Name: _____ Due Date: _____ Score: __/4

In-Class Workbook

Geometry: Angles, Triangle, Triangle Classification

Unit 8: Workbook Part 2

How do geometric models describe spatial relationships?

Why are angles a fundamental building block?

Standard	Description
7.G.A.2	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
7.G.B.5	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

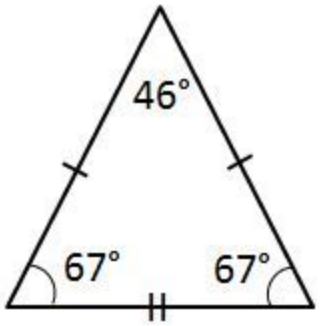
Lesson	I can…
8.1 & 8.2	solve for unknown **angles** in word problems and in diagrams involving complementary, supplementary, vertical, and adjacent angles.
8.3	solve for unknown angles in word problems and in diagrams involving ALL learned angle facts.
8.4	explore the properties of triangles.
8.5 & 8.6	explore how changes in arrangement and measurement affect a triangle, creating a list of conditions that determine a **unique triangle.**
8.7	apply what I've learned about about **angles** AND **unique triangles** to novel scenarios.

Packet Completion Rubric				
4	**3**	**2**	**1**	**0**
Workbook demonstrates significant effort. Student utilizes notes to help extend their thinking, writing questions, comments or reactions to the content.	Workbook demonstrates some effort. Student takes notes but could further understanding by questioning and interacting with the material.	Workbook shows little effort. Student takes notes sporadically, and could benefit from greater consistency with the material.	Workbook shows little to no effort. Student does not take notes and must demonstrate future interaction with the material to aid understanding.	Workbook is entirely incomplete or not turned in.

Grading Breakdown: 3.5 - 4 = A 3 - 3.4 = B 2.5 - 2.9 = C 2 - 2.4 = D 0 - 1.9 = F

Use our class website too! www.7mathscience.weebly.com

Unit 8: Angles, Triangle, Triangle Classification	Lesson 8.5

Lesson 8.5 DO-NOW	**1.** Identify the following triangle by its sides and angles:  Sides: _____ Angles: _____	Use a ruler and protractor to complete the following problem: **Draw complementary angles so that one angle is 35°.** Label each angle with its measurement. Are the angles required to be adjacent? _____
Homework Reminder	This is where you will shade in the box if you turned in your homework. Lesson 8.4 homework is due today! :) ***"Excellence is not an art. It is the habit of practice." - Aristotle***	
Check-In	How are you doing today? What career uses geometry the most?	

Triangular Exploration!

Investigation Question: Can you make one or more triangles given any criteria?

Make your initial hypothesis!

CIRCLE ONE: YES OR NO

Explanation: _____

_____

_____

End Goal: ***Find a pattern*** or ***create a rule*** that determines when you are able to create a triangle.

Directions:

1. Visit each triangle station set up in your classroom.
2. Take note and observe the given criteria for the triangle at your current station.
3. Manipulate the flexible side(s) of the triangle to determine if you can make one or more triangles.
4. Record your observations in the tracker below.

Triangular Exploration Observation Tracker!

Station #	Given Criteria (Measurements)	Can you make a triangle?
1		
2		
3		
4		
5		
6		

Test your hypothesis at the anglegs station!

Jot down any patterns of revisions to your hypothesis here:

Can you think of a rule for constructing triangles given all 3 side lengths?

MY RULE:

_____

_____

_____

Video Notes: Can we ALWAYS make a triangle with the information we are given?

Rule when given side lengths of a triangle:

The _____ of the two shorter sides must be _____than the longest side.

Examples - Try to make a triangle with the following criteria:

Use your ruler to draw three segments of the following lengths:

4 cm, 7 cm, and 12 cm

Label each segment with its measurement.

Were you able to make a triangle? How does your triangle compare with the rest of the class?

