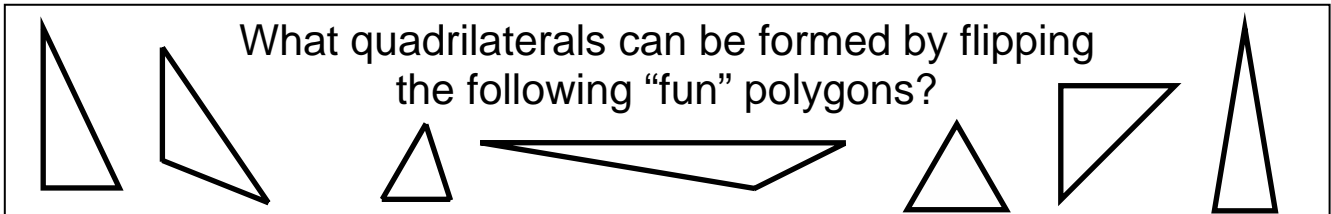
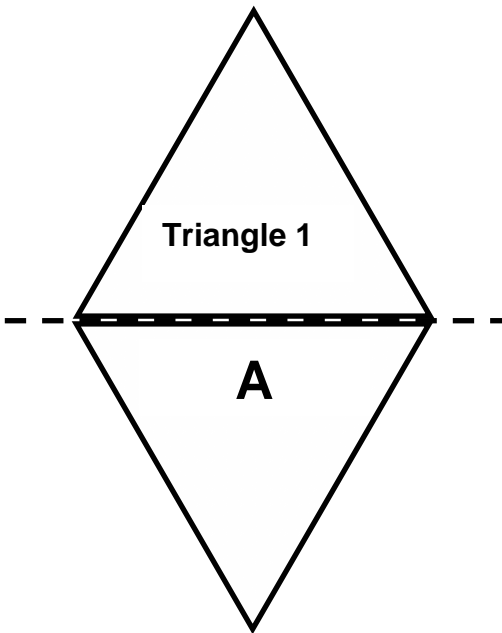


A Quadrilateral Quagmire*

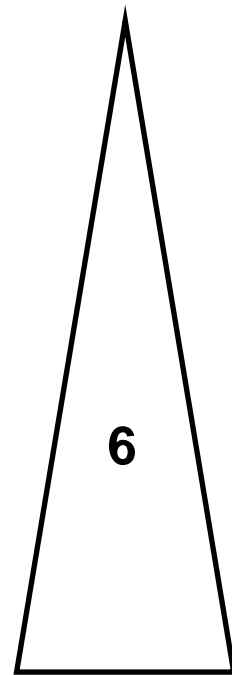
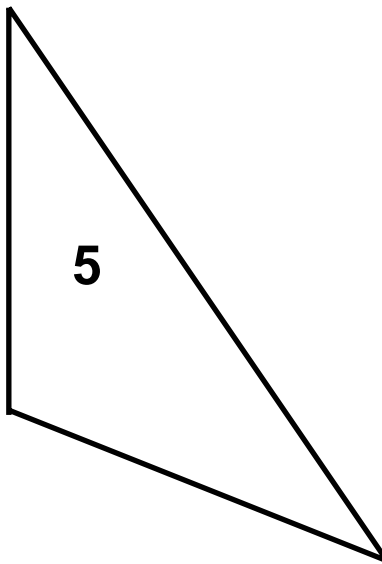
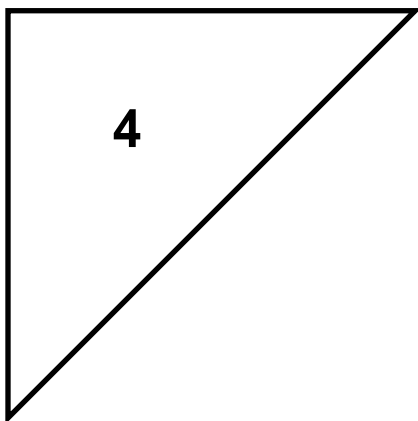
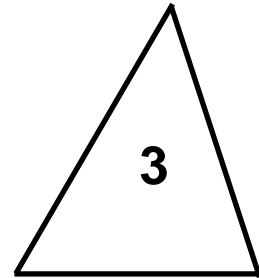
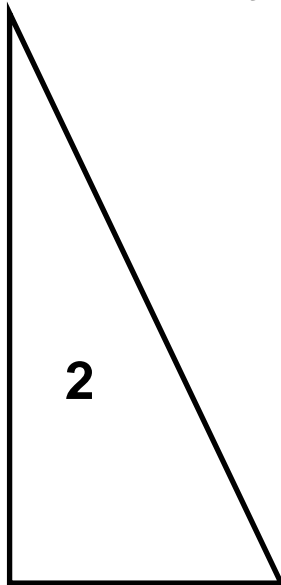
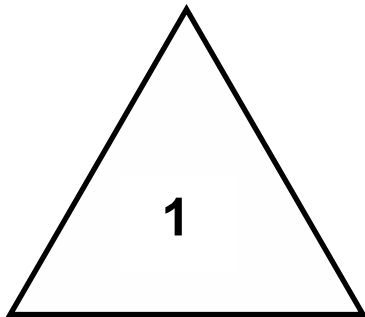


Part 1—Flip the triangles to form as many different quadrilaterals as possible. **Trace** each quadrilateral, **label** it with a letter, and **draw** its line of symmetry. See the example provided for Triangle 1 below.



*A quagmire is defined as a difficult situation or predicament.

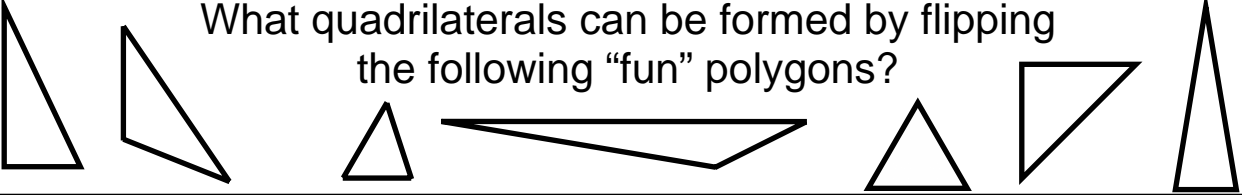
The "Fun" Polygon



Cardstock paper cutouts make easy manipulatives for students to slide, flip, and turn.

A Quadrilateral Quagmire*

What quadrilaterals can be formed by flipping the following “fun” polygons?



Part 2—Classify the quadrilaterals from Part 1. You may use a 2-ring Venn Diagram, a 3-ring Venn Diagram, or another type of organizer. **Label** each classification or grouping according to its characteristics.

Part 3—Write a paragraph to explain the classifications shown above.

