Geometry Assignment Overview
2020

April 30th

Directions	Student Checklist
Complete the activities: ● Topic 3 SAS 2	❑ I solved all of the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 1st

Directions	Student Checklist
Complete the activities: ● Topic 3 SAS 3	❑ I solved all of the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 4th

Directions	Student Checklist
Complete the activities: ● Topic 3 SAS 4	❑ I solved all of the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 5th

Directions	Student Checklist
Complete the activities: ● Topic 10 SAS 1	❑ I solved all of the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 6th

Directions	Student Checklist
Complete the activities: ● Topic 10 SAS 2	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 7th

Directions	Student Checklist
Complete the Activities: ● Topic 10 SAS 3	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 8th

Directions	Student Checklist
Complete the Activities: ● Topic 10 SAS 5	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 12th

Directions	Student Checklist
Complete the Activities: ● Topic 17 SAS 1	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 13th

Directions	Student Checklist
Complete the Activities: ● Topic 17 SAS 2	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 14th

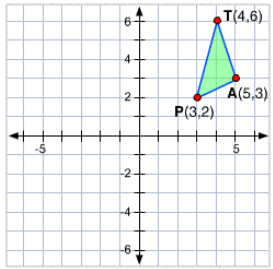
Directions	Student Checklist
Complete the Activities: ● Topic 17 SAS 3	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

May 15th

Directions	Student Checklist
Complete the Activities: ● Topic 17 SAS 4	❑ I solved the problems and showed my work. ❑ I checked my work against the answer key and made corrections.

Support for students, parents, and guardians:

- Teachers will be available to answer questions through Zoom on the following dates. To access the support call, following the directions below
    - **Thursday, May 7th, 11:00 – 11: 45 a.m.**
        - Click on the link https://zoom.us/j/3791568353, OR
        - Open Zoom, click join, and enter Meeting ID: 379 156 8353
    - **Thursday, May 14th, 11:00 – 11:45 a.m.**
        - Click on the link https://zoom.us/j/3791568353, OR
        - Open Zoom, click join, and enter Meeting ID: 379 156 8353



1. Using Patty Paper, reflect Δ**PAT** across the ***y***-axis. Label the image Δ**P'A'T'.** What are the coordinates of the vertices of Δ**P'A'T'**?

2. Write a conjecture about what happens to the coordinates of a point when you reflect it across the ***y***-axis.

3. Write a conjecture about what happens to the coordinates of a point when you reflect it across the ***x***-axis.

4. Using Patty Paper, reflect Δ**PAT** across the ***x***-axis. Label the image Δ**P''A''T''**. What are the coordinates of the vertices of Δ**P''A''T''**?

x	***y***	***-x***	***-y***

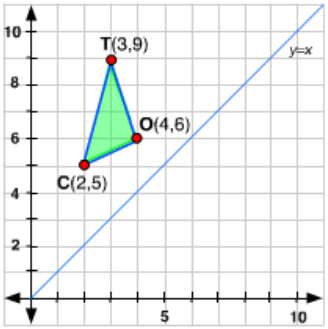
5. Use the answer choices shown above to complete the following statements.

   a. A reflection across the ***x***-axis maps the point (***x***,***y***) to the point (_____ , _____).

   b. A reflection across the ***y***-axis maps the point (***x***,***y***) to the point (_____ , _____).

6. Using ordered pair rule notation, rewrite the rules you completed in question 5.

7. Using Patty Paper, reflect Δ**COT** across the line ***y*** = ***x***. Label the image Δ**C'O'T'**. What are the coordinates of the vertices of Δ**C'O'T'**?



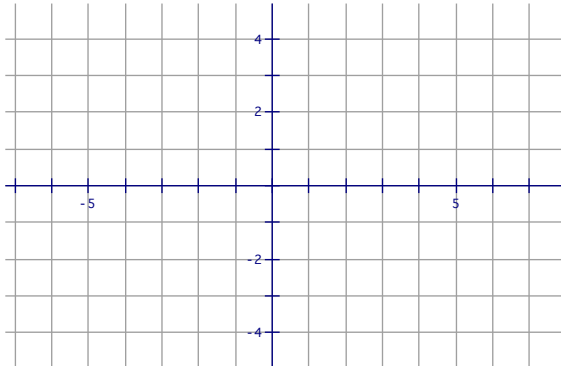
8. Compare the coordinates of **C** and **C'**, **O** and **O'**, and **T** and **T'**. Notice what is true about the coordinates of each pre-image (***x***,***y***) and its image (***x***',***y***'). Then use the given answer choices to complete the following statements.

x	***y***	**stay the same**	**have their signs changed**
-*x*	**-*y***	**are interchanged**	

a. When the pre-image (***x***,***y***) is reflected across the line ***y*** = ***x***, the ***x***- and ***y***-coordinates of the pre-image and image _____.

b. The ordered pair rule for a reflection across the line ***y*** = ***x*** is

(***x***,***y***) → (_____ , _____).



9. **REINFORCE** Quadrilateral **CDEF** has the following vertices: **C**(1,2), **D**(5,3), **E**(5,1), and **F**(3,-2).

a. Plot quadrilateral **CDEF** on the grid.

b. Reflect quadrilateral **CDEF** across the ***x***-axis. What are the coordinates of the image?

c. Reflect quadrilateral **CDEF** across the ***y***-axis. What are the coordinates of the image?

d. Reflect quadrilateral **CDEF** across the line ***y*** = ***x***. What are the coordinates of the image?

10. Using the answer choices provided, name the transformation that goes with each ordered pair rule. Assume $a \neq b$.

reflection across $y = x$	reflection across the x-axis	reflection across the y-axis
rotation of 180° about (0,0)	doesn't match a given transformation	

a. $(a,b) \rightarrow (b,a)$ _____

b. $(a,b) \rightarrow (-a,b)$ _____

c. $(a,b) \rightarrow (a,-b)$ _____

d. $(a,b) \rightarrow (-a,-b)$ _____

e. $(a,b) \rightarrow (-b,-a)$ _____

11. **REINFORCE** Find the image of the point (5,8) for each transformation described.

a. Reflection across the x-axis.

b. Reflection across the y-axis.

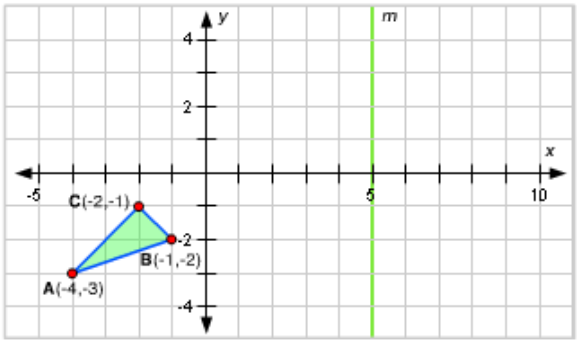
c. Reflection across the line $y = x$.

d. Reflection across the x-axis, followed by a reflection across the y-axis.

e. Reflection across the y-axis, followed by a reflection across the x-axis.

f. Rotation about the origin by 180°.