_____

_____

_____

_____

_____

_____

Now…Use your ruler to draw three segments of the following lengths: **8 cm, 7 cm, and 12 cm** *Label each segment with its measurement. If you're able to construct a triangle, use your protractor to measure each angle in your triangle.*	Were you able to make a triangle? How does your triangle compare with the rest of the class? _____ _____ _____ _____ _____ _____

Try it Out!

Directions: Place a checkmark under *Triangle* or *Not a Triangle* according to the given side lengths.

Sides			**Triangle**	**Not a Triangle**
a	**b**	**c**		
1	5	8		
4	4	9		
3	4	5		
3	4	7		
7	8	10		
5	6	8		
2	4	7		
6	9	10		

Think about this question….

Can you make more than one **triangle when given the three side lengths?**

Thoughts…?

Guided Practice	
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____
Task Card: _____	Task Card: _____

Did I stay focused and on task today? _____

Teacher Initials: _____

Unit 8: Angles, Triangle, Triangle Classification	Lesson 8.6

Lesson

8.6

DO-NOW

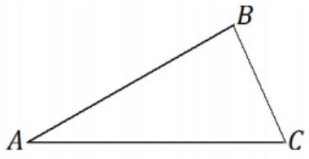
When studying triangles, it is essential to be able to communicate about the parts of a triangle without any confusion.

The following terms are used to identify particular angles or sides:

- adjacent to
- opposite to
- included within [side/angle]

Use the figure △ABC to fill in the following blanks:

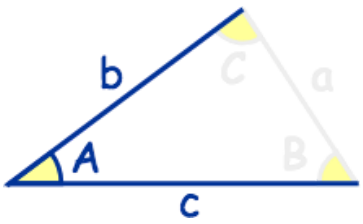
1. ∠A is _____ sides $\overline{AB}$.
2. ∠B is _____ side $\overline{AB}$ and to side $\overline{BC}$.
3. Side $\overline{AB}$ is _____ ∠C.
4. Side _____ is the included side of ∠B and ∠C.
5. ∠____ is opposite to side $\overline{AC}$.
6. Side $\overline{AB}$ is between ∠____ and ∠____.
7. What is the included angle of sides $\overline{AB}$ and $\overline{BC}$ _____

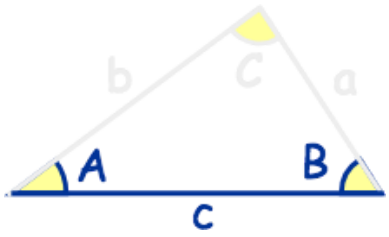


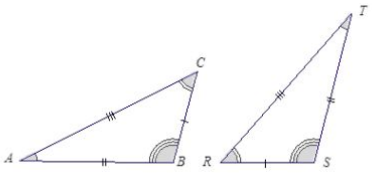
Homework Reminder	This is where you will shade in the box if you turned in your homework. Lesson 8.5 homework is due today! :) ***"Excellence is not an art. It is the habit of practice." - Aristotle***
Check-In	How are you doing today? Do you like geometry better than algebra?

Vocabulary you will need to know:

Included Angle	Included Side	Identical Triangle
_____	_____	_____
_____	_____	_____
_____	_____	_____
		_____





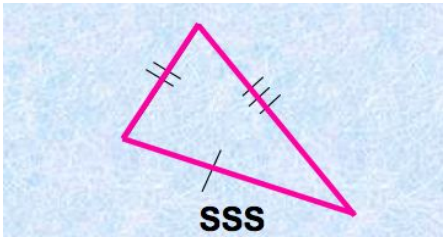


Unique Triangle

A unique triangle is a triangle that doesn't have an equivalent. It's _____.

What makes a triangle unique? You are given certain criteria that _____.