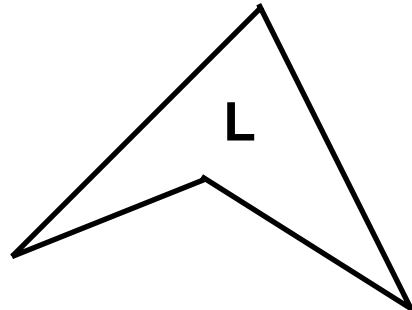
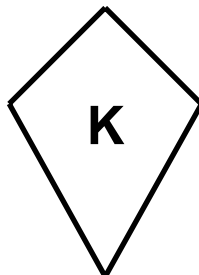
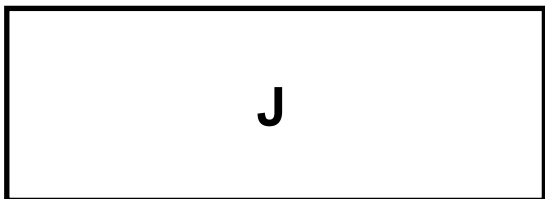
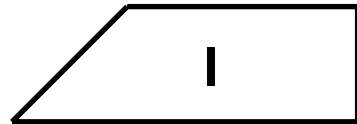
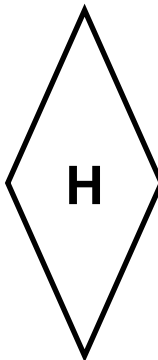
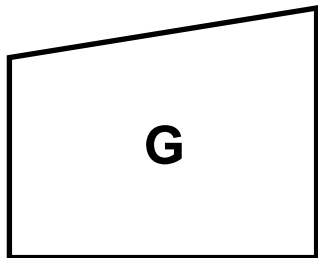
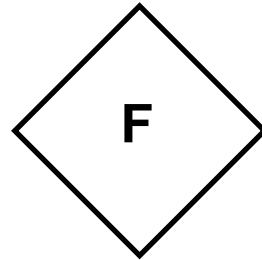
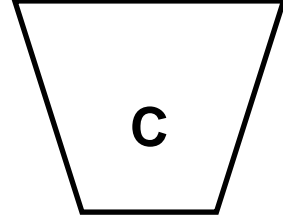
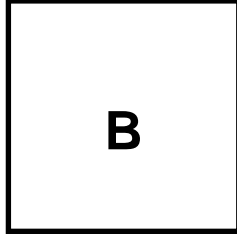
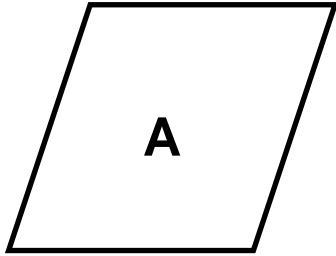
Quadrilateral Trivia Questions



1. This building, constructed in Athens in the 400s BC, incorporates golden sections and *rectangles*.
2. This French architect designed buildings in the 1900s that incorporated golden sections and *rectangles*.
3. Carpenters and cabinetmakers use this woodworking tool to measure angles and make straight lines.
4. This quadrilateral is also the name of one our wrist bones.
5. What role does a *square* play in a cotton plant?
6. Which U.S. President used the phrase a “*square deal*” to refer to his policy of social reform?
7. Name three ancient civilizations that used *rectangular* sails to power their sea vessels.
What name did all three groups give to these sails?
8. Before WWII, the United States Army organized 4 infantry regiments under 2 brigades. What name did the U.S. Army assign to this type of division?
9. This type of American folk dancing is performed by groups of 4 couples.
10. Did you know that knots in a rope weaken the rope? Find out which knot weakens a rope by 50 percent.




A Quadrilateral Quandary*



*A quandary is a perplexing situation or state; a dilemma or problem.

A Quadrilateral Quandary

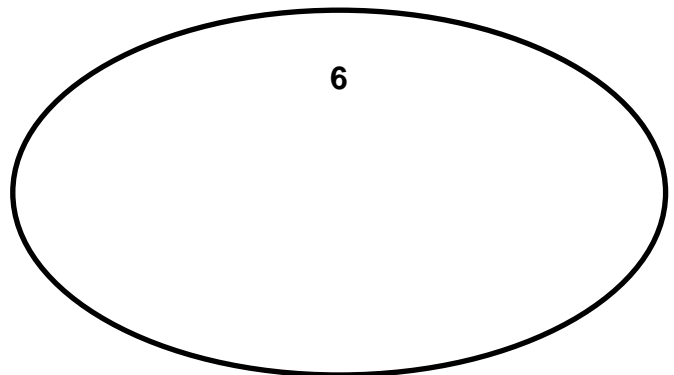
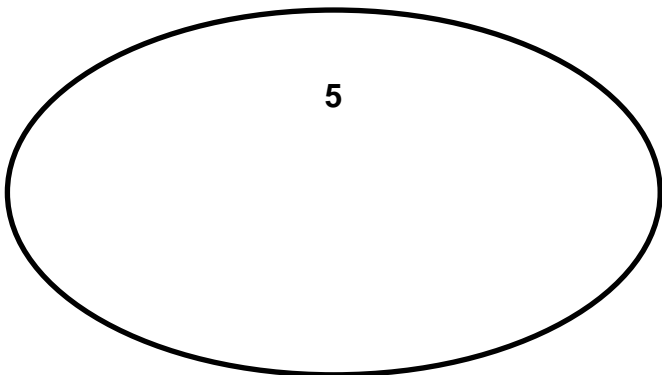
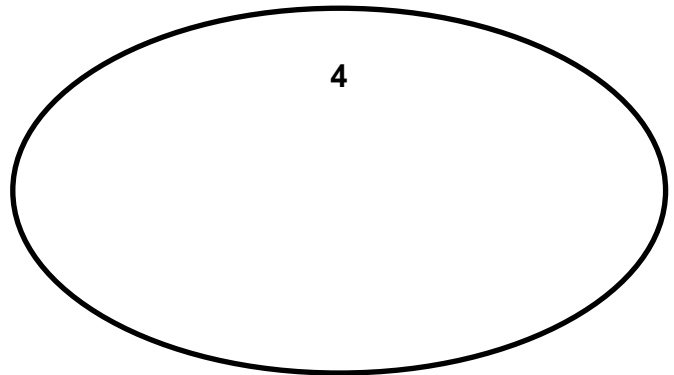
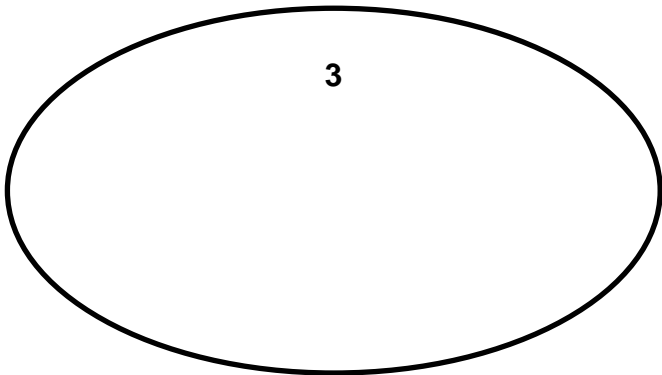
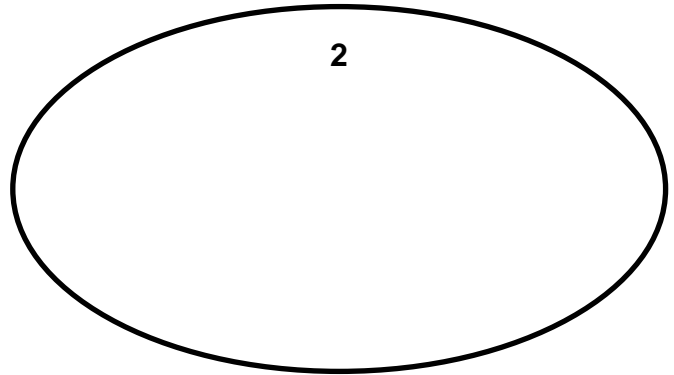
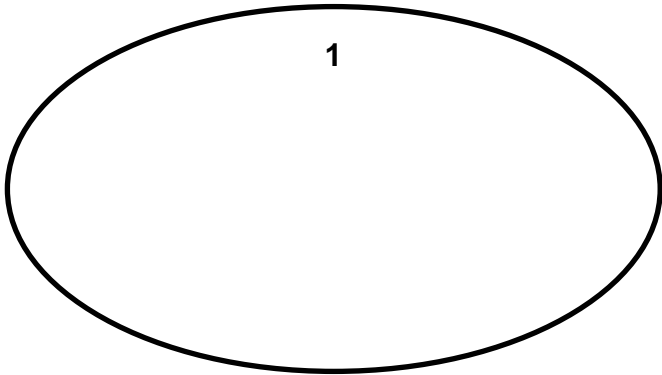
Part 1--Sketch a similar quadrilateral in the chart below. Then use appropriate geometric vocabulary to **describe** each quadrilateral.

