equal to
$ a $	Absolute value of a
\sqrt{a}	Square root of a

Linear Equations	
$m = \frac{y_2 - y_1}{x_2 - x_1}$	Slope
$ax + b = c$	One variable
$y = mx + b$	Slope-intercept form
$ax + by = c$	General form
$y - y_1 = m(x - x_1)$	Point-slope form

Arithmetic Sequences	
$a_n = a_1 + (n - 1)d$	Explicit formula
$a_n = a_{n-1} + d$	Recursive formula

Geometric Sequences	
$a_n = a_1 \cdot r^{n-1}$	Explicit formula
$a_n = a_{n-1} \cdot r$	Recursive formula

Exponential Equations	
$y = ab^x$	General form
$y = ab^{\frac{x}{t}}$	Exponential equation
$y = a(1 + r)^t$	Exponential growth
$y = a(1 - r)^t$	Exponential decay
$A = P \left(1 + \frac{r}{n} \right)^{nt}$	
Compounded...	n (number of times per year)
Yearly/annually	1
Semi-annually	2
Quarterly	4
Monthly	12
Weekly	52
Daily	365

Functions	
$f(x)$	Notation, “ f of x ”
$f(x) = mx + b$	Linear function
$f(x) = b^x + k$	Exponential function
$(f + g)(x) = f(x) + g(x)$	Addition
$(f - g)(x) = f(x) - g(x)$	Subtraction
$(f \cdot g)(x) = f(x) \cdot g(x)$	Multiplication
$(f \div g)(x) = f(x) \div g(x)$	Division

Formulas

Properties of Equality	
Property	In symbols
Reflexive property of equality	$a = a$
Symmetric property of equality	If $a = b$, then $b = a$.
Transitive property of equality	If $a = b$ and $b = c$, then $a = c$.
Addition property of equality	If $a = b$, then $a + c = b + c$.
Subtraction property of equality	If $a = b$, then $a - c = b - c$.
Multiplication property of equality	If $a = b$ and $c \neq 0$, then $a \cdot c = b \cdot c$.
Division property of equality	If $a = b$ and $c \neq 0$, then $a \div c = b \div c$.
Substitution property of equality	If $a = b$, then b may be substituted for a in any expression containing a .

Properties of Operations	
Property	General rule
Commutative property of addition	$a + b = b + a$
Associative property of addition	$(a + b) + c = a + (b + c)$
Commutative property of multiplication	$a \cdot b = b \cdot a$
Associative property of multiplication	$(a \cdot b) \cdot c = a \cdot (b \cdot c)$
Distributive property of multiplication over addition	$a \cdot (b + c) = a \cdot b + a \cdot c$

Properties of Inequality	
Property	
If $a > b$ and $b > c$, then $a > c$.	
If $a > b$, then $b < a$.	
If $a > b$, then $-a < -b$.	
If $a > b$, then $a \pm c > b \pm c$.	
If $a > b$ and $c > 0$, then $a \cdot c > b \cdot c$.	
If $a > b$ and $c < 0$, then $a \cdot c < b \cdot c$.	
If $a > b$ and $c > 0$, then $a \div c > b \div c$.	
If $a > b$ and $c < 0$, then $a \div c < b \div c$.	

Laws of Exponents	
Law	General rule
Multiplication of exponents	$b^m \cdot b^n = b^{m+n}$
Power of exponents	$(b^m)^n = b^{mn}$ $(bc)^n = b^n c^n$
Division of exponents	$\frac{b^m}{b^n} = b^{m-n}$
Exponents of zero	$b^0 = 1$
Negative exponents	$b^{-n} = \frac{1}{b^n}$ and $\frac{1}{b^{-n}} = b^n$

Formulas

DATA ANALYSIS

$IQR = Q_3 - Q_1$	Interquartile range
$Q_1 - 1.5(IQR)$	Lower outlier formula
$Q_3 + 1.5(IQR)$	Upper outlier formula
$y - y_0$	Residual formula

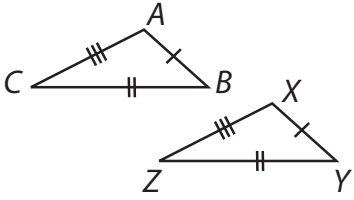
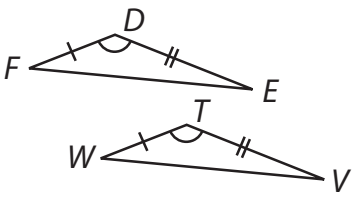
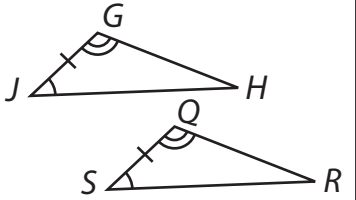
GEOMETRY

Symbols	
$d(\widehat{ABC})$	Arc length
\angle	Angle
\odot	Circle
\cong	Congruent
\overleftrightarrow{PQ}	Line
\overline{PQ}	Line Segment
\overrightarrow{PQ}	Ray
\parallel	Parallel
\perp	Perpendicular
\bullet	Point
\triangle	Triangle
A'	Prime
$^\circ$	Degrees

Translations	
$T_{(h,k)} = (x + h, y + k)$	Translation

Reflections	
$r_{x\text{-axis}}(x, y) = (x, -y)$	Through the x -axis
$r_{y\text{-axis}}(x, y) = (-x, y)$	Through the y -axis
$r_{y=x}(x, y) = (y, x)$	Through the line $y = x$

Rotations	
$R_{90}(x, y) = (-y, x)$	Counterclockwise 90° about the origin
$R_{180}(x, y) = (-x, -y)$	Counterclockwise 180° about the origin
$R_{270}(x, y) = (y, -x)$	Counterclockwise 270° about the origin

Congruent Triangle Statements		
Side-Side-Side (SSS)	Side-Angle-Side (SAS)	Angle-Side-Angle (ASA)
		
$\triangle ABC \cong \triangle XYZ$	$\triangle DEF \cong \triangle TVW$	$\triangle GHJ \cong \triangle QRS$

Formulas

Pythagorean Theorem

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

Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Distance formula

Area

$A = lw$	Rectangle
$A = \frac{1}{2}bh$	Triangle

MEASUREMENTS

Length

Metric

1 kilometer (km) = 1000 meters (m)

1 meter (m) = 100 centimeters (cm)

1 centimeter (cm) = 10 millimeters (mm)

Customary

1 mile (mi) = 1760 yards (yd)

1 mile (mi) = 5280 feet (ft)

1 yard (yd) = 3 feet (ft)

1 foot (ft) = 12 inches (in)

Volume and Capacity

Metric

1 liter (L) = 1000 milliliters (mL)

Customary

1 gallon (gal) = 4 quarts (qt)

1 quart (qt) = 2 pints (pt)

1 pint (pt) = 2 cups (c)

1 cup (c) = 8 fluid ounces (fl oz)

Weight and Mass

Metric

1 kilogram (kg) = 1000 grams (g)

1 gram (g) = 1000 milligrams (mg)

1 metric ton (MT) = 1000 kilograms (kg)

Customary

1 ton (T) = 2000 pounds (lb)

1 pound (lb) = 16 ounces (oz)