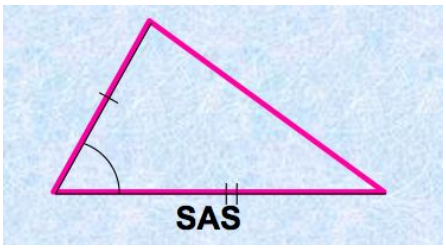
Unique Triangles

Abbreviation	Condition (Known Parts)	Picture
SSS		

Which of these triangles would make an SSS unique triangle? (**Circle and show your work):**

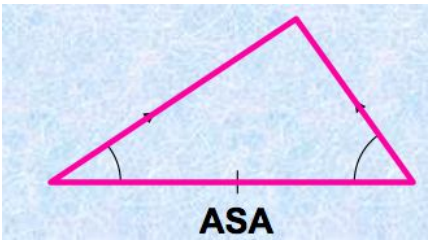
A triangle with the sides 4, 4, 9?	A triangle with the sides 3, 4, 6?

Workspace:

SAS		

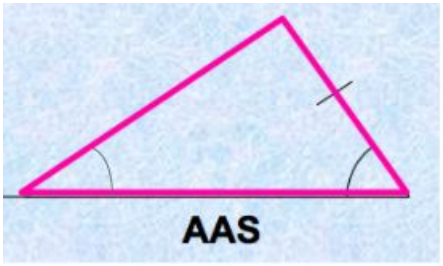
A triangle DEF has an angle of 40 degrees included between sides with lengths of 4 cm (side DE) and 7 cm (side DF). How would you construct this triangle?

Workspace:

ASA		

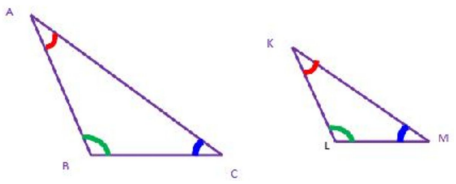
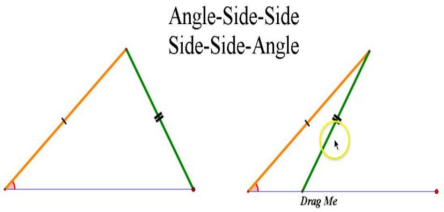
A triangle XYZ has angles <X = 30 degrees and <Y = 50 degrees and an **INCLUDED** side (in the middle of the two angles) of XY = 6 cm. How would you construct this triangle?

Workspace:

AAS		

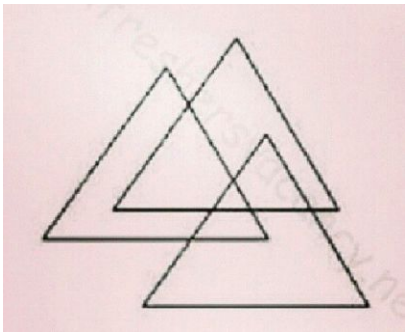
A triangle ABC has angles <A = 45 degrees and <C= 50 degrees and an **NON-INCLUDED** side (not between the angles) of AB = 5 cm. How would you construct this triangle?

Workspace:

NOT Unique Triangles		
Abbreviation	**Condition (Known Parts)**	**Picture**
AAA		
SSA		

Conditions of a Unique Triangle

Abbreviation	Information Given	Unique Triangle?
SSS	Side, Side, Side	YES
SSA	Side, Side, Angle	NO
SAS	Side, Angle, Side	YES
SAA	Side, Angle, Angle	YES
ASS	Angle, Side, Side	NO
ASA	Angle, Side, Angle	YES
AAS	Angle, Angle, Side	YES
AAA	Angle, Angle, Angle	NO

Challenge: How many triangles are there?	

Guided Practice

Three students are given attributes about a triangle and make a conclusion based on their information. For each scenario, decide if you agree or disagree with their statement and explain your reasoning.

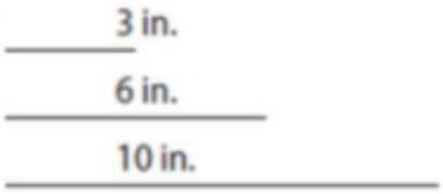
Scenario #1 **50°, 60°, 70°**	Scenario #2 **6 in, 8 in, 10 in**	Scenario #3 **5 cm , 5 cm , 50°**
Robbie claims that only one triangle can be made with those angle measures.	Omar claims that you can draw multiple triangles using the same side lengths.	May claims that she can draw two triangles with those measures.