Shape	Similar Figure	Sides	Angles
A		4 congruent sides 2 pairs of parallel sides	2 acute angles 2 obtuse angles
B			
C			
D			
E			
F			
G			
H			
I			
J			
K			
L			

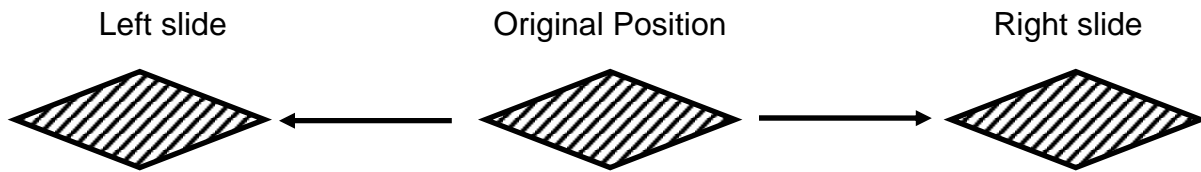
A List of Appropriate Geometric Vocabulary:

A Quadrilateral Quandary

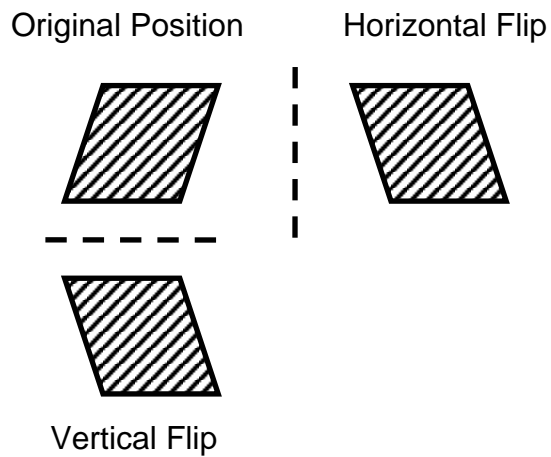
Part 2--Classify the quadrilaterals according to common characteristics. **Sketch** a similar figure of each shape and use letters (A, B, C, etc.) to **identify** it. **Shapes MAY be used more than once.**



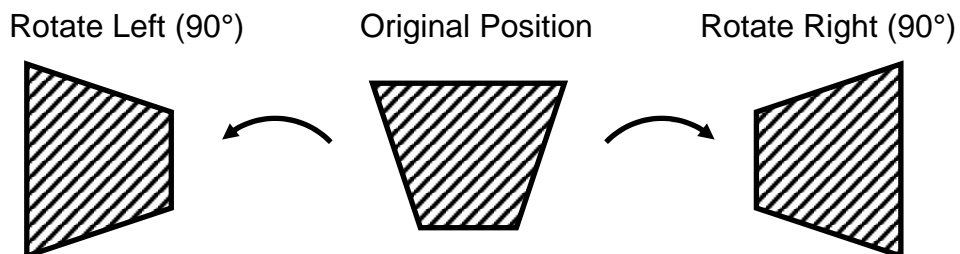
SLIDES (\longrightarrow)



FLIPS (- - - - -)