PROGRAM OVERVIEW

Glossary

English		Español
A		
acute angle an angle measuring less than 90° but greater than 0°	U5-2	ángulo agudo ángulo que mide menos de 90° pero más de 0°
algebraic expression a mathematical statement that includes numbers, operations, and variables to represent a number or quantity	U1-3	expresión algebraica declaración matemática que incluye números, operaciones y variables para representar un número o una cantidad
algebraic inequality an inequality that has one or more variables and contains at least one of the following symbols: $<$, $>$, \leq , \geq , or \neq	U1-167	desigualdad algebraica desigualdad que tiene una o más variables y contiene al menos uno de los siguientes símbolos: $<$, $>$, \leq , \geq , o \neq
altitude the perpendicular line from a vertex of a figure to its opposite side; height	U5-91	altitud línea perpendicular desde un vértice de una figura hasta su lado opuesto; altura
angle two rays or line segments sharing a common endpoint; the symbol used is \angle	U5-2 U5-91	ángulo dos semirrectas o segmentos de línea que comparten un extremo común; el símbolo utilizado es \angle
angle of rotation the measure of the angle created by the preimage vertex to the point of rotation to the image vertex. All of these angles are congruent when a figure is rotated.	U5-254	ángulo de rotación medida del ángulo creada por el vértice del preimagen hasta el punto de rotación del vértice del imagen. Todos estos ángulos son congruentes cuando una figura está rotada.
angle-side-angle (ASA) if two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent	U5-312	ángulo-lado-ángulo (ASA) si dos ángulos y el lado incluido de un triángulo son congruentes con los dos ángulos y el lado incluido de otro triángulo, entonces los dos triángulos son congruentes
arc length the distance between the endpoints of an arc; written as $d(\widehat{ABC})$	U5-2	longitud de arco distancia entre los extremos de un arco; se expresa como $d(\widehat{ABC})$
area the amount of space inside the boundary of a two-dimensional figure	U6-58	área cantidad de espacio dentro del límite de una figura bidimensional

PROGRAM OVERVIEW

Glossary

English

arithmetic sequence a linear function with a domain of positive consecutive integers in which the difference between any two consecutive terms is equal

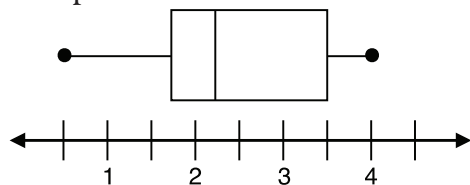
asymptote a line that a graph gets closer and closer to, but never crosses or touches

base the factor being multiplied together in an exponential expression; in the expression a^b , a is the base

bisect to cut in half

box plot a plot showing the minimum, maximum, first quartile, median, and third quartile of a data set; the middle 50% of the data is indicated by a box.

Example:



Español

U2-457 **secuencia aritmética** función lineal con dominio de enteros consecutivos positivos, en la que la diferencia entre dos términos consecutivos es equivalente

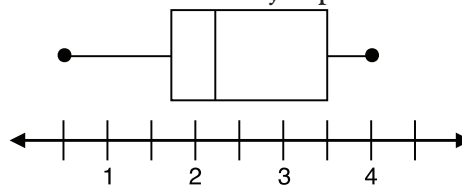
U2-167 U2-246 **asíntota** línea a la que se acerca cada vez más un gráfico, pero sin cruzarlo ni tocarlo

B

U1-3 **base** factor que se multiplica en forma conjunta en una expresión exponencial; en la expresión a^b , a es la base

U5-91 **bisecar** cortar por la mitad

U4-3 **diagrama de caja** diagrama que muestra el mínimo, máximo, primer cuartil, mediana y tercer cuartil de un conjunto de datos; se indica con una caja el 50% medio de los datos. Ejemplo:



C

causation a relationship between two events where a change in one event is responsible for a change in the second event

circle the set of points on a plane at a certain distance, or radius, from a single point, the center. The set of points forms a two-dimensional curve that measures 360° .

circular arc on a circle, the unshared set of points between the endpoints of two radii

U4-175 **causalidad** relación entre dos eventos en la que un cambio en un evento es responsable por un cambio en el segundo evento

U5-2 U5-175 **círculo** conjunto de puntos en un plano a determinada distancia, o radio, de un único punto, el centro. El conjunto de puntos forma una curva bidimensional que mide 360° .

U5-2 **arco circular** en un círculo, conjunto de puntos no compartidos entre los extremos de dos radios

PROGRAM OVERVIEW

Glossary

English		Español
clockwise rotating a figure in the direction that the hands on a clock move	U5-58 U5-254	sentido horario rotación de una figura en la dirección en que se mueven las agujas de un reloj
coefficient the number multiplied by a variable in an algebraic expression	U1-3	coeficiente número multiplicado por una variable en una expresión algebraica
common difference the number added to each consecutive term in an arithmetic sequence	U2-457	diferencia común número sumado a cada término consecutivo en una secuencia aritmética
compass an instrument for creating circles or transferring measurements that consists of two pointed branches joined at the top by a pivot	U5-91	compás instrumento utilizado para crear círculos o transferir medidas, que consiste en dos brazos terminados en punta y unidos en la parte superior por un pivote
compression a transformation in which a figure becomes smaller; compressions may be horizontal (affecting only horizontal lengths), vertical (affecting only vertical lengths), or both	U5-254	compresión transformación en la que una figura se hace más pequeña; las compresiones pueden ser horizontales (cuando afectan sólo la longitud horizontal), verticales (cuando afectan sólo la longitud vertical), o en ambos sentidos
conditional relative frequency the percentage of a joint frequency as compared to the total number of respondents, total number of people with a given characteristic, or the total number of times a specific response was given	U4-76	frecuencia condicional relativa porcentaje de una frecuencia conjunta en comparación con la cantidad total de respondedores, cantidad total de personas con una determinada característica, o cantidad total de veces que se dio una respuesta específica
congruency transformation a transformation in which a geometric figure moves but keeps the same size and shape	U5-254	transformación de congruencia transformación en la que se mueve una figura geométrica pero se mantiene el mismo tamaño y la misma forma
congruent figures are congruent if they have the same shape, size, lines, and angles; the symbol for representing congruency between figures is \cong	U5-2 U5-91 U5-175 U5-254 U6-2	congruente las figuras son congruentes si tienen la misma forma, tamaño, rectas y ángulos; el símbolo para representar la congruencia entre figuras es \cong
congruent angles two angles that have the same measure	U5-312	ángulos congruentes dos ángulos con la misma medida

PROGRAM OVERVIEW

Glossary

English		Español
congruent sides two sides that have the same length	U5-312	lados congruentes dos lados con la misma longitud
congruent triangles triangles having the same angle measures and side lengths	U5-312	triángulos congruentes triángulos con las mismas medidas de ángulos y longitudes de lados
consistent a system of equations with at least one ordered pair that satisfies both equations	U3-67	consistente sistema de ecuaciones con al menos un par ordenado que satisface ambas ecuaciones
constant a quantity that does not change	U1-3	constante cantidad que no cambia
constant ratio the number each consecutive term is multiplied by in a geometric sequence	U2-457	proporción constante el número que cada término esta multiplicado por en una secuencia geométrica
constraint a restriction or limitation on either the input or output values	U1-167	limitación restricción o límite en los valores de entrada o salida
construct to create a precise geometric representation using a straightedge along with either patty paper (tracing paper), a compass, or a reflecting device	U5-91	construir crear una representación geométrica precisa mediante regla de borde recto y papel encerado (papel para calcar), compás o un dispositivo de reflexión
construction a precise representation of a figure using a straightedge and a compass, patty paper and a straightedge, or a reflecting device and a straightedge	U5-91 U5-175	construcción representación precisa de una figura mediante regla de borde recto y compás, papel encerado y una regla de borde recto, o un dispositivo de reflexión y una regla de borde recto
continuous having no breaks	U2-167	continuo sin interrupciones
coordinate plane a set of two number lines, called the axes, that intersect at right angles	U1-93	plano de coordenadas conjunto de dos rectas numéricas, denominadas ejes, que se cortan en ángulos rectos
correlation a relationship between two events, where a change in one event is related to a change in the second event. A correlation between two events does not imply that the first event is responsible for the change in the second event; the correlation only shows how likely it is that a change also took place in the second event.	U4-175	correlación relación entre dos eventos en la que el cambio en un evento se relaciona con un cambio en el segundo evento. Una correlación entre dos eventos no implica que el primero sea responsable del cambio en el segundo; la correlación sólo demuestra cuán probable es que también se produzca un cambio en el segundo evento.