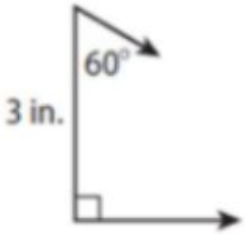
Workspace for drawing triangles:

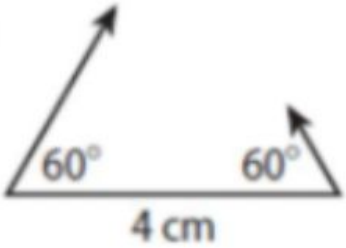
Scenario	Answer	Reasoning
1		
2		
3		

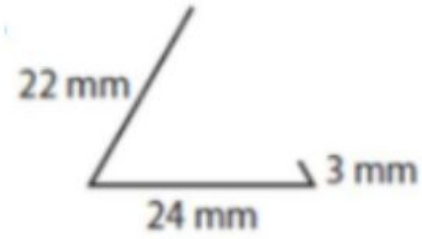
Guided Practice

Determine if a unique triangle is formed.









Workspace:

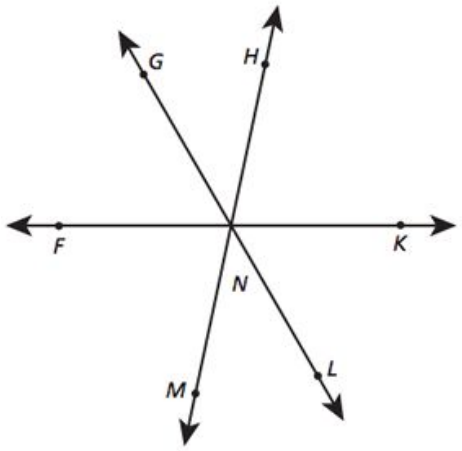
Scenario	Answer	Reasoning
1		
2		
3		
4		

Guided Practice Continued:

DIRECTIONS: Complete the table below given the following conditions for a triangle. Use a separate piece of paper to draw your triangles to determine whether it's a (1) Unique Triangle, (2) Can form more than one triangle, or (3) Not possible to form a triangle. Lastly, fill in the reasoning box as to why you selected the type of triangle.

Information	Triangle possible?	Check	Reasoning
a. Angle B = 50°, AC = 3 cm, BC = 5 cm.	Unique Triangle?		
	More than one triangle		
	Not possible		
b. AB = 10 cm, BC = 11 cm, AC = 9 cm.	Unique Triangle?		
	More than one triangle		
	Not possible		
c. Angle A = 40°, Angle B = 60°, Angle C = 80°.	Unique Triangle?		
	More than one triangle		
	Not possible		
d. AB = 4 cm, BC = 3 cm, Angle B = 30°.	Unique Triangle?		
	More than one triangle		
	Not possible		

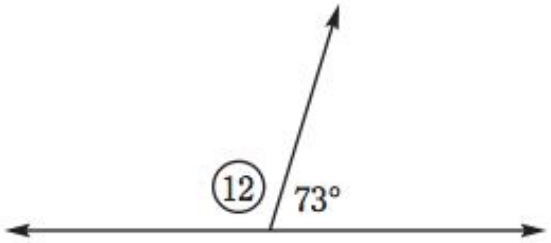
Unit 8: Angles, Triangle, Triangle Classification	Lesson 8.7

Lesson 8.7 DO-NOW	1. Using the image name a pair of ***vertical*** angles. 2. Using the image name a pair of ***supplementary*** angles.	
Homework Reminder	This is where you will shade in the box if you turned in your homework. Lesson 8.6 homework is due today! :) ***"Excellence is not an art. It is the habit of practice." - Aristotle***	
Check-In	How are you doing today? What is your favorite or least favorite part of geometry so far?	