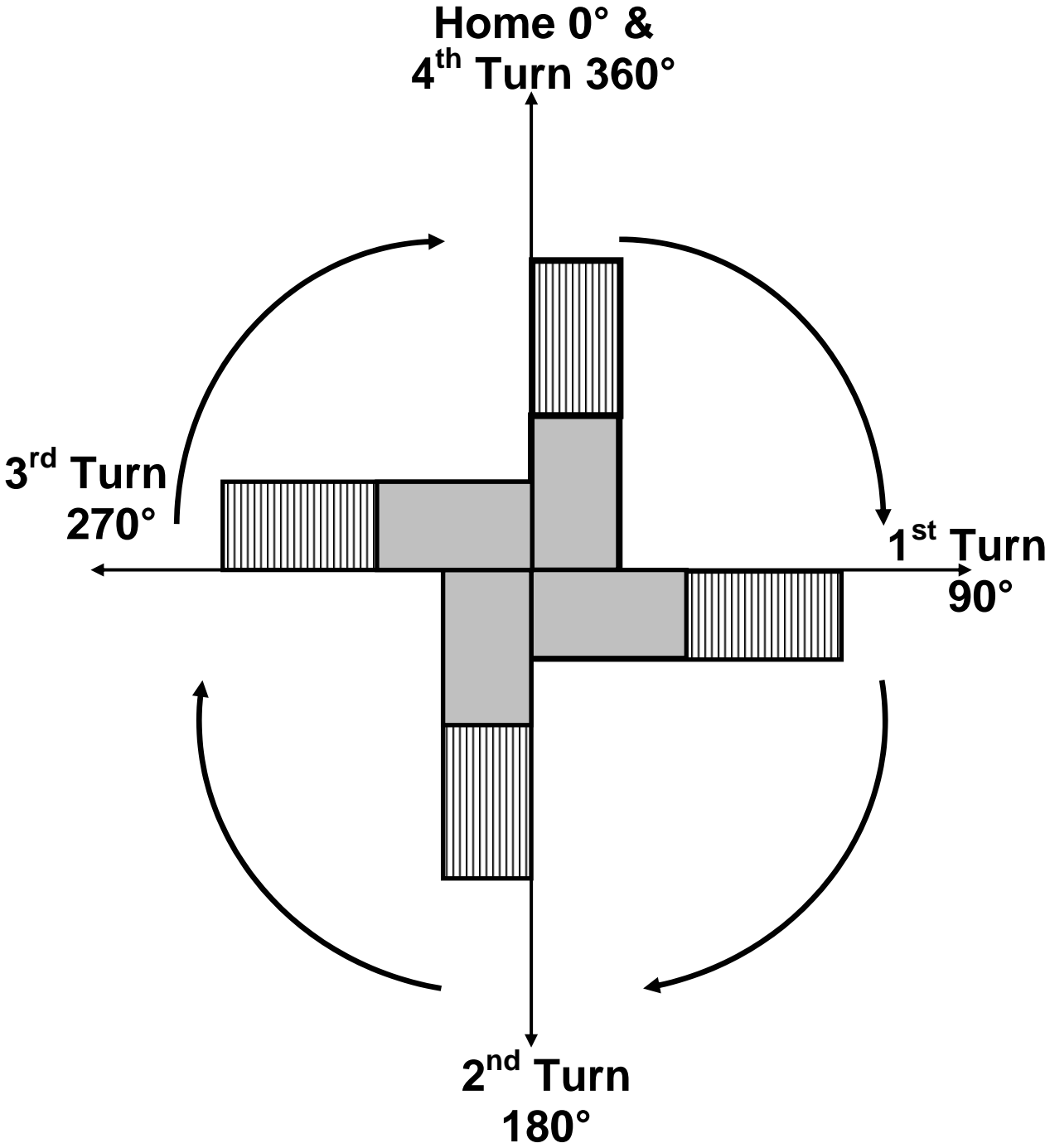


TURNS (\curvearrowright)



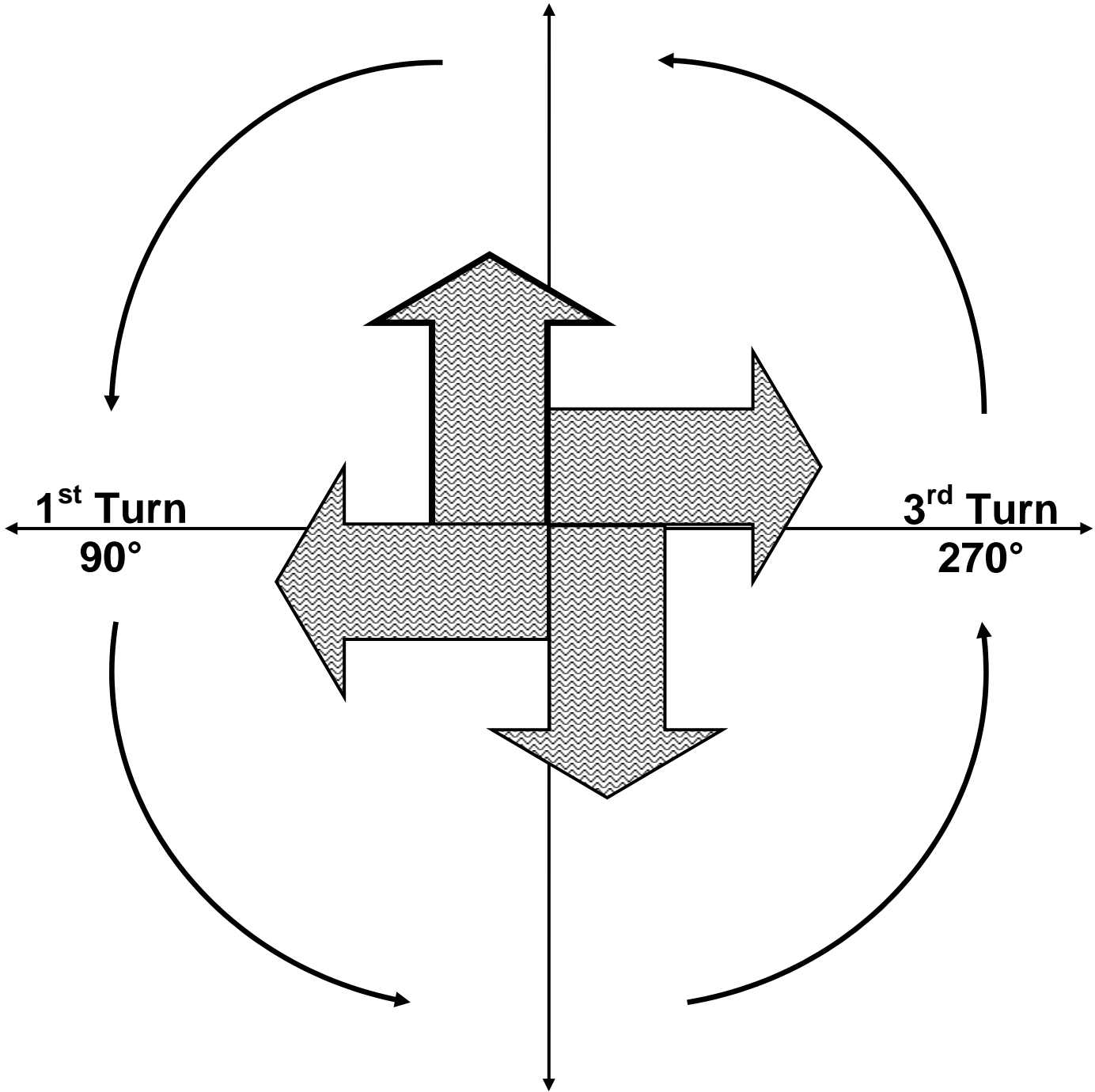
Be sure to use the appropriate symbols (straight arrows, dotted lines, and curved arrows) to record whether the figure was slid, flipped, or turned.

Clockwise Rotations (Turns)



Counterclockwise Rotations (Turns)