1. Use this grid to complete the Patty Paper exercise below.



- Overlay your Patty Paper to copy the ***x***- and ***y***-axes, line ***m***, and Δ**ABC**.
- Reflect Δ**ABC** across the ***y***-axis. Mark the locations of **A'**, **B'**, and **C'**.
- Overlay your Patty Paper on the grid to find the coordinates of **A'**, **B'**, and **C'**.
- Reflect Δ**A'B'C'** across the line ***x*** = ***m***. Mark the locations of **A"**, **B"**, and **C"**.
- Overlay your Patty Paper on the grid to find the coordinates of **A"**, **B"**, and **C"**.

Sketch the results from your Patty Paper on the grid, or attach your Patty Paper to this Student Activity Sheet.

Use the results of your Patty Paper activity from question 1 to answer questions 2-4.

2. What is the single ordered pair rule for translating point **A**?

3. What are the single ordered pair rules for translating points **B** and **C**?

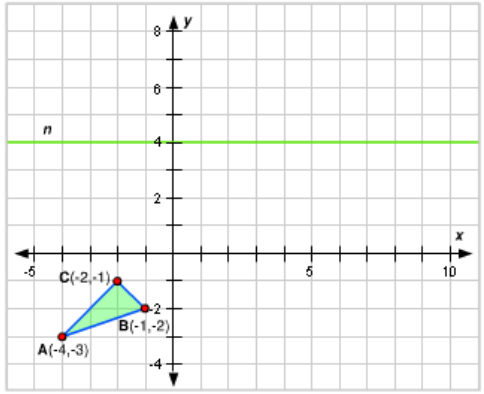
agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

4. Complete the steps below to investigate what happens when $\Delta A''B''C''$ translates vertically.

   Step 1: Draw $\Delta A''B''C''$ and the line $y = 4$ on the coordinate grid. Label the line ***n***.

   Step 2: Draw the reflection image of $\Delta A''B''C''$ across the ***x***-axis. Label the reflection image of $\Delta A''B''C''$ and record the coordinates of the vertices **D**, **E**, and **F**.

   Step 3: Now reflect ΔDEF across line ***n*** to get the translation image of $\Delta A''B''C''$. Label the translation image $\Delta D'E'F'$ and record the coordinates of the vertices.



5. What is the ordered pair rule for reflecting **A"** twice to **D'**?

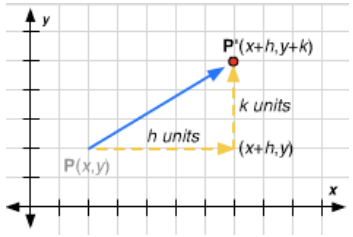
6. What are the single ordered pair rules for translating points **A"**, **B"**, and **C"**?

7. To compare the beginning position of ΔABC with the ending position of $\Delta D'E'F'$, write single ordered pair rules for corresponding vertices. Then describe the translation in words.

8. Fill in the blanks to complete the statements below.

   In science, a vector is a quantity that has _____ and _____. A vector can also be described as a _____ _____ _____.

9. Use vector notation to describe the vector on the graph.



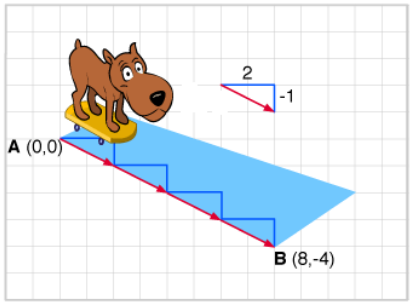
10. Using the answer choices provided, complete the following statements.

$k < 0$	$h > 0$	$x + h$	$x - h$
$k > 0$	$h < 0$	$y + k$	$y - k$

   a. If $P(x,y)$ is translated $|h|$ units to the right, the signed value of h is _____.
   b. If $P(x,y)$ is translated $|h|$ units to the left, the signed value of h is _____.
   c. If $P(x,y)$ is translated $|k|$ units up, the signed value of k is _____.
   d. If $P(x,y)$ is translated $|k|$ units down, the signed value of k is _____.
   e. A single ordered pair rule for translating $P(x,y)$ h units horizontally and k units vertically is $P(x,y) \xrightarrow{\langle h,k \rangle} P'$ (_____ , _____).

11. **REINFORCE** A point has coordinates (x,y). Write an ordered pair rule for a translation that moves the point 5 units to the right and 3 units down.

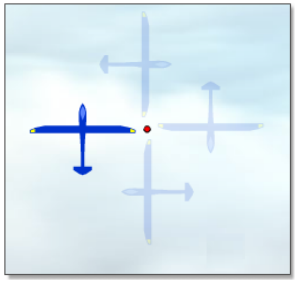
An animation of a dog is modeled in the coordinate plane with translations and translation vectors.

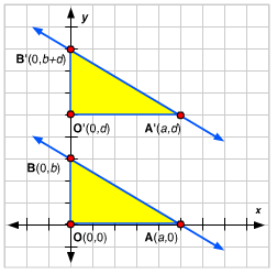


1. What is one translation vector that moves the dog along the path shown?

2. How would this vector be applied to move the dog from point **A** to point **B**?

3. How could you model a glider in the air circling a point on the ground? In this example, the glider is circling clockwise about the point on the ground. Suppose the glider is placed in the coordinate plane with the point on the ground set at the origin. What transformation would make the glider follow the exact path shown?





4. Use algebra to show that $\overleftrightarrow{AB}$ and $\overleftrightarrow{A'B'}$ are parallel.

5. Describe the relationship between an image and its dilation.

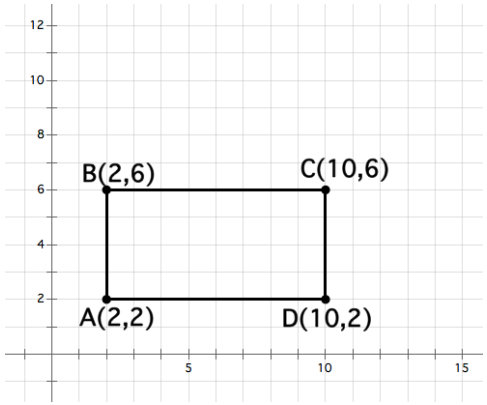
6. Point P(x,y) is dilated with the center at the origin by a scale factor of s. Write an ordered pair rule for this transformation.

7. Point P(x,y) is transformed by a horizontal stretch with factor a and vertical stretch with factor b. Write an ordered pair rule for this transformation.

8. Place an X in each slot in the table to decide if each transformation preserves size or shape or neither.

Transformations	Preserves size	Preserves shape	Preserves neither
Reflection	☐	☐	☐
Rotation	☐	☐	☐
Translation	☐	☐	☐
Dilation	☐	☐	☐
Vertical stretch	☐	☐	☐
Horizontal stretch	☐	☐	☐

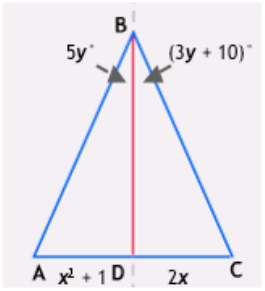
11. **REINFORCE** Quadrilateral ABCD is a rectangle with the coordinates of vertices shown.



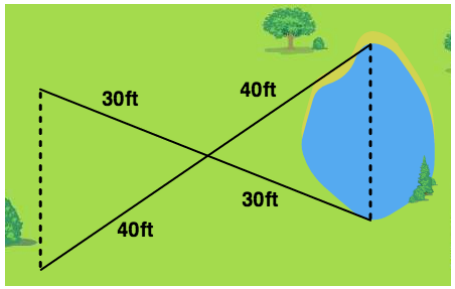
a. Transform quadrilateral ABCD by a vertical stretch with factor 2 and horizontal stretch with factor ½. What are the coordinates of the transformed quadrilateral A'B'C'D'?