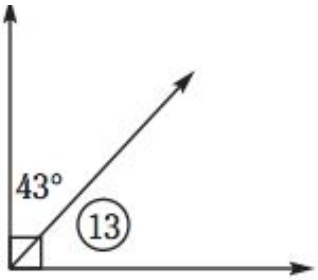
Let's Practice! - Stations	
Directions: 1. You will complete the problem set at each station. 2. You **MUST** work as a group to complete the practice problems. 3. You will have ***15 minutes*** at each station, so work efficiently.	***As you work through each station, check it off below:*** ❑ #1: Types of Angles and Label Angle Drawings ❑ #2: Solving for Unknown Angles ❑ #3: Unique and Not Unique Triangles ❑ #4: Drawings

Station #1: Types of Angles and Label Angle Drawings

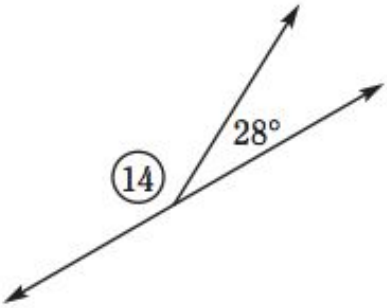
DIRECTIONS: Identify these angles as either **complementary** or **supplementary** angles. Then find the measure of each numbered angle.



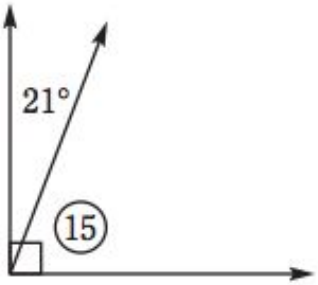
_____ ____°



_____ ____°



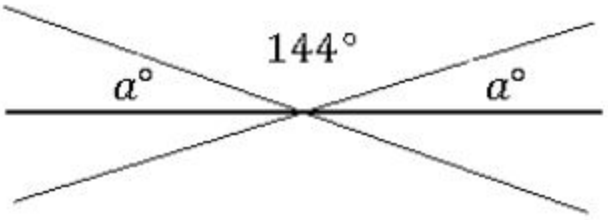
_____ ____°



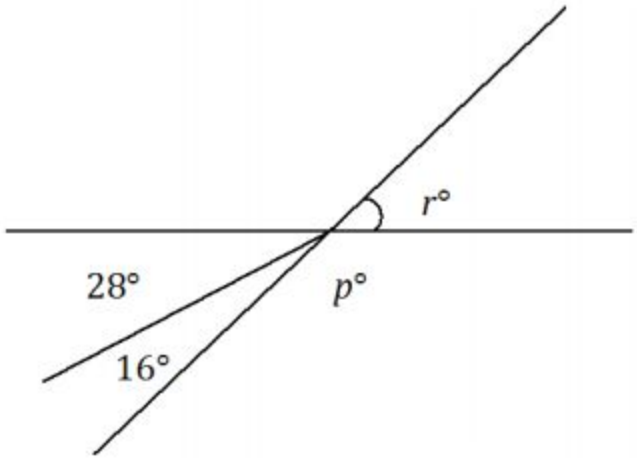
_____ ____°

WORK SPACE:

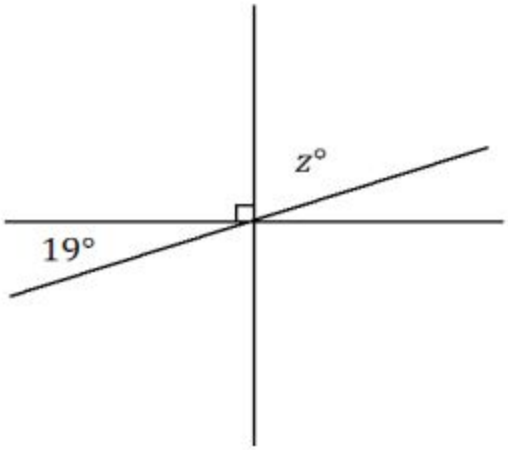
1. Three lines meet at a point. In a complete sentence, describe the relevant angle relationship in the diagram. Set up and solve an equation to find the value of a .