PROGRAM OVERVIEW

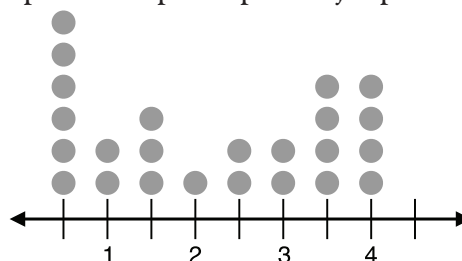
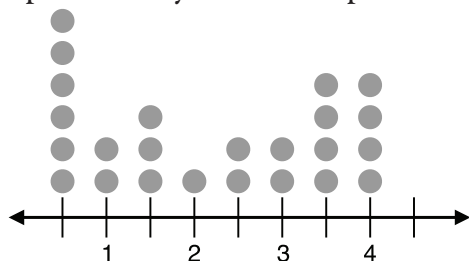
Glossary

English		Español
correlation coefficient a quantity that assesses the strength of a linear relationship between two variables, ranging from -1 to 1 ; a correlation coefficient of -1 indicates a strong negative correlation, a correlation coefficient of 1 indicates a strong positive correlation, and a correlation coefficient of 0 indicates a very weak or no linear correlation	U4-175	coeficiente de correlación cantidad que evalúa la fuerza de una relación lineal entre dos variables, que varía de -1 a 1 ; un coeficiente de correlación de -1 indica una fuerte correlación negativa, un coeficiente de correlación de 1 indica una fuerte correlación positiva, y un coeficiente de correlación de 0 indica una correlación muy débil o no lineal
corresponding angles angles of two figures that lie in the same position relative to the figure. In transformations, the corresponding vertices are the preimage and image vertices, so $\angle A$ and $\angle A'$ are corresponding vertices and so on.	U5-254 U5-312	ángulos correspondientes ángulos de dos figuras que se ubican en la misma posición relativa a la figura. En las transformaciones, los vértices correspondientes son los vértices de preimagen e imagen, de manera que $\angle A$ y $\angle A'$ son los vértices correspondientes, etc.
Corresponding Parts of Congruent Triangles are Congruent (CPCTC) if two or more triangles are proven congruent, then all of their corresponding parts are congruent as well	U5-312	Las partes correspondientes de triángulos congruentes son congruentes (CPCTC) si se comprueba que dos o más triángulos son congruentes, entonces todas sus partes correspondientes son también congruentes
corresponding sides sides of two figures that lie in the same position relative to the figure. In transformations, the corresponding sides are the preimage and image sides, so \overline{AB} and $\overline{A'B'}$ are corresponding sides and so on.	U5-254 U5-312	lados correspondientes lados de dos figuras que están en la misma posición relativa a la figura. En las transformaciones, los lados correspondientes son los de preimagen e imagen, entonces \overline{AB} y $\overline{A'B'}$ son los lados correspondientes, etc.
counterclockwise rotating a figure in the opposite direction that the hands on a clock move	U5-58 U5-254	en sentido antihorario rotación de una figura en la dirección opuesta a la que se mueven las agujas de un reloj
curve the graphical representation of the solution set for $y = f(x)$; in the special case of a linear equation, the curve will be a line	U2-2	curva representación gráfica del conjunto de soluciones para $y = f(x)$; en el caso especial de una ecuación lineal, la curva será una recta

PROGRAM OVERVIEW

Glossary

English		Español
D		
dependent a system of equations that has an infinite number of solutions; lines coincide when graphed	U3-67	dependiente sistema de ecuaciones con una cantidad infinita de soluciones; las rectas coinciden cuando se grafican
dependent variable labeled on the y -axis; the quantity that is based on the input values of the independent variable; the output variable of a function	U1-93 U2-2	variable dependiente designada en el eje y ; cantidad que se basa en los valores de entrada de la variable independiente; variable de salida de una función
diameter a straight line passing through the center of a circle connecting two points on the circle; twice the radius	U5-175	diámetro línea recta que pasa por el centro de un círculo y conecta dos puntos en el círculo; dos veces el radio
dilation a transformation in which a figure is either enlarged or reduced by a scale factor in relation to a center point	U5-254	dilatación transformación en la que una figura se amplía o se reduce por un factor de escala en relación con un punto central
discrete individually separate and distinct	U2-139	discreto individualmente aparte y distinto
distance along a line the linear distance between two points on a given line; written as $d(PQ)$	U5-2	distancia a lo largo de una recta distancia lineal entre dos puntos de una determinada línea; se expresa como $d(PQ)$
distance formula formula that states the distance between points (x_1, y_1) and (x_2, y_2) is equal to $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	U6-2 U6-58	fórmula de distancia fórmula que establece la distancia entre los puntos (x_1, y_1) y (x_2, y_2) equivale a $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
domain the set of all inputs of a function; the set of x -values that are valid for the function	U2-2 U2-168	dominio conjunto de todas las entradas de una función; conjunto de valores x que son válidos para la función
dot plot a frequency plot that shows the number of times a response occurred in a data set, where each data value is represented by a dot. Example:	U4-3	diagrama de puntos diagrama de frecuencia que muestra la cantidad de veces que se produjo una respuesta en un conjunto de datos, en el que cada valor de dato está representado por un punto. Ejemplo:



PROGRAM OVERVIEW

Glossary

English		Español
drawing a precise representation of a figure, created with measurement tools such as a protractor and a ruler	U5-92	dibujo representación precisa de una figura, creada con herramientas de medición tales como transportador y regla
E		
elimination method adding or subtracting the equations in the system together so that one of the variables is eliminated; multiplication might be necessary before adding the equations together	U3-67	método de eliminación suma o sustracción conjunta de ecuaciones en el sistema de manera de eliminar una de las variables; podría requerirse multiplicación antes de la suma conjunta de las ecuaciones
end behavior the behavior of the graph as x approaches positive infinity and as x approaches negative infinity	U2-246	comportamiento final el comportamiento de la gráfica al aproximarse x a infinito positivo o a infinito negativo
endpoint either of two points that mark the ends of a line segment; a point that marks the end of a ray	U5-92	extremo uno de los dos puntos que marcan el final de un segmento de recta; punto que marca el final de una semirrecta
equation a mathematical sentence that uses an equal sign (=) to show that two quantities are equal	U1-33 U2-371	ecuación declaración matemática que utiliza el signo igual (=) para demostrar que dos cantidades son equivalentes
equidistant the same distance from a reference point	U5-92 U5-255	equidistante a la misma distancia de un punto de referencia
equilateral triangle a triangle with all three sides equal in length	U5-175	triángulo equilátero triángulo con sus tres lados de la misma longitud
explicit equation an equation describing the n th term of a pattern	U2-371	ecuación explícita ecuación que describe el <i>enésimo</i> término de un patrón
explicit formula a formula used to find the n th term of a sequence; the explicit formula for an arithmetic sequence is $a_n = a_1 + (n - 1)d$; the explicit formula for a geometric sequence is $a_n = a_1 \cdot r^{n-1}$	U2-139 U2-457	fórmula explícita fórmula utilizada para encontrar el <i>enésimo</i> término de una secuencia; la fórmula explícita para una secuencia aritmética es $a_n = a_1 + (n - 1)d$; la fórmula explícita para una secuencia geométrica es $a_n = a_1 \cdot r^{n-1}$
exponent the number of times a factor is being multiplied together in an exponential expression; in the expression a^b , b is the exponent	U1-3	exponente cantidad de veces que se multiplica un factor en forma conjunta en una expresión exponencial; en la expresión a^b , b es el exponente

PROGRAM OVERVIEW

Glossary

English		Español
exponential decay an exponential equation with a base, b , that is between 0 and 1 ($0 < b < 1$); can be represented by the formula $y = a(1 - r)^t$, where a is the initial value, $(1 - r)$ is the decay rate, t is time, and y is the final value	U1-33 U1-93	decaimiento exponencial ecuación exponencial con una base, b , que está entre 0 y 1 ($0 < b < 1$); puede representarse con la fórmula $y = a(1 - r)^t$, en la que a es el valor inicial, $(1 - r)$ es la tasa de decaimiento, t es el tiempo, y y es el valor final
exponential equation an equation that has a variable in the exponent; the general form is $y = a \cdot b^x$, where a is the initial value, b is the base, x is the time, and y is the final output value. Another form is $y = ab^{\frac{x}{t}}$, where t is the time it takes for the base to repeat.	U1-33 U1-93 U2-371	ecuación exponencial ecuación con una variable en el exponente; la forma general es $y = a \cdot b^x$, en la que a es el valor inicial, b es la base, x es el tiempo, y y es el valor final de salida. Otra forma es $y = ab^{\frac{x}{t}}$, en la que t es el tiempo que tarda la base en repetirse.
exponential function a function that has a variable in the exponent: <ul style="list-style-type: none">the general form is $f(x) = ab^x$, where a is the initial value, b is the growth or decay factor, x is the time, and $f(x)$ is the final output valuecan also be written in the form $f(x) = b^x + k$, where b is a positive integer not equal to 1 and k can equal 0; the parameters are b and k. b is the growth factor and k is the vertical shift.	U2-246 U2-296 U2-484	función exponencial función con una variable en el exponente: <ul style="list-style-type: none">la forma general es $f(x) = ab^x$, en la que a es el valor inicial, b es el factor de crecimiento o decaimiento, x es el tiempo, y $f(x)$ es el valor de salidatambién puede expresarse en la forma $f(x) = b^x + k$, en donde b es un entero positivo diferente de 1 y k puede ser igual a 0; los parámetros son b y k. b es el factor de crecimiento y k es el desplazamiento vertical.
exponential growth an exponential equation with a base, b , greater than 1 ($b > 1$); can be represented by the formula $y = a(1 + r)^t$, where a is the initial value, $(1 + r)$ is the growth rate, t is time, and y is the final value	U1-33 U1-93	crecimiento exponencial ecuación exponencial con una base, b , mayor que 1 ($b > 1$); puede representarse con la fórmula $y = a(1 + r)^t$, en la que a es el valor inicial, $(1 + r)$ es la tasa de crecimiento, t es el tiempo, y y es el valor final

PROGRAM OVERVIEW

Glossary

English		Español
expression a combination of variables, quantities, and mathematical operations; 4 , $8x$, and $b + 10^2$ are all expressions.	U2-371	expresión combinación de variables, cantidades y operaciones matemáticas; 4 , $8x$, y $b + 10^2$ son todas expresiones.
extrema the minima and maxima of a function	U2-168	extremos los mínimos y máximos de una función
F		
factor one of two or more numbers or expressions that when multiplied produce a given product	U1-3 U2-296	factor uno de dos o más números o expresiones que cuando se multiplican generan un producto determinado
first quartile the value that identifies the lower 25% of the data; the median of the lower half of the data set; written as Q_1	U4-4	primer cuartil valor que identifica el 25% inferior de los datos; mediana de la mitad inferior del conjunto de datos; se expresa Q_1
formula a literal equation that states a specific rule or relationship among quantities	U1-187	fórmula ecuación literal que establece una regla específica o relación entre cantidades
function a relation in which every element of the domain is paired with exactly one element of the range; that is, for every value of x , there is exactly one value of y .	U2-2 U2-371 U2-422 U4-76	función relación en la que cada elemento de un dominio se combina con exactamente un elemento del rango; es decir, para cada valor de x , existe exactamente un valor de y .
function notation a way to name a function using $f(x)$ instead of y	U2-3	notación de función forma de nombrar una función con el uso de $f(x)$ en lugar de y
G		
geometric sequence an exponential function that results in a sequence of numbers separated by a constant ratio	U2-457	secuencia geométrica función exponencial que produce como resultado una secuencia de números separados por una proporción constante
graphing method solving a system by graphing equations on the same coordinate plane and finding the point of intersection	U3-67	método de representación gráfica resolución de un sistema mediante graficación de ecuaciones en el mismo plano de coordenadas y hallazgo del punto de intersección
growth factor the multiple by which a quantity increases or decreases over time	U2-296	factor de crecimiento múltiplo por el que aumenta o disminuye una cantidad con el tiempo

PROGRAM OVERVIEW

Glossary

English

Español

H

half plane a region containing all points that has one boundary, a straight line that continues in both directions infinitely

U2-83

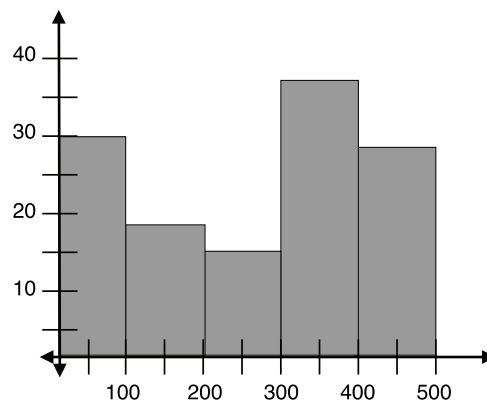
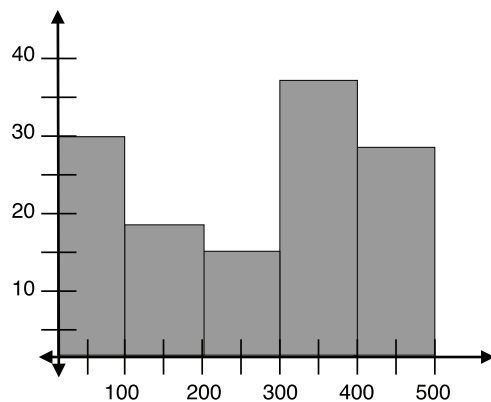
semiplano región que contiene todos los puntos y que tiene un límite, una línea recta que continúa en ambas direcciones de manera infinita

histogram a frequency plot that shows the number of times a response or range of responses occurred in a data set.