12. **REINFORCE** Write a comparison of rigid and nonrigid transformations. Include dilations, vertical stretches, and horizontal stretches in your discussion of nonrigid transformations. Be sure to discuss and similarities and differences.

1. **REVIEW** Suppose ΔABC is isosceles with **AB** = **BC** and altitude $\overline{BD}$. Find the length of **AC** and $m\angle ABC$.

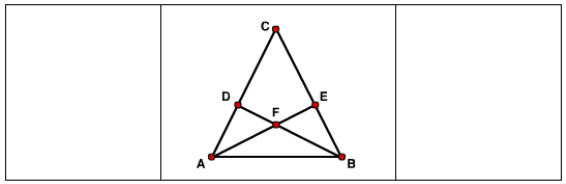


2. In order to find the distance across a pond, a surveyor helps a park ranger measure the following distances to create two triangles. How can the park ranger be sure that the two triangles are congruent?



3. What does CPCTC stand for?

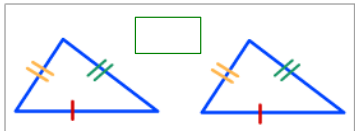
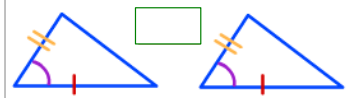
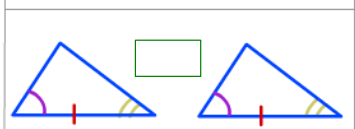
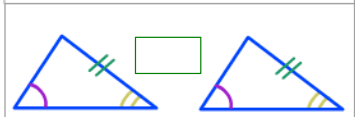
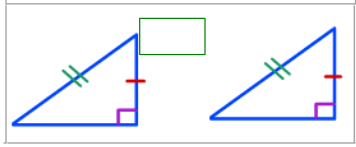
4. In the box to the left draw Δ**CEA**, and in the box to the right draw Δ**CDB**.



Student:_____Class:_____Date_____

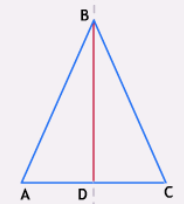
Using congruent triangles
Topic 10 Student Activity Sheet 1; *Overview*

Fill in the blanks in the table with the abbreviations of the congruent triangle postulates.

	If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.
	If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.
	If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.
	If two angles and a nonincluded side of one triangle are congruent to two angles and a nonincluded side of another triangle, then the triangles are congruent.
	If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and the corresponding leg of another right triangle, then the triangles are congruent.

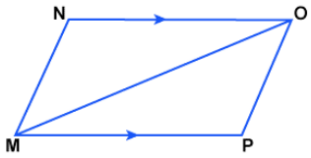
agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

REINFORCE Suppose you want to prove $\overline{AD} \cong \overline{DC}$. These two segments are parts of which two triangles?

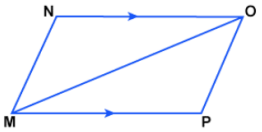


1. **REINFORCE** Given: $\overline{NO} \cong \overline{MP}$, $\overline{NO} \parallel \overline{MP}$
   Prove: $\angle N \cong \angle P$

   a. To complete this proof, first mark all the congruent parts on the diagram. Based on your markings, which triangles are congruent, and why? How can you use these triangles to prove $\angle N \cong \angle P$?



   b. Complete the proof by filling in the blanks.



Given: $\overline{NO} \cong \overline{MP}$, $\overline{NO} \parallel \overline{MP}$
Prove: $\angle N \cong \angle P$

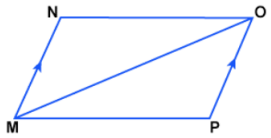
Statements	Reasons
1. $\overline{NO} \parallel \overline{MP}$	1. Given
2. $\angle NOM \cong \angle PMO$	2.
3. $\overline{NO} \cong \overline{MP}$	3.
4. $\overline{MO} \cong \overline{MO}$	4.
5. $\Delta NOM \cong \Delta PMO$	5.
6. $\angle N \cong \angle P$	6.

2. **REINFORCE** Complete the proof by choosing statements from the list below and filling in the steps of the proof in the correct order.

Statements:

$\overline{MO} \cong \overline{MO}$	$\angle NOM \cong \angle PMO$	$\overline{NO} \parallel \overline{MP}$	$\angle NMO \cong \angle POM$	$\angle N \cong \angle P$	$\overline{NM} \parallel \overline{OP}$	$\Delta NOM \cong \Delta PMO$

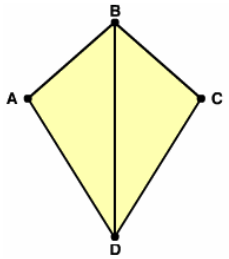
Given: $\overline{NM} \parallel \overline{OP}$, $\angle N \cong \angle P$
Prove: $\overline{NO} \parallel \overline{MP}$



Statement	Reasons
1. $\overline{NM} \parallel \overline{OP}$	1. Given
2.	2. If parallel lines are cut by a transversal, then alternate interior angles are congruent.
3.	3. Given
4.	4. Reflexive property of congruence
5.	5. AAS
6.	6. CPCTC
7.	7. If the alternate interior angles are congruent, then the lines are parallel.

3. Mark the congruent parts of the triangles and complete the proof.

SAS	**Reflexive**	**$\Delta ABD \cong \Delta CBD$**	**Def $\angle$ bis.**	**ASA**
$\angle A \cong \angle C$	**$\Delta ABD \cong \Delta DBC$**	**CPCTC**	**Given**	**Symmetric**

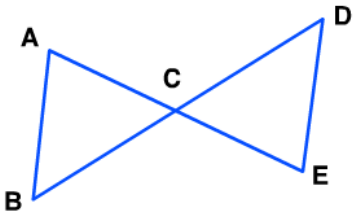


Statements	Reasons
1. $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$	1.
2. $\angle ABD \cong \angle CBD$; $\angle ADB \cong \angle BDC$	2.
3. $\overline{BD} \cong \overline{BD}$	3. property
4.	4.
5.	5.

4. Mark the congruent parts of the triangles and complete the proof.

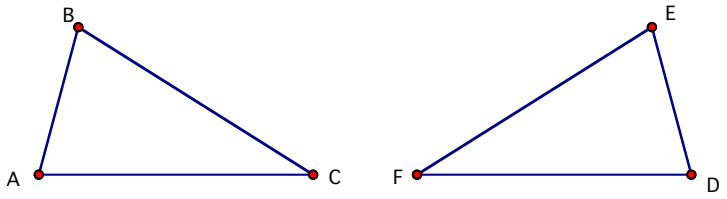
Given	ASA Postulate	$\Delta BCA \cong \Delta DCE$	CPCTC	$\angle ACB \cong \angle ECD$
$\overline{AE}$ bisects $\overline{BD}$	$\overline{BC} \cong \overline{CD}$	$\overline{AC} \cong \overline{CE}$	$\overline{DB}$ bisects $\overline{AE}$	

Given: $\angle B \cong \angle D$; $\overline{AE}$ bisects $\overline{BD}$
Prove: $\overline{DB}$ bisects $\overline{AE}$

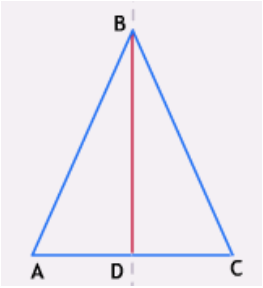


Statements	Reasons
$\angle B \cong \angle D$	
	Given
	Def. of segment bisector
	Vertical angles are congruent.
	Def. of segment bisector

5. **REINFORCE** Given $\Delta ABC \cong \Delta DEF$, name all of the corresponding parts you could prove congruent using CPCTC.