2. Two lines meet at a point that is also the endpoint of a ray. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of p and r.



3. Three lines meet at a point. In a complete sentence, describe the relevant angle relationships in the diagram. Set up and solve an equation to find the value of z.

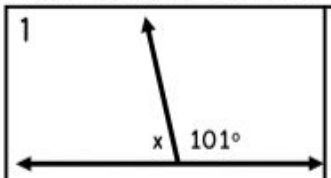
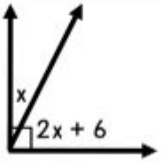
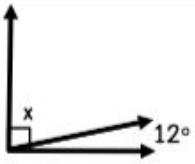
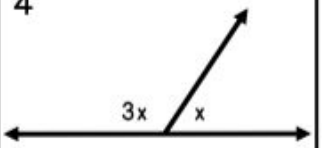
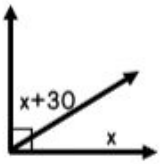
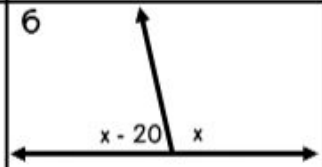
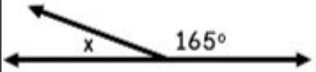
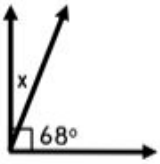
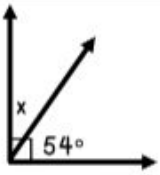
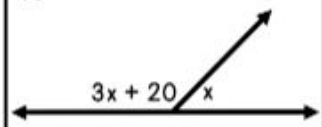
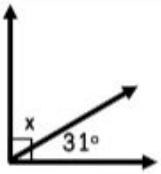
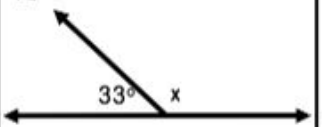


4. What is the relationship between ***vertical angles***?

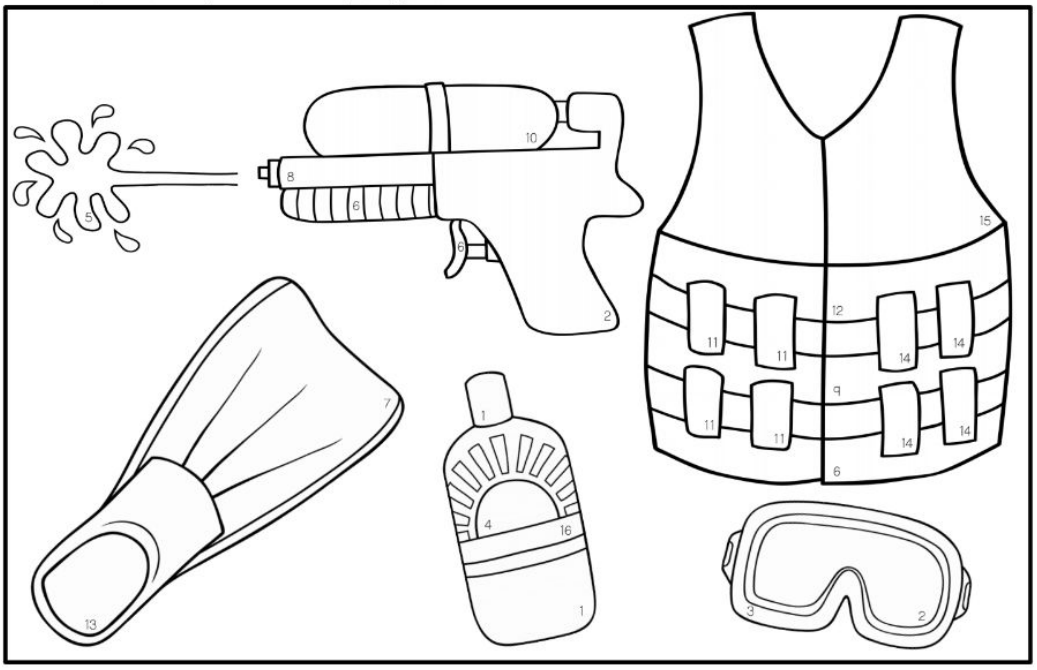
Station #2: Solving for Unknown Angles

COMPLEMENTARY AND SUPPLEMENTARY ANGLES

Write and solve an equation to determine the missing angle measures. Determine the value of x, then find the answer and color it the corresponding color.