Home 0° &
4th Turn 360°



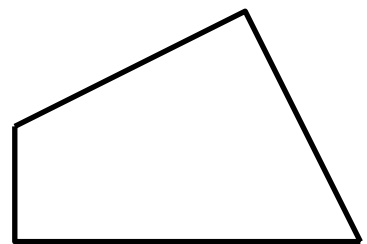
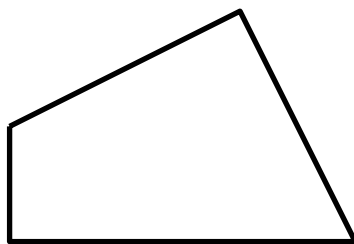
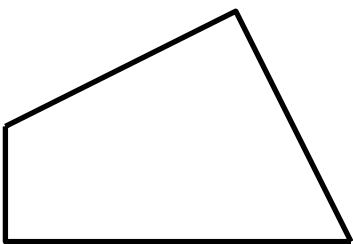
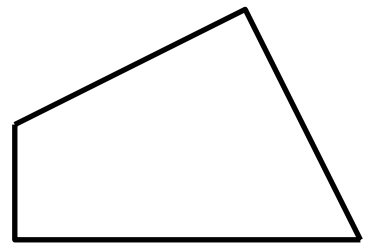
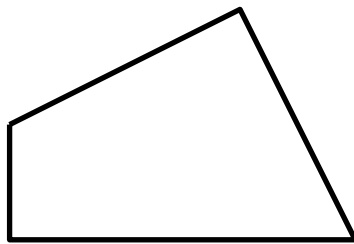
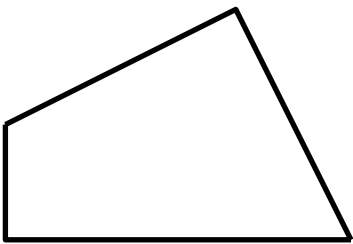
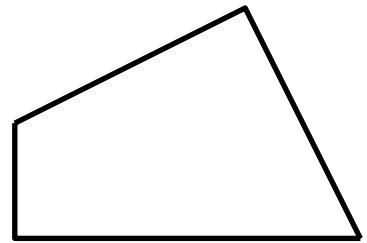
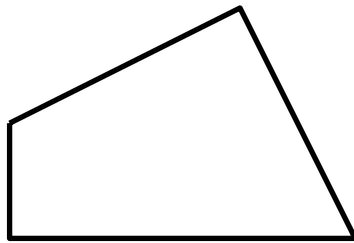
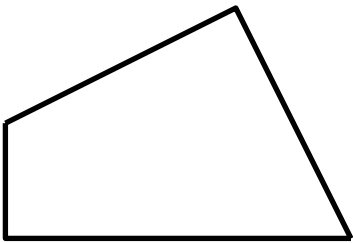
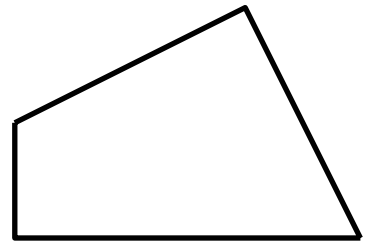
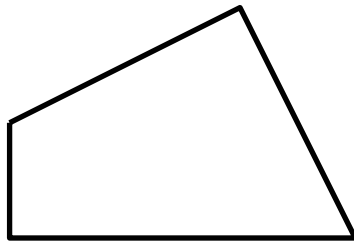
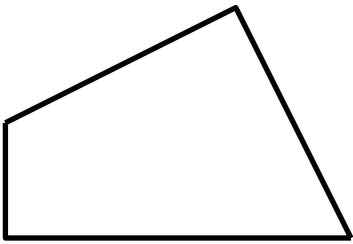
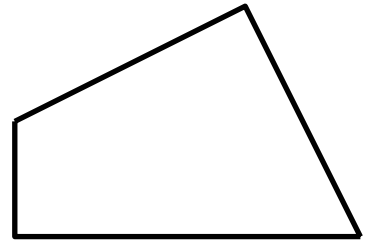
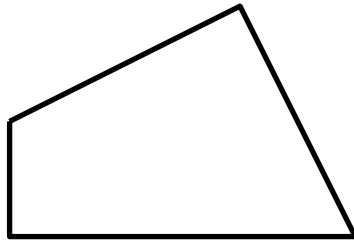
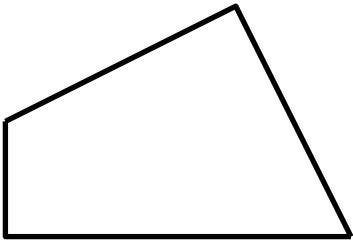
1st Turn
 90°

3rd Turn
 270°

2nd Turn
 180°

A General Quadrilateral

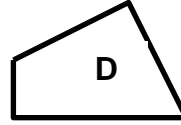
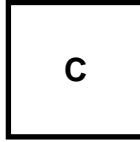
Copy on cardstock and distribute these manipulatives to students.



Building Code Check-Up #5

Part A

Quinton is in a quandary. He must select four of the following five quadrilaterals and write a paragraph to explain how they are related.



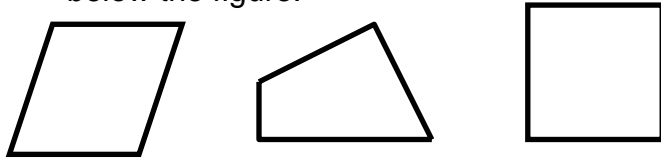
1. Complete the chart Quinton started.

Shape	Sides	Angles
A	-opposite sides are congruent -2 sets of parallel sides	-4 right angles
B		
C		
D		
E		

2. Select four quadrilaterals (check the box beside the letter). Write a paragraph to explain how they are related. Include an introduction, descriptions from the chart that support your ideas, and a conclusion.

Part B

3. On each quadrilateral, draw all its lines of **symmetry**, or write NO SYMMETRY below the figure.

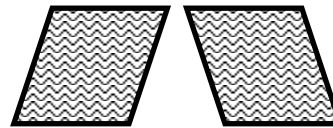


4. One line of symmetry has been drawn. Complete the other half of the quadrilateral.



Part C

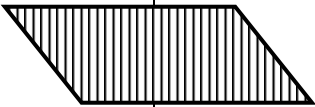
5. Label the movement of each quadrilateral. Did it flip? Slide? Or Turn?








Set 1: _____

Set 2: _____

6. Select and perform a flip, slide, or turn using the quadrilateral below. Draw the result in the third column.

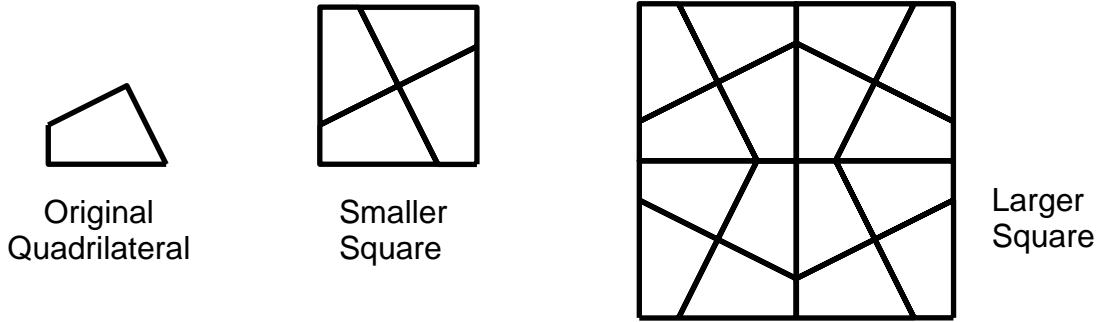
 <p>Original Quadrilateral</p>	<p>Flip Slide Turn (Circle one)</p>	<p>Result</p>
---	--	----------------------

7. Quinton colored the front and back of a square (see the **original**). He used the square to perform flips, slides, and clockwise turns.