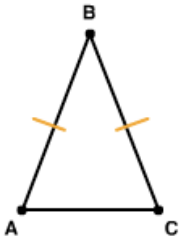
1. List the isosceles triangles conjectures you made in the topic **Properties of a Triangle.**



2. **REINFORCE** If the vertex angle of an isosceles triangle has a measure of 50°, what are the measures of the two base angles? Explain your solution.

Student:_____Class:_____Date_____

Using congruent triangles
Topic 10 Student Activity Sheet 3; *Exploring* "Isosceles triangle theorem" Page 2 of 5

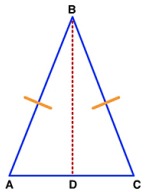


3. Complete this proof of the Isosceles Triangle Theorem.

AD = DC	**CPCTC**	**reflexive**	**AB = BC**	**symmetric**	**SSA**	**midpoint**	**SSS**

Given: AB = BC

Prove ∠A ≅ ∠C



Draw $\overline{BD}$, a median of **ΔABC.**

D is the _____ of $\overline{AC}$ by the definition of a median.

_____ by the definition of a midpoint.

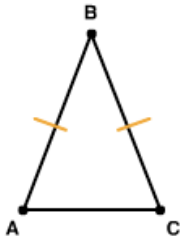
_____ is Given.

ΔABD ≅ ΔCBD by the _____ postulate.

BD = BD by the _____ property of equality.

∠A ≅ ∠C by _____

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin



a. Decide if each of the following triangle congruence statements is true or false. Explain your reasoning.

_____**ΔABC ≅ ΔABC**

_____**ΔABC ≅ ΔCBA**

_____**ΔABC ≅ ΔBAC**

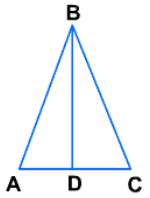
b. Which one of the true triangle congruency statements above can be used to prove the Isosceles Triangle Theorem? Explain your reasoning.

4. Parts a and b below guide the proofs for the remaining isosceles triangle conjectures.

a. Complete the proof of the third conjecture: $\overline{BD}$ bisects ∠**ABC**.

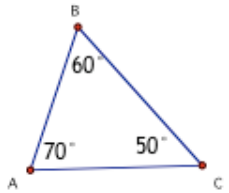
CPCTC	**ΔDAB ≅ ΔDBC**	**$\overline{BD}$ bisects ∠ABC**	**Definition of midpoint**	**ΔABD ≅ ΔCBD**	**Given**	**SSS**

Given: **AB = BC** and $\overline{BD}$ is the median of $\overline{AC}$.
Prove: $\overline{BD}$ bisects ∠**ABC**.



Statements	Reasons
1. AB = BC	1.
2. $\overline{BD}$ is the median of $\overline{AC}$.	2.
3.	3. Median of isos. △ forms two ≅ △s.
4. ∠ABD ≅ ∠CBD	4.
5.	5. Def. of ∠ bisector

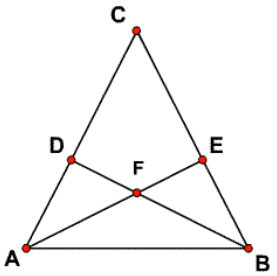
9. **REINFORCE** Given the triangle below with the angle measures shown, rank the side lengths in order from smallest to greatest.



_____ < _____ < _____

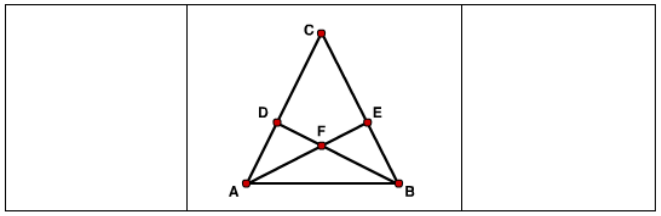
Given: AD = BE, CD = CE

Prove: ∠CEA ≅ ∠CDB



1. Consider the proof set up above. What triangle congruence would help you prove the statement?

2. Redraw the triangles so they do not overlap. On the two new triangle diagrams, mark the congruences given in the proof setup, as well as the two angles you know are congruent by the Reflexive Property.

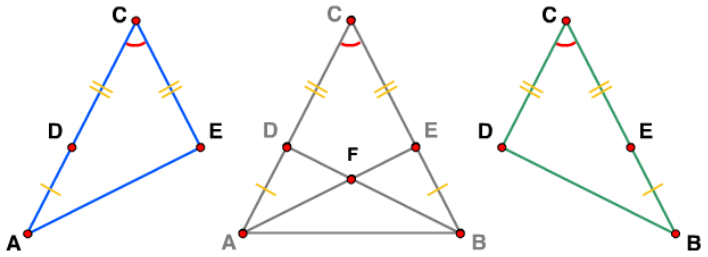


3. Based on the given information, which triangle congruence postulate will you use to prove $\Delta CEA \cong \Delta CDB$?

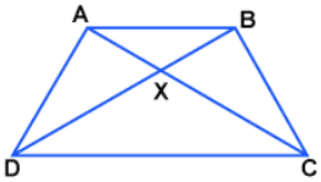
4. Now write a formal proof.

Given: AD = BE, CD = CE

Prove: ∠CEA ≅ ∠CDB

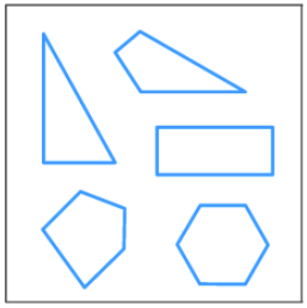


REINFORCE Given: $\overline{AD} \cong \overline{BC}$, and ∠**DAB** ≅ ∠**CBA**
Prove: Δ**AXB** is isosceles



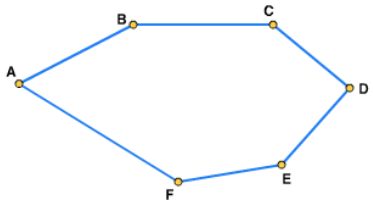
1. Consider the sets of images.

   a. What title would you give each set of images?



   b. Write the definition of a polygon.