1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 The complement of an angle is three times the measurement of the angle. Find the measurement of the larger angle.	**14** Two angles are supplementary. The first angle is 3x degrees. The second angle is (2x+25) degrees. Determine the measure of the smaller angle.	**15** The supplement of an angle is twice the measurement of the angle. Find the measurement of the smaller angle.	**16** Two angles are complementary. The first angle is 2x degrees. The second angle is (x + 30) degrees. Determine the larger angle.

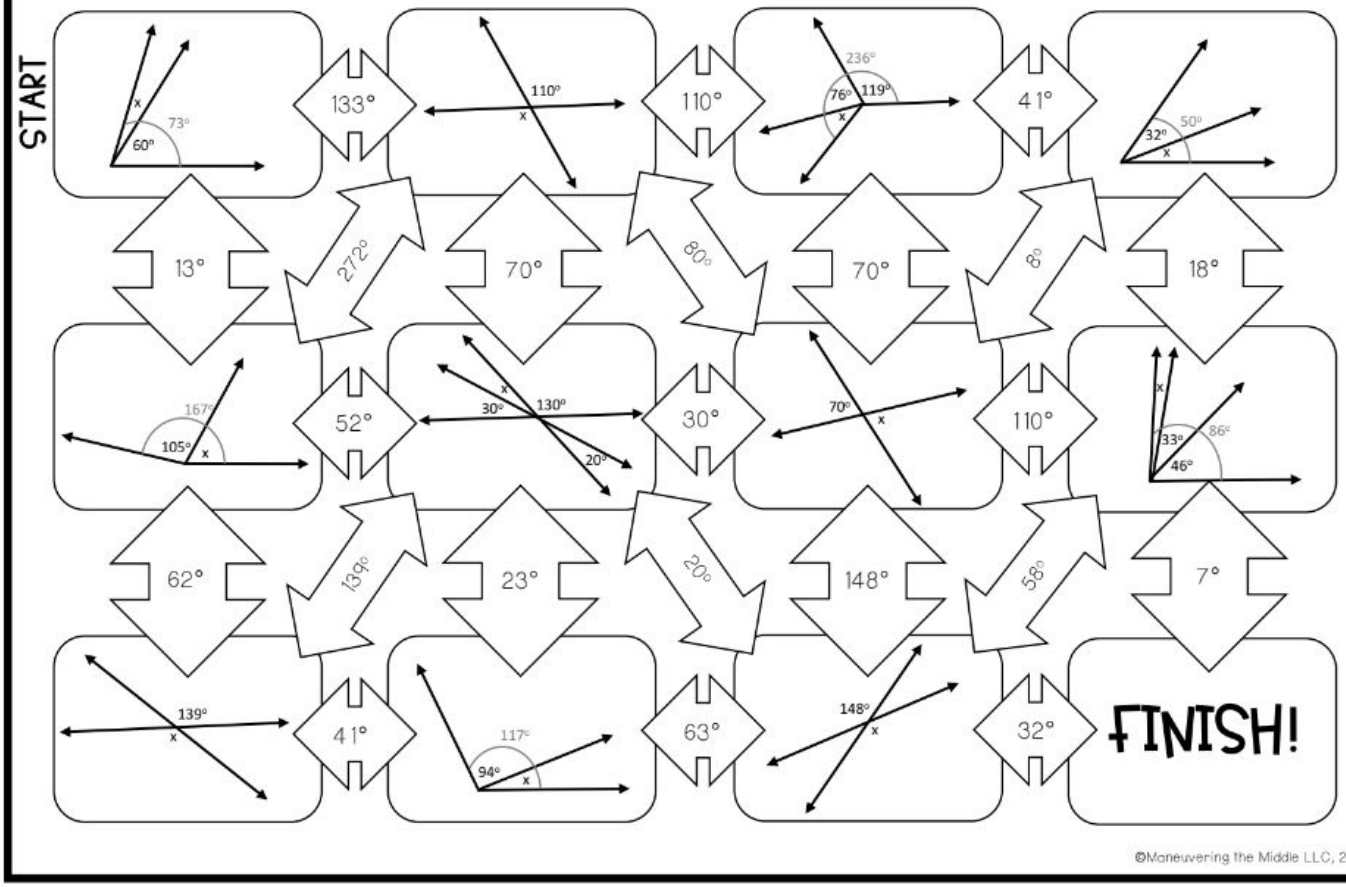
RED	YELLOW	PINK	BLUE	LIGHT GREEN	ORANGE	DARK GREEN	PURPLE
45°	40°	22°	147°	100°	60°	15°	59°
67.5°	79°	30°	78°	50°	87°	28°	36°