	<p>Original</p> 	<p>Shape A</p> 	<p>Shape B</p> 	<p>Shape C</p> 	<p>Shape D</p>
--	--	--	--	---	----------------

- Did Shape A result from a **flip** or a **90° turn**? (circle one)
- Did Shape B result from a **flip** or a **slide**? (circle one)
- Did Shape C result from a **flip** or a **360° turn**? (circle one)
- Did Shape D result from a **180°** or a **270° turn**? (circle one)

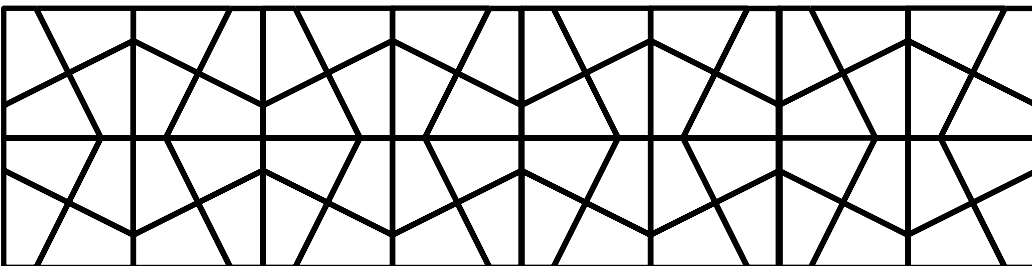
Use the quadrilaterals below to answer questions 8 and 9.



8. The original quadrilateral was (flipped, slid, turned) to create the smaller square. (Circle one)
9. The smaller square was (flipped, slid, turned) to create the larger square. (Circle one)

Extra Credit (10 points)

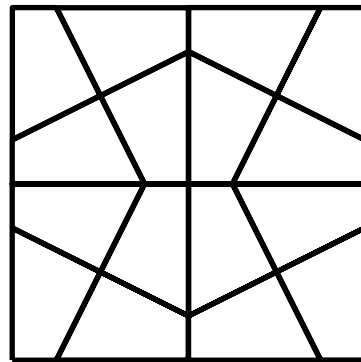
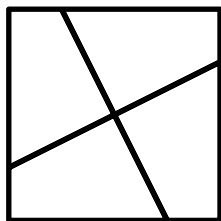
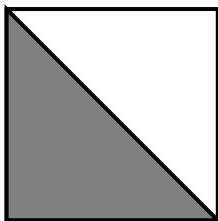
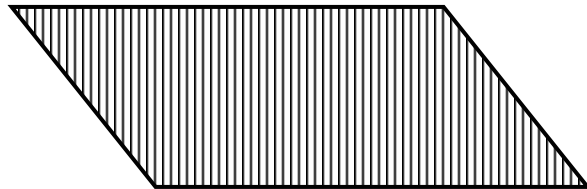
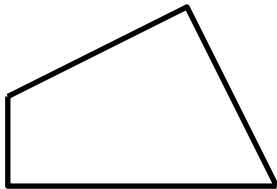
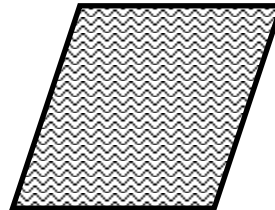
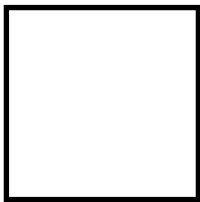
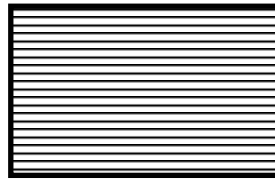
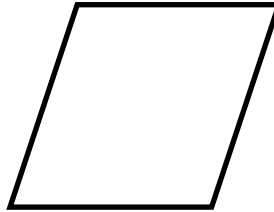
10. The larger square is a section of the tessellation shown below. Create a color pattern in the larger square. Then flip, slide, or turn the larger square to create a color pattern in the tessellation below.



Explain how flips, slides, and/or turns are used in the pattern.

Building Code Check-Up #5

Manipulatives



Building Code Check-Up #5

Scoring Criteria

Part A

1. **16 points** Students complete the chart using appropriate vocabulary. (A sample chart is shown below. Accept all reasonable answers.)

Shape	Sides	Angles
<input type="checkbox"/> A	-opposite sides are congruent -2 sets of parallel sides	-4 right angles
<input type="checkbox"/> B	-opposite sides are congruent -2 sets of parallel sides	-2 acute angles -2 obtuse angles
<input type="checkbox"/> C	-4 congruent sides -2 sets of parallel sides	-4 right angles
<input type="checkbox"/> D	-0 congruent sides -0 sets of parallel sides	-1 right angle, 1 acute angle -2 obtuse angles
<input type="checkbox"/> E	-4 congruent sides -2 sets of parallel sides	-2 acute angles -2 obtuse angles

2a. **4 points** Students select four quadrilaterals.

2b. **20 points** The content of the paragraph is assessed as follows:

Students include descriptions from the chart to explain how the selected quadrilaterals are related. *See the adapted Long-Answer Question rubric below to understand what a “clear and complete” answer looks like for this prompt (# points x 5).*

	4 points	3 points	2 points	1 point
Explaining Your Answer	Your explanation is so clear and complete that the reader can use the specific details and vocabulary you provide to draw another related quadrilateral.	Your explanation is clear and complete. It is supported by specific and appropriate vocabulary. It is clear to the reader how the quadrilaterals are related.	Your explanation is hard to follow. Appropriate vocabulary may be used, but relationships are unclear. It is hard for the reader to understand how the quadrilaterals are related.	Your explanation is unclear and/or incomplete. It contains inappropriate or insufficient vocabulary. The reader is confused about how the quadrilaterals are related.

2c. The format of the paragraph may be assessed as follows:

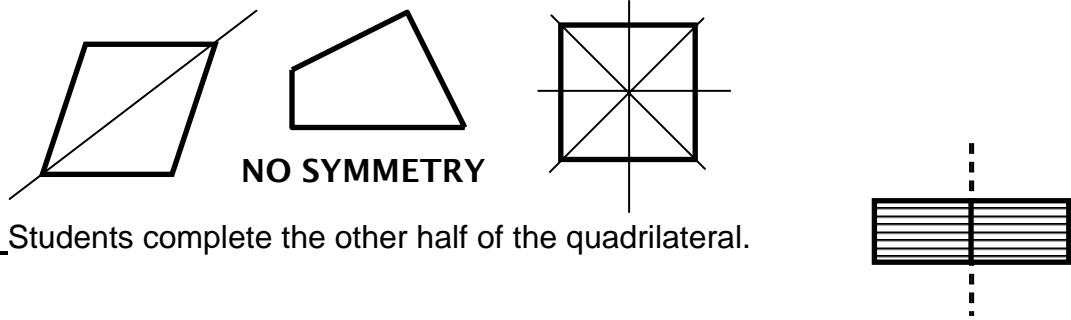
3 points Students begin the paragraph with an introductory sentence.

6-8 points Students support ideas with little or no irrelevant or repetitious information (2 points per relevant piece of information).

3 points Students conclude the paragraph.

Part B

3. **6 points** Students draw and identify all lines of symmetry (1 points per identification).