2. Fill in the blanks below to show your understanding of the parts of a polygon.



   a. Name a vertex. _____

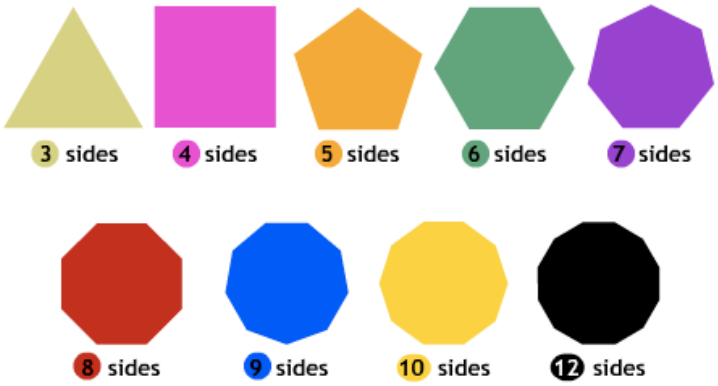
   b. Name the polygon. _____

   c. Name a side. _____

   d. Name an interior angle. _____

   e. Name a diagonal. _____

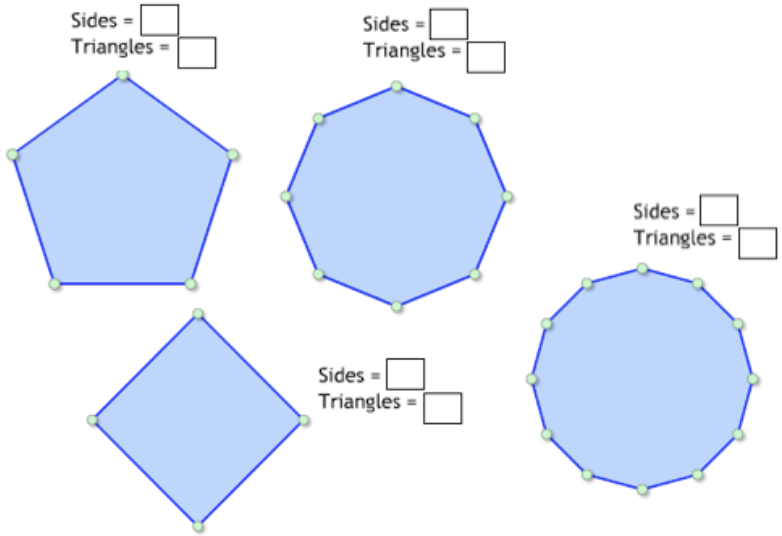
3. Name the following polygons.



4. Write a definition of a regular polygon.

5. Draw a regular polygon. Then draw an irregular polygon with the same number of sides.

1. Divide each polygon into non-overlapping triangles. What pattern do you see?



2. Write a formula for the sum of the interior angles of a polygon with ***n*** sides.

3. Use what you know about regular polygons to find the measure of each interior angle of the regular polygons listed in the chart. What do you notice?

Regular Polygons		
Number of sides	**Sum of interior angle measures (in degrees)**	**Measure of each interior angle (in degrees)**
3		
4		
6		
8		
10		
20		
100		
1000		

Student:_____Class:_____Date_____

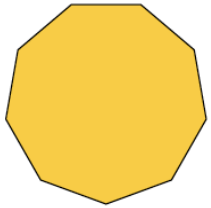
Polygons and special quadrilaterals
Topic 17 Student Activity Sheet 2; *Exploring* "Interior and exterior angles of a polygon"

4. **REINFORCE** A soccer ball consists of a pattern of regular pentagons and regular hexagons (as shown). Explain why this pattern cannot be used to tile a flat surface.

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

5. Show algebraically why the exterior angles of a polygon add up to 360º.

6. Fill in the blanks to describe the regular nonagon shown.



   a. Sum of the measures of the interior angles: _____

   b. Measure of each interior angle: _____

   c. Sum of the measures of the exterior angles: _____

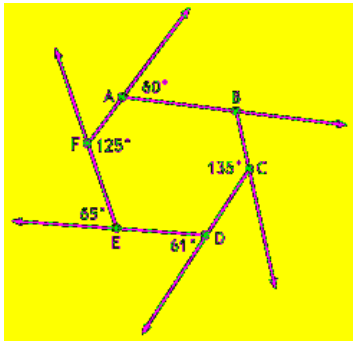
   d. Measure of each exterior angle: _____

7. **REINFORCE** Find the measure of each interior and exterior angle (one at each vertex).

Angle	Interior	Exterior
A		60°
B		
C	135°	
D		61°
E		65°
F	125°	
Total		

Student:_____Class:_____Date_____

Polygons and special quadrilaterals
Topic 17 Student Activity Sheet 2; *Exploring* "Interior and exterior angles of a polygon"



agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

1. Write a definition of a parallelogram.

2. What symmetry does a parallelogram have?

3. Draw a scalene triangle. Find a rotation that will create a parallelogram from the pre-image and image of the rotation.

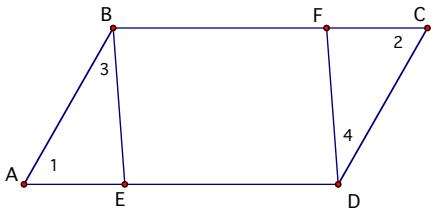
Student:_____Class:_____Date_____

Polygons and special quadrilaterals
Topic 17 Student Activity Sheet 3; *Exploring* "Special quadrilaterals"

4. What conjectures can you make about the sides, angles, and diagonals of a parallelogram?

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

REINFORCE Fill in the missing statements and reasons in the following proof.



Given: ABCD is a parallelogram

$\angle 3 \cong \angle 4$

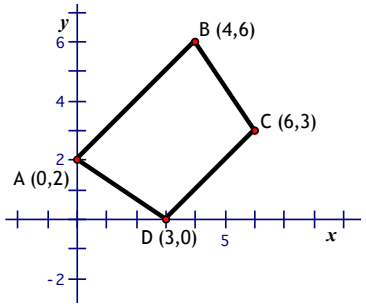
Prove: $\overline{AE} \cong \overline{FC}$

Statements	Reasons
1. **ABCD** is a parallelogram.	1.
2. $\overline{\mathbf{AB}} \cong \overline{\mathbf{CD}}$	2.
3. $\angle 1 \cong \angle 2$	3.
4.	4. Given
5. $\Delta\mathbf{ABE} \cong \Delta\mathbf{CDF}$	5.
6.	6. CPCTC

5. List the diagonal properties of each shape.

Parallelogram	_____
Rectangle	_____ _____
Rhombus	_____ _____
Square	_____ _____ _____
Isosceles trapezoid	_____

1. **REVIEW** Use this polygon to answer the following questions.



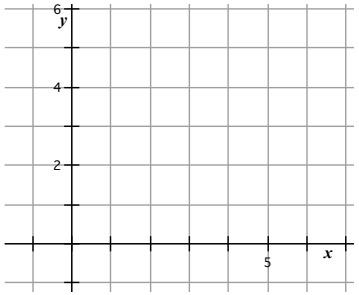
a. Find the midpoint of $\overline{AB}$.

b. Find the slope of each of the four sides.

c. Are any of the slopes the same? If so, what does this tell you about those sides?

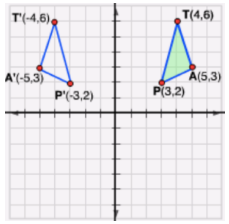
d. Find the length of each of the sides. Then, name any sides that have the same length.

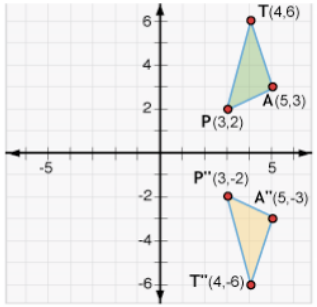
2. Sketch quadrilateral **ABCD**, where **A** is (2,1), **B** is (4,2), **C** is (3,4), and **D** is (1,3).