VERTICAL & ADJACENT ANGLES

Name: _____ Date: _____

Maze #1 **Instructions:** Write and solve an equation to find the missing angle measure, x. Shade or color your path as you go.



Station #3: Unique and Not Unique Triangles

CONDITIONS OF A TRIANGLE

Each of the 10 cards will have statements from two students. Read carefully and choose the name of the student who made the correct statement. Then, justify your answer in the space provided.

❶ _____ is correct because...	❷ _____ is correct because...
❸ _____ is correct because...	❹ _____ is correct because...
❺ _____ is correct because...	❻ _____ is correct because...
❼ _____ is correct because...	❽ _____ is correct because...
❾ _____ is correct because...	❶❼ _____ is correct because...

Station #4: Drawings

DIRECTIONS: Use a ruler and a protractor to complete the following problems.

1. Draw a segment AB that is 5 cm in length and perpendicular to segment CD, which is 2 cm in length.

2. Draw supplementary angles so that one angle is 26°. Label each angle with its measurement.

3. Draw $\triangle ABC$ so that $\angle B$ has a measurement of 100°.

4. Draw an isosceles $\triangle ABC$. Begin by drawing $\angle A$ with a measurement of 80°. Use the rays of $\angle A$ as the equal legs of the triangle. Choose a length of your choice for the legs and draw them. Label each marked point with B and C. Label all angle measurements.

5. Draw an isosceles $\triangle DEF$. Begin by drawing a horizontal segment DE that is 6 cm in length. Use your protractor to draw $\angle D$ and $\angle E$ so that the measurements of both angles are 30°. If the non-horizontal rays of $\angle D$ and $\angle E$ do not already cross, extend each ray until the two rays intersect. Label the point of intersection F. Label all side and angle measurements.	6. Draw vertical angles so that one angle is 125°. Label each angle formed with its measurement.
7. Draw complementary angles so that one angle is 35°. Label each angle with its measurement. Are the angles required to be adjacent?	8. Use your ruler to draw three segments of the following lengths: 4 cm, 7.2 cm, and 12.8 cm. Label each segment with its measurement.

Workbook Reflection

Answer the question as completely as possible, using evidence from what we have learned this unit. Justify your response with examples and evidence from throughout the packet.

How can we classify triangles? What are the classifications we learned about?

Choose one of the following concepts and describe it. Include visuals to support your answer.

- *Unique triangles*
- *Finding unknown angle measures*
- *Types of angles*

What lesson most challenged your thinking?

What would you have done differently?

Flip through your packet, and look to see if you shaded the box every day for turning in your homework. How many days did you shade it in?

Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5	Lesson 6	Lesson 7

If you didn't finish it each night, consider why →

Would you like to come in during lunch or recess for support?