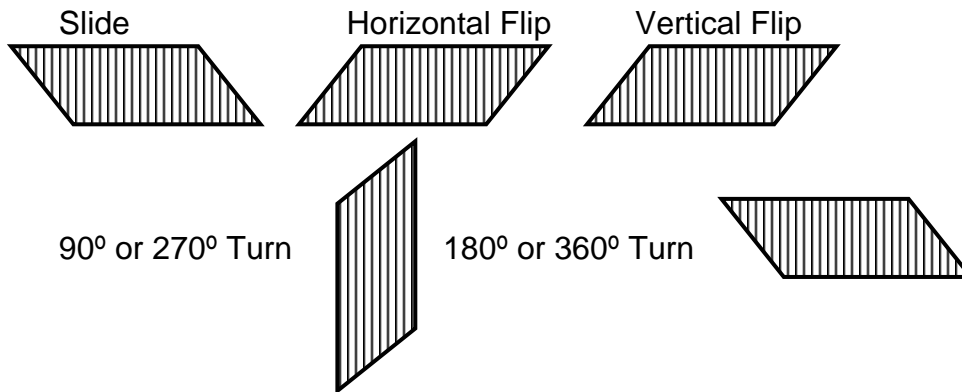


4. **2 points** Students complete the other half of the quadrilateral.

Part C

5. **8 points** Students correctly identify Set 1 as a slide and Set 2 as a flip.

6. **6 points** Students select and perform a flip, slide, or turn.



7. **16 points** Students correctly identify the effect of a flip, slide, or turn on the original quadrilateral (4 points each).

- a. 90° turn b. slide c. flip d. 180° turn

8. **4 points** Students identify that the quadrilateral was turned.

9. **4 points** Students identify that the smaller square was flipped.

Extra Credit (10 points)

8 points Students a) create a coloring pattern in the larger square, and then b) flip, slide, or turn the larger square to create a color pattern in the tessellation.

2 points Students explain how flips, slides, or turns are used in the pattern. (Use the Short-Answer Question rubric to score the writing.)

Quadrilateral Trivia Answers



(Answers are underlined. Quadrilateral names and terms are *italicized*.)

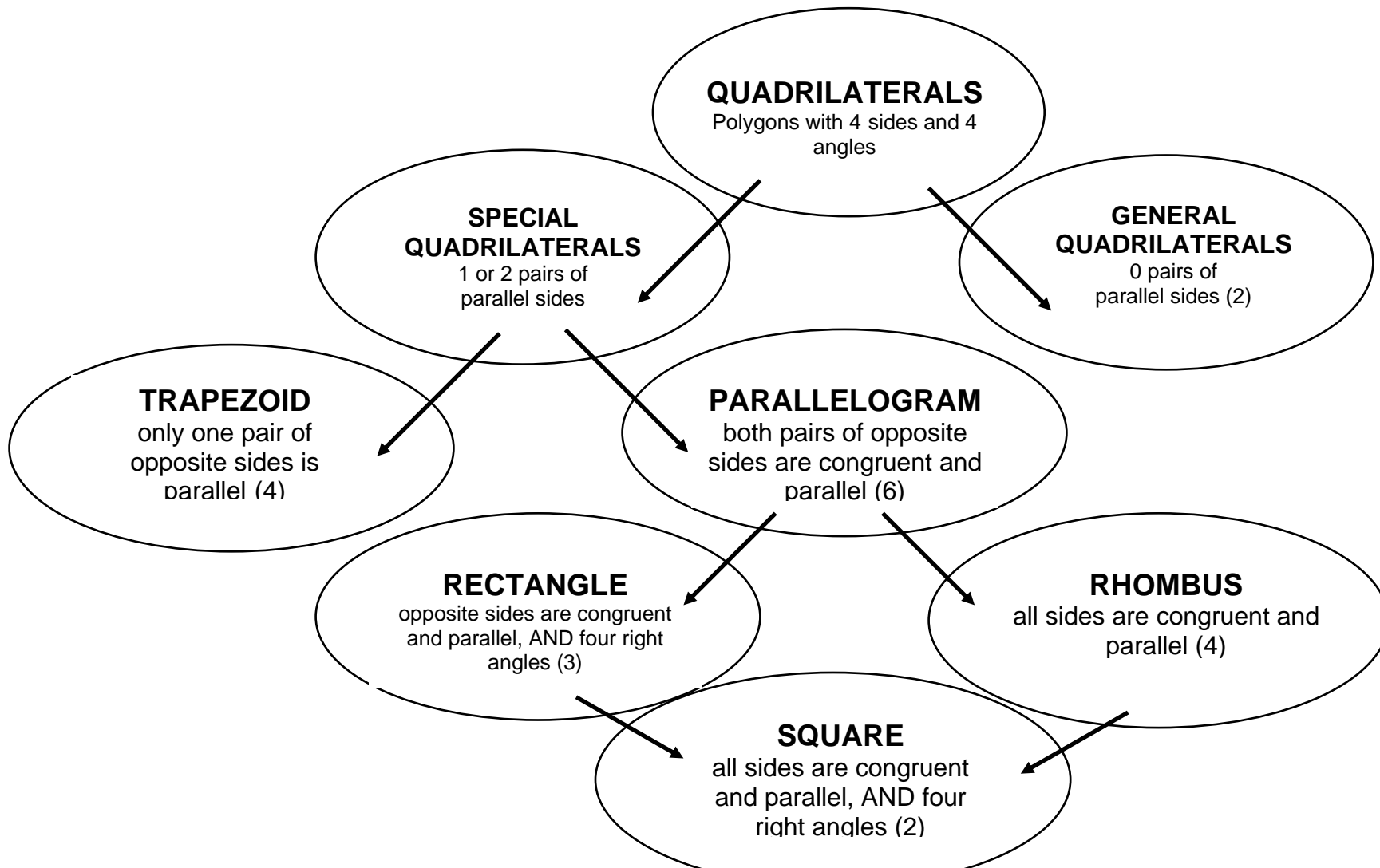
1. The Parthenon incorporates golden sections and *rectangles*.
2. Le Corbusier was a French architect that designed buildings that incorporated golden sections and *rectangles*.
3. A *square* is used in woodworking to measure angles and make straight lines.
4. One of our wrist bones is called a *trapezoid*.
5. In a cotton plant, a “*square*” is the flower bud.
6. Theodore Roosevelt used the phrase, “a *square* deal.”
7. Ancient Egyptians, Greeks and Romans used a *rectangular* sail called the “*square sail*” to power heavy sea vessels.
8. Prior to WWII, the U.S. army used a *square division*.
9. Four couples can participate in *square dancing*.
10. *Square knots* weaken rope by 50 percent.