U4-4

histograma diagrama de frecuencia que muestra la cantidad de veces que se produce una respuesta o rango de respuestas en un conjunto de datos. Ejemplo:

Example:



I

image the new, resulting figure after a transformation

U5-3

imagen nueva figura resultante después de una transformación

U5-255

included angle the angle between two sides

U5-312

ángulo incluido ángulo entre dos lados

included side the side between two angles of a triangle

U5-312

lado incluido lado entre dos ángulos de un triángulo

inclusive a graphed line or boundary is part of an inequality's solution

U2-83

inclusivo línea graficada o límite que forma parte de una solución de desigualdad

inconsistent a system of equations with no solutions; lines are parallel when graphed

U3-67

inconsistente sistema de ecuaciones sin soluciones; las líneas son paralelas cuando se las grafica

independent a system of equations with exactly one solution

U3-67

independiente sistema de ecuaciones con una solución exacta

PROGRAM OVERVIEW

Glossary

English		Español
independent variable labeled on the x -axis; the quantity that changes based on values chosen; the input variable of a function	U1-93 U2-3	variable independiente designada en el eje x ; cantidad que cambia según valores seleccionados; variable de entrada de una función
inequality a mathematical sentence that shows the relationship between quantities that are not equivalent	U1-33 U1-167	desigualdad declaración matemática que demuestra la relación entre cantidades que no son equivalentes
inscribe to draw one figure within another figure so that every vertex of the enclosed figure touches the outside figure	U5-175	inscribir dibujar una figura dentro de otra de manera que cada vértice de la figura interior toque la exterior
integer a number that is not a fraction or a decimal	U2-168	entero número que no es una fracción ni un decimal
intercept the point at which a line intersects the x - or y -axis	U2-83 U2-168	intersección punto en el que una recta corta el eje x o y
interquartile range the difference between the third and first quartiles; 50% of the data is contained within this range	U4-4	rango intercuartílico diferencia entre el tercer y primer cuartil; el 50% de los datos está contenido dentro de este rango
interval a continuous series of values	U2-168 U2-296	intervalo serie continua de valores
inverse a number that when multiplied by the original number has a product of 1	U1-187	inverso número que cuando se lo multiplica por el número original tiene un producto de 1
irrational numbers numbers that cannot be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$; any number that cannot be written as a decimal that ends or repeats	U2-168	números irracionales números que no pueden expresarse como $\frac{a}{b}$, en los que a y b son enteros y $b \neq 0$; cualquier número que no puede expresarse como decimal finito o periódico
isometry a transformation in which the preimage and image are congruent	U5-3 U5-255	isometría transformación en la que la preimagen y la imagen son congruentes
J		
joint frequency the number of times a specific response is given by people with a given characteristic; the cell values in a two-way frequency table	U4-76	frecuencia conjunta cantidad de veces que personas con una determinada característica brindan una respuesta específica; valores de celdas en una tabla de frecuencia de doble entrada

PROGRAM OVERVIEW

Glossary

English		Español
L		
laws of exponents rules that must be followed when working with exponents	U3-2	leyes de los exponentes normas que deben cumplirse cuando se trabaja con exponentes
like terms terms that contain the same variables raised to the same power	U1-3	términos semejantes términos que contienen las mismas variables elevadas a la misma potencia
line the set of points between two points P and Q in a plane and the infinite number of points that continue beyond those points; written as \overleftrightarrow{PQ}	U5-3 U5-92	línea recta conjunto de puntos entre dos puntos P y Q en un plano y cantidad infinita de puntos que continúan más allá de esos puntos; se expresa como \overleftrightarrow{PQ}
line of reflection the perpendicular bisector of the segments that connect the corresponding vertices of the preimage and the image	U5-255	línea de reflexión bisectriz perpendicular de los segmentos que conectan los vértices correspondientes de la preimagen y la imagen
line of symmetry a line separating a figure into two halves that are mirror images; written as ℓ	U5-3	línea de simetría línea que separa una figura en dos mitades que son imágenes en espejo; se expresa como ℓ
line segment a line with two endpoints; written as \overline{PQ}	U5-3	segmento de recta recta con dos extremos; se expresa como \overline{PQ}
line symmetry exists for a figure if for every point on one side of the line of symmetry, there is a corresponding point the same distance from the line	U5-3	simetría lineal la que existe en una figura si para cada punto a un lado de la línea de simetría, hay un punto correspondiente a la misma distancia de la línea
linear equation an equation that can be written in the form $ax + by = c$, where a , b , and c are rational numbers; can also be written as $y = mx + b$, in which m is the slope, b is the y -intercept, and the graph is a straight line. The solutions to the linear equation are the infinite set of points on the line.	U1-33 U1-93 U2-3 U2-371	ecuación lineal ecuación que puede expresarse en la forma $ax + by = c$, en la que a , b , y c son números racionales; también puede escribirse como $y = mx + b$, en donde m es la pendiente, b es el intercepto de y , y la gráfica es una línea recta. Las soluciones de la ecuación lineal son el conjunto infinito de puntos en la recta.
linear fit (or linear model) an approximation of data using a linear function	U4-175	ajuste lineal (o modelo lineal) aproximación de datos con el uso de una función lineal

PROGRAM OVERVIEW

Glossary

English		Español
linear function a function that can be written in the form $f(x) = mx + b$, in which m is the slope, b is the y -intercept, and the graph is a straight line	U2-246 U2-296 U2-484	función lineal función que puede expresarse en la forma $f(x) = mx + b$, en la que m es la pendiente, b es el intercepto de y , y la gráfica es una línea recta
literal equation an equation that involves two or more variables	U1-187	ecuación literal ecuación que incluye dos o más variables
M		
marginal frequency the total number of times a specific response is given, or the total number of people with a given characteristic	U4-76	frecuencia marginal cantidad total de veces que se da una respuesta específica, o cantidad total de personas con una determinada característica
mean the average value of a data set, found by summing all values and dividing by the number of data points	U4-4	media valor promedio de un conjunto de datos, que se determina al sumar todos los valores y dividirlos por la cantidad de puntos de datos
mean absolute deviation the average absolute value of the difference between each data point and the mean; found by summing the absolute value of the difference between each data point and the mean, then dividing this sum by the total number of data points	U4-4	desviación media absoluta valor promedio absoluto de la diferencia entre cada punto de datos y la media; se determina mediante la suma del valor absoluto de la diferencia entre cada punto de datos y la media, y luego se divide esta suma por la cantidad total de puntos de datos
measures of center values that describe expected and repeated data values in a data set; the mean and median are two measures of center	U4-4	medidas de centro valores que describen los valores de datos esperados y repetidos de un conjunto de datos; la media y la mediana son dos medidas de centro
measures of spread a measure that describes the variance of data values, and identifies the diversity of values in a data set	U4-4	medidas de dispersión medidas que describen la varianza de los valores de datos e identifican la diversidad de valores en un conjunto de datos
median 1. the middle-most value of a data set; 50% of the data is less than this value, and 50% is greater than it 2. the segment joining the vertex to the midpoint of the opposite side	U4-4 U5-92	mediana 1. valor medio exacto de un conjunto de datos; el 50% de los datos es menor que ese valor, y el otro 50% es mayor 2. segmento que une el vértice con el punto medio del lado opuesto