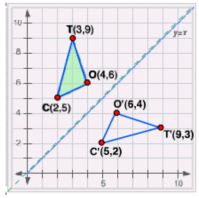
3. Using the distance formula, find the length of each side of quadrilateral **ABCD**.

4. What algebraic relationship do perpendicular lines have?

1. 

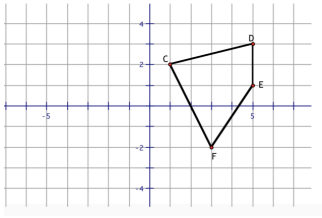
2. When you reflect a point across the y-axis, the x-coordinates change signs.
3. When you reflect a point across the **x**-axis, the **y**-coordinates change signs.
4. 

5. a) (**x**,-**y**) b. (-**x**, **y**) 6. A) (x.y) → (x.-y) b) (x,y) → (-x,y)

7. 

8. A) are interchanged. B) (x,y) → (y,x)

April 30th
Answer Sheets Topic 3 SAS 2
Transformations and coordinate geometry



9. A) ANSWER SHOWN ON GRAPH ABOVE B) C'(1,-2), D' (5, -3), E' (5, -1), F'(3,2)
C) **C'**(-1,2), **D'**(-5,3), **E'**(-5,1), **F'**(-3,-2) D) **C'**(2,1), **D'**(3,5), **E'**(1,5), **F'**(-2,3)

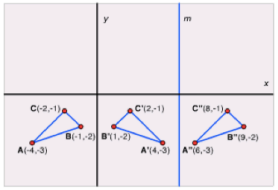
10. A) REFLECTION ACROSS Y=X B) REFLECTION ACROSS THE -AXIS
C) REFLECTION ACROSS THE X-AXIS D) ROTATION OF 180 DEGREES ABOUT (0.0)
E) DOESN'T MATCH A GIVEN TRANSFORMATION

11. a) (5,-8) b) (-5,8) c) (8,5) d) (-5,-8) e) -5,-8) f) (-5,-8)

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

1.

Completed Patty Paper activity should look like this:



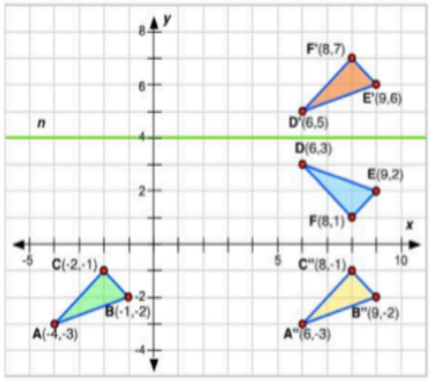
2. A is (-4,-3) →(6. -3)
3. B is (-1,-2) → (9,-2) C is (-2, -1) → (8,-1)
4.

Complete the steps below to investigate what happens when ΔA"B"C" translates vertically. **[EX2, pages 5 and 6]**

Step 1: Draw ΔA"B"C" and the line **y** = 4 on the coordinate grid. Label the line ***n***.

Step 2: Draw the reflection image of ΔA"B"C" across the ***x***-axis. Label the reflection image of ΔA"B"C" and record the coordinates of the vertices **D**, **E**, and **F**.

Step 3: Now reflect ΔDEF across line ***n*** to get the translation image of ΔA"B"C" . Label the translation image ΔD'E'F' and record the coordinates of the vertices.



5. Point A" moved to D and D' in the following way: (6, -3) → (6,3) →(6,5)

May 1st
Answer Sheets SAS 3

Transformations and coordinate geometry

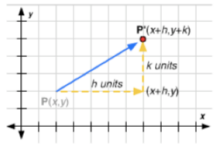
6. The single ordered pair rule for translating point A" to D' is (6,-3) → (6,5). The rule for B" to E' is (9,-2)→ (9,6) and the rule for C" to F' is (8,-1) → (8,7).

7. A(-4,-3) → D'(6,5); B(-1,-2) → E'(9,6); C(-2,-1) → F'(8,7) Each vertex of ΔABC is translated 10 units horizontally and 8 units vertically.

8. Magnitude; direction. Directed line segment

9.

Use vector notation to describe the vector on the graph. **[EX2, page 9]**



$P \xrightarrow{\langle h,k \rangle} P'$

10. a) h > 0 b) h > 0 c) k > 0 d) k < 0 e) $P(x,y) \xrightarrow{\langle h,k \rangle} P'(x+h, y+k)$.

11.

$(x,y) \rightarrow (x+5, y-3)$ or $(x,y) \xrightarrow{\langle 5,-3 \rangle} (x+5, y-3)$

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

May 4th
Answer Sheets SAS 4

Transformations and coordinate geometry

Student Activity Sheet 4; *Exploring* "Rigid and nonrigid transformations"

1. Some possible answers: <2, -1>, <4,-2>, <8,-4>
2. Answers will cary depending on vector given in question 1. The answer below corresponds to the vector <2,-1>. The transformation would have to be repeated four times.
3. A 270° clockwise rotation would cause the glider to follow this path. 270° out of 360° is three-fourths of a complete rotation. The glider stops three-fourths of the way around the circle.
4. $\overleftrightarrow{AB}$ has slope $m_{AB} = \frac{b-0}{0-a} = -\frac{b}{a}$.

   $\overleftrightarrow{A'B'}$ has slope $m_{A'B'} = \frac{(b+d)-d}{0-a} = -\frac{b}{a}$.

   $\overleftrightarrow{AB}$ and $\overleftrightarrow{A'B'}$ are parallel because they have the same slope.
5. A dilation is a transformation that scales an image by a scale factor. The ratios of the lengths of the corresponding sides of the triangle are equal, so the side lengths are proportional. The measures of corresponding angles are equal. The original image and the dilated image are similar.
6. $P(x,y) \rightarrow P'(sx, sy)$
7. $P(x,y) \rightarrow P'(ax, by)$
8.

Transformations	Preserves size	Preserves shape	Preserves neither
Reflection	☑	☑	☐
Rotation	☑	☑	☐
Translation	☑	☑	☐
Dilation	☐	☑	☐
Vertical stretch	☐	☐	☑
Horizontal stretch	☐	☐	☑

11. a) A'(1,4) B'(1,12) C'(5,12) D'(5,4)

12. Students' answers will vary. Answers should point out that nonrigid transformations do not preserve size and shape. Dilations preserve shape but not size. Angle measures are also preserved in dilations. Vertical and horizontal stretches distort the image.

May 5th.
Answer Sheets SAS 1

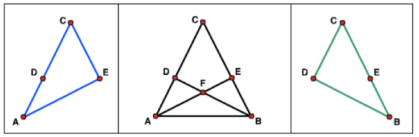
Using congruent triangles

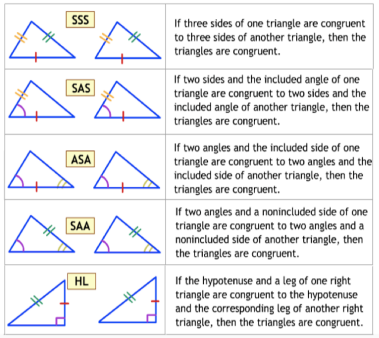
Topic 10 Student Activity Sheet 1; *Overview*

1.