Long-Answer Question Rubric

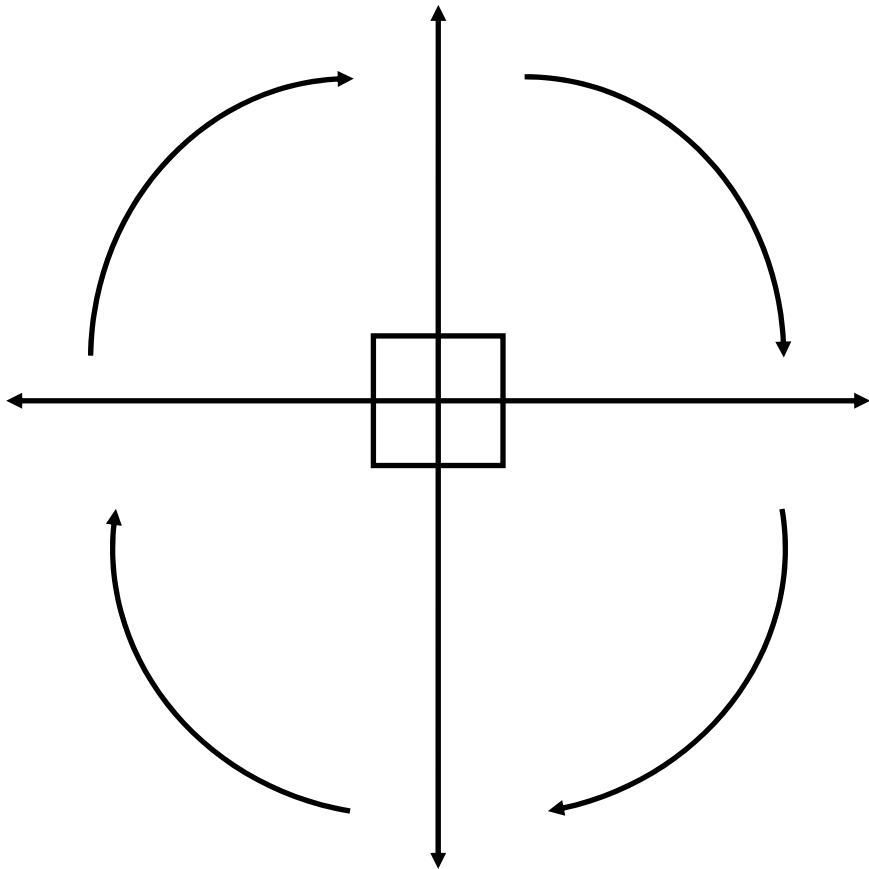
	4	3	2	1	0
Answering the Problem	You arrive at a correct answer. Minor errors in your response do not take away from the understanding shown by your work.	You arrive at a correct answer, but minor errors in your response indicate that you have some misunderstanding of the concepts and procedures.	You may arrive at a correct answer, but the errors in your response reveal that there are essential parts of the concepts and procedures that you do not understand.	You arrive at an incomplete answer. The errors in your response reveal many flaws in your understanding of the concepts and procedures.	Your answer was incorrect or not given at all.
Showing your Work	You follow the given directions to show how the problem was solved. All steps are provided and they show correct math procedures.	You follow the given directions to show how the problem was solved. Steps are provided, but careless errors are shown in the math procedures.	You follow the given directions in an attempt to show how the problem was solved. Some of the steps provided show incorrect math procedures.	You attempt to show how the problem was solved. Some of the steps are addressed, but you fail to arrive at a complete answer.	You make no attempt to show how the problem was solved, or the procedures shown are all incorrect.
Explaining & Interpreting your Answer	You explain how to solve the problem so clearly and completely that someone else can find the answer in a new situation. The interpretations you give can be inferred from the information.	You explain how to solve the problem so that someone else can find the answer. The interpretations you give can be supported by the information.	You may begin to explain how to solve the problem, but you do not clearly show how to find the answer. The interpretations you give are not always supported by the information.	Your explanation of how to solve the problem is incomplete or flawed. The interpretations you give can not be supported by the information.	Your explanations and interpretations are not correct, understood, or given.
What each point value means...	<i>Your work shows a complete understanding of the concepts & procedures.</i>	<i>Your work shows an essential understanding of the concepts & procedures.</i>	<i>Your work shows a partial understanding of the concepts & procedures.</i>	<i>Your work shows a limited understanding of the concepts & procedures.</i>	<i>Your work shows no understanding of the concepts & procedures.</i>

A Concept Map for Quadrilaterals

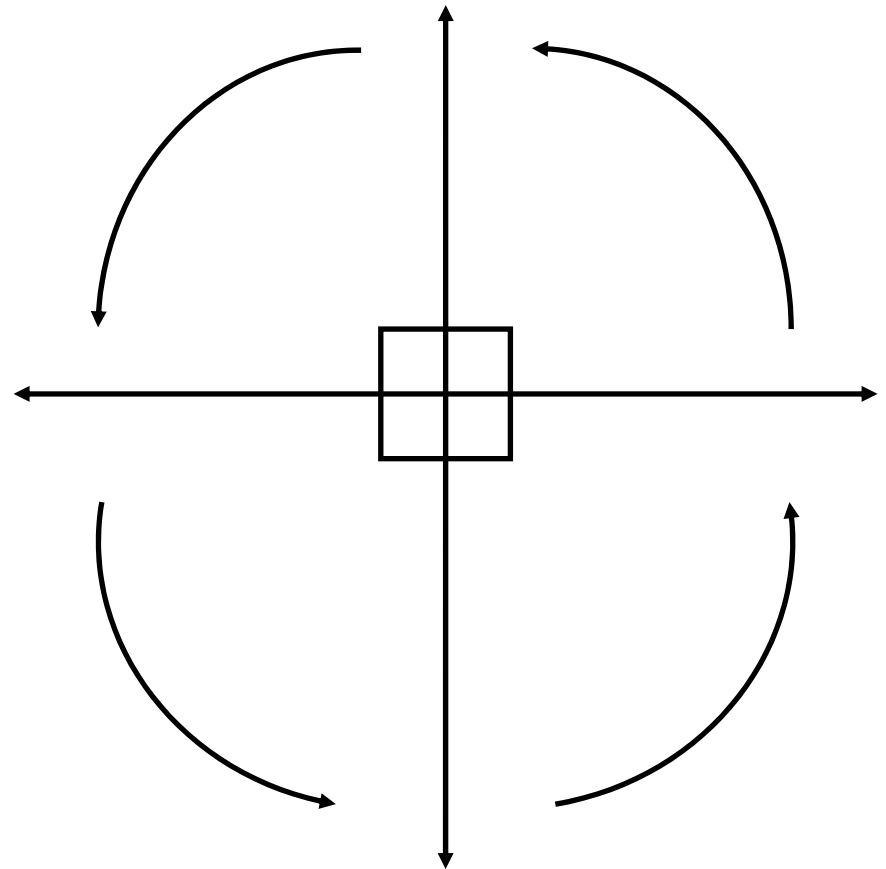
Directions: Sketch the similar figures from “A Quadrilateral Quandary” that match the descriptions provided.



Clockwise Rotation (or Turns)



Counterclockwise Rotations (or Turns)



URNS, URNS, URNS

Remember: As each object is turned, *use arrowheads to label the direction* (clockwise or counterclockwise) *and write in the number of degrees* it has moved.