PROGRAM OVERVIEW

Glossary

English		Español
midpoint a point on a line segment that divides the segment into two equal parts	U5-92	punto medio punto en un segmento de recta que lo divide en dos partes iguales
midsegment a line segment joining the midpoints of two sides of a figure	U5-92	segmento medio segmento de recta que une los puntos medios de dos lados de una figura
N		
natural numbers the set of positive integers $\{1, 2, 3, \dots, n\}$	U2-139 U2-168	números naturales conjunto de enteros positivos $\{1, 2, 3, \dots, n\}$
negative function a portion of a function where the y -values are less than 0 for all x -values	U2-168	función negativa porción de una función en la que los valores y son menores que 0 para todos los valores x
non-inclusive a graphed line or boundary is not part of an inequality's solution	U2-83	no inclusivo línea graficada o límite que no forma parte de una solución de desigualdad
non-rigid motion a transformation done to a figure that changes the figure's shape and/or size	U5-255	movimiento no rígido transformación hecha a una figura que cambia su forma o tamaño
O		
obtuse angle an angle measuring greater than 90° but less than 180°	U5-3	ángulo obtuso ángulo que mide más de 90° pero menos de 180°
one-to-one a relationship wherein each point in a set of points is mapped to exactly one other point	U5-3	unívoca relación en la que cada punto de un conjunto de puntos se corresponde con otro con exactitud
order of operations the order in which expressions are evaluated from left to right (grouping symbols, evaluating exponents, completing multiplication and division, completing addition and subtraction)	U1-3	orden de las operaciones orden en el que se evalúan las expresiones de izquierda a derecha (con agrupación de símbolos, evaluación de exponentes, realización de multiplicaciones y divisiones, sumas y sustracciones)
ordered pair a pair of values (x, y) where the order is significant	U2-3	par ordenado par de valores (x, y) , en los que el orden es significativo
outlier a data value that is much greater than or much less than the rest of the data in a data set; mathematically, any data less than $Q_1 - 1.5(\text{IQR})$ or greater than $Q_3 + 1.5(\text{IQR})$ is an outlier	U4-4	valor atípico valor de datos que es mucho mayor o mucho menor que el resto de los datos de un conjunto de datos; en matemática, cualquier dato menor que $Q_1 - 1,5(\text{IQR})$ o mayor que $Q_3 + 1,5(\text{IQR})$ es un valor atípico

PROGRAM OVERVIEW

Glossary

English		Español
	P	
parallel lines that never intersect and have equal slope	U6-2	paralelas líneas que nunca llegan a cortarse y tienen la misma pendiente
parallel lines lines in a plane that either do not share any points and never intersect, or share all points; written as $\overleftrightarrow{AB} \parallel \overleftrightarrow{PQ}$	U5-3 U5-92	líneas paralelas líneas en un plano que no comparten ningún punto y nunca se cortan, o que comparten todos los puntos; se expresan como $\overleftrightarrow{AB} \parallel \overleftrightarrow{PQ}$
parallelogram a quadrilateral with opposite sides parallel	U6-2	paralelogramo cuadrilátero con lados opuestos paralelos
parameter a term in a function that determines a specific form of a function but not the nature of the function	U2-484	parámetro término en una función que determina una forma específica de una función pero no su naturaleza
perimeter the distance around a two-dimensional figure	U6-58	perímetro distancia alrededor de una figura bidimensional
perpendicular lines that intersect at a right angle (90°); their slopes are opposite reciprocals	U6-2	perpendiculares líneas que se cortan en ángulo recto (90°); sus pendientes son recíprocas opuestas
perpendicular bisector a line constructed through the midpoint of a segment	U5-92	bisectriz perpendicular línea que se construye a través del punto medio de un segmento
perpendicular lines two lines that intersect at a right angle (90°); written as $\overleftrightarrow{AB} \perp \overleftrightarrow{PQ}$	U5-3 U5-92	líneas perpendiculares dos líneas que se cortan en ángulo recto (90°); se expresan como $\overleftrightarrow{AB} \perp \overleftrightarrow{PQ}$
point an exact position or location in a given plane	U5-3	punto posición o ubicación exacta en un plano determinado
point of intersection the point at which two lines cross or meet	U3-67	punto de intersección punto en que se cruzan o encuentran dos líneas
point of rotation the fixed location that an object is turned around; the point can lie on, inside, or outside the figure	U5-255	punto de rotación ubicación fija en torno a la que gira un objeto; el punto puede estar encima, dentro o fuera de la figura
polygon two-dimensional figure with at least three sides	U6-58	polígono figura bidimensional con al menos tres lados
positive function a portion of a function where the y -values are greater than 0 for all x -values	U2-168	función positiva porción de una función en la que los valores y son mayores que 0 para todos los valores x

PROGRAM OVERVIEW

Glossary

English		Español
postulate a true statement that does not require a proof	U5-312	postulado afirmación verdadera que no requiere prueba
preimage the original figure before undergoing a transformation	U5-3 U5-255	preimagen figura original antes de sufrir una transformación
properties of equality rules that allow you to balance, manipulate, and solve equations	U3-2	propiedades de igualdad normas que permiten equilibrar, manipular y resolver ecuaciones
properties of inequality rules that allow you to balance, manipulate, and solve inequalities	U3-2	propiedades de desigualdad normas que permiten equilibrar, manipular y resolver desigualdades
Q		
quadrant the coordinate plane is separated into four sections: <ul style="list-style-type: none">In Quadrant I, x and y are positive.In Quadrant II, x is negative and y is positive.In Quadrant III, x and y are negative.In Quadrant IV, x is positive and y is negative.	U5-58	cuadrante plano de coordenadas que se divide en cuatro secciones: <ul style="list-style-type: none">En el cuadrante I, x y y son positivos.En el cuadrante II, x es negativo y y es positivo.En el cuadrante III, x y y son negativos.En el cuadrante IV, x es positivo y y es negativo.
quadrilateral a polygon with four sides	U6-2	cuadrilátero polígono con cuatro lados
quantity something that can be compared by assigning a numerical value	U1-34	cantidad algo que puede compararse al asignarle un valor numérico
R		
radius a line segment that extends from the center of a circle to a point on the circle. Its length is half the diameter.	U5-175	radio segmento de línea que se extiende desde el centro de un círculo hasta un punto de la circunferencia del círculo. Su longitud es la mitad del diámetro.
range the set of all outputs of a function; the set of y -values that are valid for the function	U2-3	rango conjunto de todas las salidas de una función; conjunto de valores y válidos para la función
rate a ratio that compares different kinds of units	U1-34	tasa proporción en que se comparan distintos tipos de unidades
rate of change a ratio that describes how much one quantity changes with respect to the change in another quantity; also known as the slope of a line	U2-168 U2-296	tasa de cambio proporción que describe cuánto cambia una cantidad con respecto al cambio de otra cantidad; también se la conoce como pendiente de una recta