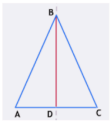
$x^2 + 1 = 2x$	$5y = 3y + 10$
$x^2 - 2x + 1 = 0$	$2y = 10$
$(x - 1)(x - 1) = 0$	$y = 5$
$x = 1$	$m\angle ABC = (5y + 3y + 10)°$
$AC = x^2 + 1 + 2x$	$m\angle ABC = (5(5) + 3(5) + 10)°$
$AC = 1 + 1 + 2$	$m\angle ABC = 50°$
$AC = 4$ units	

2. The surveyor and park ranger have measured the two pairs of sides and found that they are the same length, so each pair of sides is congruent. The included angles are congruent because they are vertical angles. Therefore, the park ranger can say that the two triangles are congruent by SAS.
3. Corresponding Parts of Congruent Triangles are Congruent.
4.





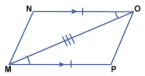
REINFORCE Suppose you want to prove $\overline{AD} \cong \overline{DC}$. These two segments are parts of which two triangles?



These segments are parts of $\triangle ABD$ and $\triangle CBD$.

1. **A)**

Mark $\overline{NO} \cong \overline{MP}$ from the given. Mark $\angle NOM \cong \angle PMO$ because they are alternate interior angles from parallel lines cut by a transversal. Finally, mark $\overline{MO} \cong \overline{MO}$ since both triangles share this segment. This makes $\triangle NOM \cong \triangle PMO$ by SAS. This means that $\angle N \cong \angle P$ by CPCTC.



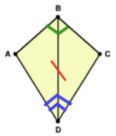
B)

Statements	Reasons
1. $\overline{NO} \parallel \overline{MP}$	1. Given
2. $\angle NOM \cong \angle PMO$	2. If parallel lines are cut by a transversal, then alt. int. angles are congruent.
3. $\overline{NO} \cong \overline{MP}$	3. Given
4. $\overline{MO} \cong \overline{MO}$	4. Reflexive property of congruence
5. $\triangle NOM \cong \triangle PMO$	5. SAS
6. $\angle N \cong \angle P$	6. CPCTC

2.

Statement
1. $\overline{NM} \parallel \overline{PO}$
2. $\angle NMO \cong \angle POM$
3. $\angle N \cong \angle P$
4. $\overline{MO} \cong \overline{MO}$
5. $\triangle NOM \cong \triangle PMO$
6. $\angle NOM \cong \angle PMO$
7. $\overline{NO} \parallel \overline{MP}$

3.



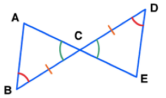
Statements	Reasons
1. $\overline{BD}$ bisects $\angle ABC$ and $\angle ADC$	1. Given
2. $\angle ABD \cong \angle CBD$; $\angle ADB \cong \angle BDC$	2. Def $\angle$ bis.
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive property
4. $\triangle ABD \cong \triangle CBD$	4. ASA
5. $\angle A \cong \angle C$	5. CPCTC

May 6th
Answer sheets SAS 2

Using congruent triangles

4.

Given: $\angle B \cong \angle D$; $\overline{AE}$ bisects $\overline{BD}$
Prove: $\overline{DB}$ bisects $\overline{AE}$



Statements	Reasons
$\angle B \cong \angle D$	Given
$\overline{AE}$ bisects $\overline{BD}$	Given
$\overline{BC} \cong \overline{CD}$	Def. of segment bisector
$\angle ACB \cong \angle ECD$	Vertical angles are congruent.
$\triangle BCA \cong \triangle DCE$	ASA Postulate
$\overline{AC} \cong \overline{CE}$	CPCTC
$\overline{DB}$ bisects $\overline{AE}$	Def. of segment bisector

5.

Using CPCTC (the definition of congruent triangles):
$m\angle A \cong m\angle D$; $m\angle B \cong m\angle E$; $m\angle C \cong m\angle F$.
$\overline{AB} \cong \overline{DE}$; $\overline{BC} \cong \overline{EF}$; $\overline{AC} \cong \overline{DF}$.

agile Mind®
Copyright Agile Mind, Inc. ® Content copyright Charles A. Dana Center, The University of Texas at Austin

May 7th
Answer Sheets SAS 3
Using congruent triangles
Topic 10 Student Activity Sheet 3; *Exploring* "Isosceles triangle theorem"

1. The base angles of an isosceles triangle are congruent. **BD** is the perpendicular bisector of **AC**. **BD** bisects ∠**ABC**. Δ**ABD** ≅ Δ**CBD**.

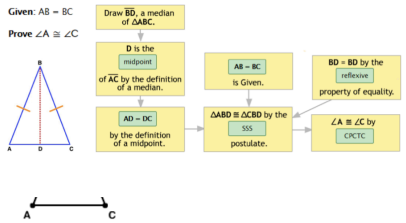
2.

Because the triangle is isosceles, the two base angles are congruent and will have the same measure. Let x be the measure of each base angle. Use the Triangle Sum Theorem to set up an equation.

$x + x + 50 = 180$
$2x = 130$
$x = 65$

Therefore, each base angle measures 65°.

3.



True ΔABC ≅ ΔABC
By the Reflexive Property, a triangle is congruent to itself.

True ΔABC ≅ ΔCBA
From the triangle congruence statement, the corresponding sides are as follows: $\overline{AB}$ and $\overline{CB}$; $\overline{BC}$ and $\overline{BA}$; $\overline{AC}$ and $\overline{CA}$. The order in which we name a segment does not matter. $\overline{AC}$ and $\overline{CA}$ are the same segment and congruent by the Reflexive Property.
$\overline{AB} \cong \overline{CB}$ and $\overline{BC} \cong \overline{BA}$ because these are the congruent sides of the isosceles triangle. Therefore, the triangle congruence statement is true by SSS.

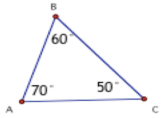
False ΔABC ≅ ΔBAC
From the triangle congruence statement, the corresponding sides $\overline{BC}$ and $\overline{CA}$ would need to be congruent. However, these are not congruent, based on the diagram. Therefore, in the order written, this is not a true congruence statement.

a)
b) Δ**ABC** ≅ Δ**CBA** can be used to prove the Isosceles Triangle Theorem because, given the correspondence as written, ∠**A** ≅ ∠**C** by ***CPCTC***.

4.

Statements	Reasons
1. AB = BC	1. Given
2. $\overline{BD}$ is the median of $\overline{AC}$.	2. Given
3. △ABD ≅ △CBD	3. Median of isos. △forms two ≅ △s.
4. ∠ABD ≅ ∠CBD	4. CPCTC
5. $\overline{BD}$ bisects ∠ABC	5. Def. of ∠ bisector

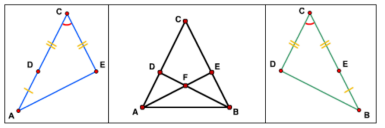
9.



AB < **AC** < **BC**

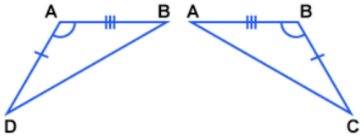
May 8th
ANSWER SHEETS SAS 5
Using congruent triangles
TOPIC 10 Student Activity Sheet 5; *Exploring* "Overlapping triangles"

1. If you could show that ΔCEA ≅ ΔCDB , you could use CPCTC to prove ∠CEA ≅ ∠CDB .
2.



3. You can use SAS, because CE = CD and ∠C ≅ ∠C . You will have to use the Segment Addition Postulate to show that AC = BC.
4.