PROGRAM OVERVIEW

Glossary

English		Español
ratio the relation between two quantities; can be expressed in words, fractions, decimals, or as a percent	U2-168	proporción relación entre dos cantidades; puede expresarse en palabras, fracciones, decimales o como porcentaje
rational number a number that can be written as $\frac{a}{b}$, where a and b are integers and $b \neq 0$; any number that can be written as a decimal that ends or repeats	U2-168	número racional número que puede expresarse como $\frac{a}{b}$, en los que a y b son enteros y $b \neq 0$; cualquier número que puede escribirse como decimal finito o periódico
ray a line with only one endpoint; written as \overrightarrow{PQ}	U5-3 U5-92	semirrecta línea con un solo extremo; se expresa como \overrightarrow{PQ}
real numbers the set of all rational and irrational numbers	U2-168	números reales conjunto de todos los números racionales e irracionales
reciprocal a number that when multiplied by the original number has a product of 1	U1-187	recíproco número que cuando se lo multiplica por el número original tiene un producto de 1
rectangle a parallelogram with opposite sides that are congruent and consecutive sides that are perpendicular	U6-2	rectángulo paralelogramo con lados opuestos congruentes y lados consecutivos que son perpendiculares
recursive formula a formula used to find the next term of a sequence when the previous term or terms are known; the recursive formula for an arithmetic sequence is $a_n = a_{n-1} + d$; the recursive formula for a geometric sequence is $a_n = a_{n-1} \cdot r$	U2-139 U2-457	fórmula recursiva fórmula que se utiliza para encontrar el término siguiente de una secuencia cuando se conoce el o los términos anteriores; la fórmula recursiva de una secuencia aritmética es $a_n = a_{n-1} + d$; la fórmula recursiva para una secuencia geométrica es $a_n = a_{n-1} \cdot r$
reflection a transformation where a mirror image is created; also called a flip; an isometry in which a figure is moved along a line perpendicular to a given line called the line of reflection	U5-3 U5-58	reflexión transformación por la cual se crea una imagen en espejo; isometría en la que se mueve una figura a lo largo de una línea perpendicular hacia una recta determinada llamada línea de reflexión
regular hexagon a six-sided polygon with all sides equal and all angles measuring 120°	U5-175	hexágono regular polígono de seis lados con todos los lados iguales y en el que todos los ángulos miden 120°

PROGRAM OVERVIEW

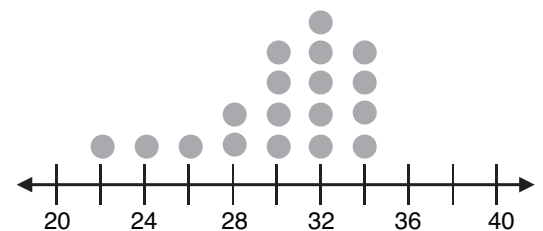
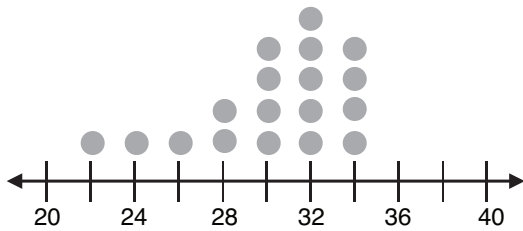
Glossary

English		Español
regular polygon a two-dimensional figure with all sides and all angles congruent	U5-175 U5-3	polígono regular figura bidimensional con todos los lados y todos los ángulos congruentes
relation a relationship between two sets of elements	U2-3	relación conexión entre dos conjuntos de elementos
relative maximum the greatest value of a function for a particular interval of the function	U2-168	máximo relativo el mayor valor de una función para un intervalo particular de la función
relative minimum the least value of a function for a particular interval of the function	U2-168	mínimo relativo el menor valor de una función para un intervalo particular de la función
residual the vertical distance between an observed data value and an estimated data value on a line of best fit	U4-77	residual distancia vertical entre un valor de datos observado y un valor de datos estimado sobre una línea de ajuste óptimo
residual plot provides a visual representation of the residuals for a set of data; contains the points $(x, \text{residual for } x)$	U4-77	diagrama residual brinda una representación visual de los residuales para un conjunto de datos; contiene los puntos $(x, \text{residual de } x)$
rhombus a parallelogram with four congruent sides	U6-3	rombo paralelograma con cuatro lados congruentes
right angle an angle measuring 90°	U5-3	ángulo recto ángulo que mide 90°
rigid motion a transformation done to a figure that maintains the figure's shape and size or its segment lengths and angle measures	U5-255 U5-313	movimiento rígido transformación que se realiza a una figura que mantiene su forma y tamaño o las longitudes de sus segmentos y las medidas de ángulos
rotation a transformation that turns a figure around a point; also called a turn; an isometry where all points in the preimage are moved along circular arcs determined by the center of rotation and the angle of rotation	U5-3 U5-58	rotación transformación que hace girar una figura alrededor de un punto; isometría en la que todos los puntos de la preimagen se mueven a lo largo de arcos circulares determinados por el centro de rotación y el ángulo de rotación

PROGRAM OVERVIEW

Glossary

English		Español
S		
scale factor a multiple of the lengths of the sides from one figure to the transformed figure. If the scale factor is larger than 1, then the figure is enlarged. If the scale factor is between 0 and 1, then the figure is reduced.	U5-255	factor de escala múltiplo de las longitudes de los lados de una figura a la figura transformada. Si el factor de escala es mayor que 1, entonces la figura se agranda. Si el factor de escala se encuentra entre 0 y 1, entonces la figura se reduce.
scatter plot a graph of data in two variables on a coordinate plane, where each data pair is represented by a point	U4-77	diagrama de dispersión gráfica de datos en dos variables en un plano de coordenadas, en la que cada par de datos está representado por un punto
segment a part of a line that is noted by two endpoints	U5-92	segmento parte de una recta comprendida entre dos extremos
sequence an ordered list of numbers	U2-139	secuencia lista ordenada de números
side-angle-side (SAS) if two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent	U5-313	lado-ángulo-lado (SAS) si dos lados y el ángulo incluido de un triángulo son congruentes con dos lados y el ángulo incluido de otro triángulo, entonces los dos triángulos son congruentes
side-side-side (SSS) if three sides of one triangle are congruent to three sides of another triangle, then the two triangles are congruent	U5-313	lado-lado-lado (SSS) si los tres lados de un triángulo son congruentes con los tres lados de otro triángulo, entonces los dos triángulos son congruentes
sketch a quickly done representation of a figure; a rough approximation of a figure	U5-92	bosquejo representación de una figura realizada con rapidez; aproximación imprecisa de una figura
skewed to the left data concentrated on the higher values in the data set, which has a tail to the left. Example:	U4-5	desviados hacia la izquierda datos concentrados en los valores más altos del conjunto de datos, que tiene una cola hacia la izquierda. Ejemplo:

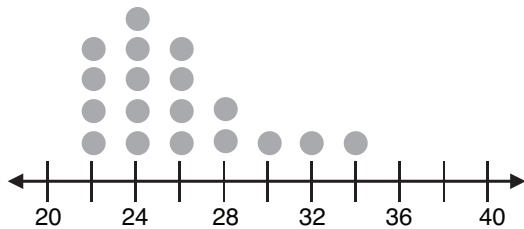


PROGRAM OVERVIEW

Glossary

English

skewed to the right data concentrated on the lower values in the data set, which has a tail to the right. Example:



slope the measure of the rate of change of one variable with respect to another variable; slope = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x} = \frac{\text{rise}}{\text{run}}$; the slope in the equation $y = mx + b$ is m .

slope-intercept method the method used to graph a linear equation; with this method, draw a line using only two points on the coordinate plane

solution a value that makes the equation true

solution set the value or values that make a sentence or statement true; the set of ordered pairs that represent all of the solutions to an equation or a system of equations

solution to a system of linear

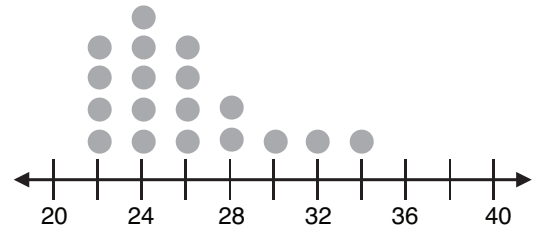
inequalities the intersection of the half planes of the inequalities; the solution is the set of all points that make all the inequalities in the system true

square a parallelogram with four congruent sides and four right angles

straightedge a bar or strip of wood, plastic, or metal having at least one long edge of reliable straightness

Español

desviados hacia la derecha datos concentrados en los valores más bajos del conjunto de datos, que tiene una cola hacia la derecha. Ejemplo:



U4-5

pendiente medida de la tasa de cambio

de una variable con respecto a otra; pendiente = $\frac{y_2 - y_1}{x_2 - x_1} = \frac{\Delta y}{\Delta x}$; la pendiente en la ecuación $y = mx + b$ es m

U1-94

U2-168

U2-296

U2-372

U4-175

U6-3

U2-168

método pendiente-intercepto método utilizado para graficar una ecuación lineal; con este método, se dibuja una línea con sólo dos puntos en un plano de coordenadas

U1-34

solución valor que hace verdadera la ecuación

U1-34

conjunto de soluciones valor o valores que hacen verdadera una afirmación o declaración; conjunto de pares ordenados que representa todas las soluciones para una ecuación o sistema de ecuaciones

U1-167

U2-3

U2-83

solución a un sistema de desigualdades lineales intersección de los medios planos de las desigualdades; la solución es el conjunto de todos los puntos que hacen verdaderas todas las desigualdades de un sistema

U5-175

cuadrado paralelograma con cuatro lados congruentes y cuatro ángulos rectos

U6-3

U5-92

regla de borde recto barra o franja de madera, plástico o metal que tiene, al menos, un borde largo de rectitud confiable

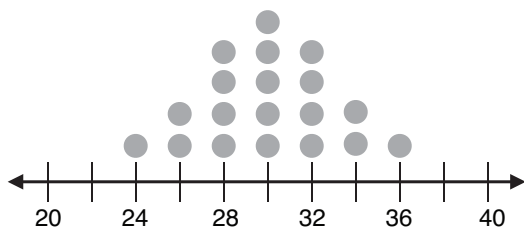
PROGRAM OVERVIEW

Glossary

English

substitution method solving one of a pair of equations for one of the variables and substituting that into the other equation

symmetric situation in which data is concentrated toward the middle of the range of data; data values are distributed in the same way above and below the middle of the sample. Example:



system a set of more than one equation

system of equations a set of equations with the same unknowns

system of inequalities two or more inequalities in the same variables that work together

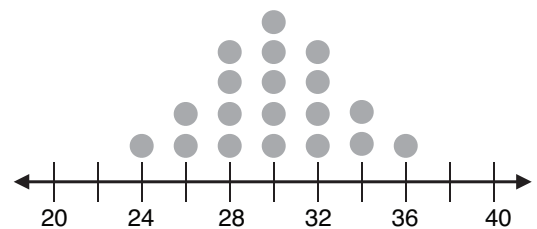
U3-67

U4-5

Español

método de sustitución solución de un par de ecuaciones para una de las variables y sustitución de eso en la otra ecuación

simétrico situación en la que los datos se concentran hacia el medio del rango de datos; los valores de datos se distribuyen de la misma manera por encima y por debajo del medio de la muestra. Ejemplo:



U2-3

U1-167

U3-67

U1-167

U2-83

sistema conjunto de más de una ecuación

sistema de ecuaciones conjunto de ecuaciones con las mismas incógnitas

sistema de desigualdades dos o más desigualdades en las mismas variables que operan juntas

T

term a number, a variable, or the product of a number and variable(s)

third quartile value that identifies the upper 25% of the data; the median of the upper half of the data set; 75% of all data is less than this value; written as Q_3

transformation a change in a geometric figure's position, shape, or size

translation moving a graph either vertically, horizontally, or both, without changing its shape; a slide; an isometry where all points in the preimage are moved parallel to a given line

U1-3

U4-5

U2-422

U5-3

U2-422

U5-3

U5-58

término número, variable o producto de un número y una o más variables

tercer cuartil valor que identifica el 25% superior de los datos; mediana de la mitad superior del conjunto de datos; el 75% de los datos es menor que este valor; se expresa como Q_3

transformación cambio en la posición, la forma o el tamaño de una figura geométrica

traslación movimiento de un gráfico en sentido vertical, horizontal, o en ambos, sin modificar su forma; deslizamiento; isometría en la que todos los puntos de la preimagen se mueven en paralelo a una línea determinada

PROGRAM OVERVIEW

Glossary

English		Español
trend a pattern of behavior, usually observed over time or over multiple iterations	U4-77	tendencia patrón de comportamiento, que se observa por lo general en el tiempo o en múltiples repeticiones
triangle a three-sided polygon with three angles	U5-175	triángulo polígono de tres lados con tres ángulos
two-way frequency table a table that divides responses into categories, showing both a characteristic in the table rows and a characteristic in the table columns; values in cells are a count of the number of times each response was given by a respondent with a certain characteristic	U4-77	tabla de frecuencia de doble entrada tabla que divide las respuestas en dos categorías, y muestra una característica en las filas y una en las columnas; los valores de las celdas son un conteo de la cantidad de veces que un respondedor da una respuesta con una determinada característica
U		
undefined slope the slope of a vertical line	U2-168	pendiente indefinida pendiente de una línea vertical
unit rate a rate per one given unit	U1-34	tasa unitaria tasa de una unidad determinada
V		
variable a letter used to represent a value or unknown quantity that can change or vary	U1-3 U1-34 U2-372	variable letra utilizada para representar un valor o una cantidad desconocida que puede cambiar o variar
vertical shift number of units the graph of the function is moved up or down; a translation	U2-422 U2-484	desplazamiento vertical cantidad de unidades que el gráfico de la función se desplaza hacia arriba o hacia abajo; traslación
W		
whole numbers the set of natural numbers that also includes 0: {0, 1, 2, 3, ...}	U2-168	números enteros conjunto de números naturales que incluye el 0: {0, 1, 2, 3, ...}
X		
x-intercept the point at which the line intersects the x -axis at $(x, 0)$	U1-94 U2-83 U2-168 U2-296	intercepto de x punto en el que una recta corta el eje x en $(x, 0)$

PROGRAM OVERVIEW

Glossary

English	Y	Español
<i>y</i>-intercept the point at which a line or curve intersects the <i>y</i> -axis at $(0, y)$; the <i>y</i> -intercept in the equation $y = mx + b$ is b .	U1-94 U2-83 U2-246 U2-296 U2-372 U4-175	intercepto de <i>y</i> punto en el que una recta o curva corta el eje <i>y</i> en $(0, y)$; el intercepto de <i>y</i> en la ecuación $y = mx + b$ es b .