Statements	Reasons
1. AD = BE,CD = CE	1. Given
2. AD + CD = BE + CE	2. Addition Property of Equality
3. AD + CD = AC, BE + CE = BC	3. Segment Addition Postulate
4. AC = BC	4. Substitution
5. ∠C ≅ ∠C	5. Reflexive Property of Congruence
6. △CEA ≅ △CDB	6. SAS Triangle Congruence Postulate
7. ∠CEA ≅ ∠CDB	7. CPCTC



Statements	Reasons
1. $\overline{AD} \cong \overline{BC}$, ∠DAB ≅ ∠CBA	1. Given
2. $\overline{AB} \cong \overline{AB}$	2. Reflexive
3. ΔDAB ≅ ΔCBA	3. SAS
4. ∠ABD ≅ ∠BAC	4. CPCTC
5. $\overline{AX} \cong \overline{BX}$	5. Converse Isosceles Triangle Theorem
6. ΔAXB is isosceles	6. Definition of isosceles triangle

May 12th
ANSWER SHEETS SAS 1

Polygons and special quadrilaterals

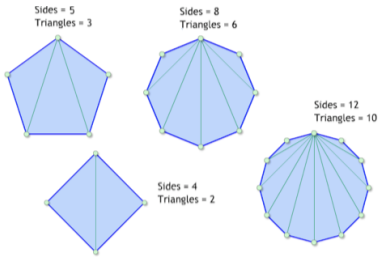
Topic 17 Student Activity Sheet 1; *Overview*

1. A) Left picture – Polygons, Right picture – Not polygons
   B) A polygon is a plane figure made up of line segments that intersect only at their endpoints and form a closed figure.
2. a) A, B, C, D, E, or F
   b) Sampel answer: ABCDEF
   c) AB,BC, CD, DE, EF, or AF
   d) ∠A, ∠B, ∠C, ∠D, ∠E, or ∠F
   e) Same answers: AC, EB, FC, DA
3. 3 = triangle, 4 = quadrilateral, 5 = pentagon, 6= hexagon, 7 = heptagon, 8= octagon, 9 = nonagon, 10= decagon, 12= dodecagon
4. A regular polygon is a polygon that is equilateral and equiangular
5. Drawings will vary

May 13th
ANSWER SHEETS SAS 2

Polygons and special quadrilaterals

Student Activity Sheet 2; *Exploring* "Interior and exterior angles of a polygon"

1. 

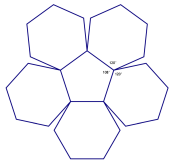
The number of triangles is two less than the number of sides.

2. Sum of the measures of the interior angles of a polygon = (n – 2)180°
3.

Regular Polygons		
Number of sides	Sum of interior angle measures (in degrees)	Measure of each interior angle (in degrees)
3	180	60
4	360	90
6	720	120
8	1,080	135
10	1,440	144
20	3,240	162
100	17,640	176.4
1000	179,640	179.6

As the number of sides increases, the angle measure increases. The interior angle measure is getting closer to 180°.

4. The interior angles of the two regular hexagons and the regular pentagon add up to less than 360° (108° + 120° + 120° = 348°) when arranged around a single point on a flat surface. This tiling arrangement only works in 3-dimensional space



May 13th
ANSWER SHEETS SAS 2

Polygons and special quadrilaterals
Student Activity Sheet 2; *Exploring* "Interior and exterior angles of a polygon"

5.

$$\text{Sum of interior } \angle s + \text{Sum of exterior } \angle s = 180^\circ n$$

$$(n-2)\,180^\circ + \text{Sum of exterior } \angle s = 180^\circ n$$

$$180^\circ n - 360^\circ + \text{Sum of exterior } \angle s = 180^\circ n$$

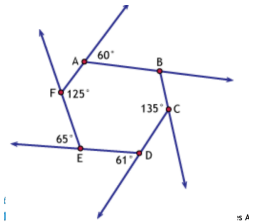
$$0 + \text{Sum of exterior } \angle s = 180^\circ n - 180^\circ n + 360^\circ$$

$$\text{Sum of exterior } \angle s = 360^\circ$$

6. a) 1260-degree b) 140 degrees c) 360 degrees d) 40 degrees

7.

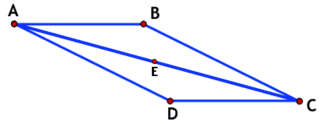
Angle	Interior	Exterior
A	120°	60°
B	106°	74°
C	135°	45°
D	119°	61°
E	115°	65°
F	125°	55°
Total	720°	360°



May 17
ANSWER SHEETS SAS 3

Polygons and special quadrilaterals
Student Activity Sheet 3; *Exploring* "Special quadrilaterals"

1. **A parallelogram is a quadrilateral with two pairs of parallel sides.**
2. **Parallelograms have point symmetry, which is 180 degrees rotational symmetry.**
3.



4.

- The opposite sides of a parallelogram are congruent.
- The opposite angles of a parallelogram are congruent.
- The consecutive angles of a parallelogram are supplementary.
- The diagonals of a parallelogram bisect each other

Statements	Reasons
1. **ABCD** is a parallelogram.	1. Given
2. $\overline{AB} \cong \overline{CD}$	2. Opposite sides of a parallelogram are congruent.
3. $\angle 1 \cong \angle 2$	3. Opposite angles of a parallelogram are congruent.
4. $\angle 3 \cong \angle 4$	4. Given
5. $\Delta ABE \cong \Delta CDF$	5. ASA
6. $\overline{AE} \cong \overline{FC}$	6. CPCTC

5.

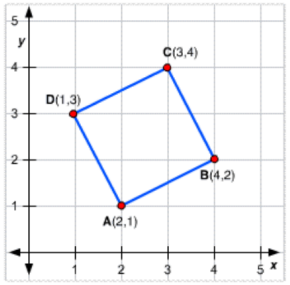
Parallelogram	Diagonals bisect
Rectangle	Diagonals bisect Diagonals ≅
Rhombus	Diagonals bisect Diagonals ⊥
Square	Diagonals ⊥ Diagonals ≅ Diagonals bisect
Isosceles trapezoid	Diagonals ≅

May 15th
ANSWER SHEETS SAS 4

Polygons and special quadrilaterals
Student Activity Sheet 4; *Exploring* "Coordinate proofs"

1. a) the midpoint of AB is (2.4)
   b) $m_{\overline{AB}} = 1$ $m_{\overline{BC}} = -\frac{3}{2}$ $m_{\overline{CD}} = 1$ $m_{\overline{AD}} = -\frac{2}{3}$
   c) Yes, AB and CD have the same slope: therefore, AB and CD are parallel
   d) $AB = 4\sqrt{2}$ $BC = \sqrt{13}$ $CD = 3\sqrt{2}$ $AD = \sqrt{13}$; $BC = AD$

2.



3. $AB = BC = CD = AD = \sqrt{5}$
4. The slopes of perpendicular lines are negative reciprocals of each other. Another way of saying this is that the product of the slopes of perpendicular lines is -1.