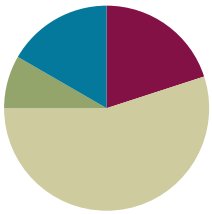
Lesson 2

Objective: Build, identify, and analyze two-dimensional shapes with specified attributes.

Suggested Lesson Structure



Fluency Practice	(12 minutes)
Application Problem	(5 minutes)
Concept Development	(33 minutes)
Student Debrief	(10 minutes)
Total Time	**(60 minutes)**

Fluency Practice (12 minutes)

- Rename for the Larger Unit **2.NBT.1** (3 minutes)
- Sprint: Make a Hundred to Add **2.NBT.7** (9 minutes)

Rename for the Larger Unit (3 minutes)

Note: This fluency activity reviews place value foundations.

T: (Write 10 ones = ____ ten.)
T: I'm going to give you a number of ones. I want you to make as many tens as you can and then tell me how many tens and ones. If there are no ones, then just say the tens. Ready?
T: Say the number sentence.
S: 10 ones = 1 ten.
T: (Write 100 ones = ____ tens 10 ones.) Say the number sentence.
S: 100 ones is 9 tens 10 ones.
T: 120 ones = ____ tens 10 ones.
S: 120 ones = 11 tens 10 ones.

Continue with the following possible sequence: 140 ones, 210 ones, 250 ones, 225 ones, 381 ones, 360 ones, and 306 ones.

Sprint: Make a Hundred to Add (9 minutes)

Materials: (S) Make a Hundred to Add Sprint

Note: Students review compensation to make a hundred when adding to gain automaticity.

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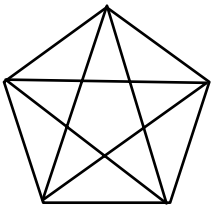
Application Problem (5 minutes)

Materials: (S) Find the triangles (Application Template)

How many triangles can you find? (Hint: If you only found 10, keep looking!)



Note: This brainteaser challenges students to search for a familiar shape, the triangle, in a different way. Students are encouraged to think creatively as they find triangles of various sizes and orientations. There are 35 triangles. Hint: There are five of each variation of triangle as students track them around the pentagon. Each student needs both pages of the template.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Offer students having difficulty seeing the solution a strategy to solve the triangle Application Problem. They can write the numbers inside the most obvious triangles and then lightly shade the larger triangles within the pentagon.

Another option is to print the whole page and have students shade one triangle at a time on each separate image.

Concept Development (33 minutes)

Materials: (T) 4 charts from Lesson 1, tape, sentence strips with shape names (triangle, quadrilateral, pentagon, hexagon) (S) Container of uncooked spaghetti of differing lengths per group of four students, 1 piece of dark construction paper per student

Note: The polygon is described first, as the other listed descriptions stem from it. The descriptions provided here provide a solid foundation to the definitions that are a part of students' experience in later grades.

When introducing the term *polygon*, show images of polygons, and summarize by saying that they are closed shapes that are made up of some number of straight sides. Polygon and other shape descriptions are given below.

Polygon: A closed figure with three or more straight sides. Every side meets exactly two other sides at the corners. A polygon always has the same number of angles as sides.

Triangle: A three-sided polygon with three angles.

Quadrilateral: A four-sided polygon with four angles.

Pentagon: A five-sided polygon with five angles.

Hexagon: A six-sided polygon with six angles.

NOTES ON MULTIPLE MEANS OF ACTION AND EXPRESSION:

Tap into the culture of English language learners by asking them to contribute the words for polygon, triangle, rectangle, pentagon, hexagon, and octagon in their native language (parents can help). Add the names in the students' languages to the charts. This not only helps students to bridge the languages but enriches the whole class's experience as well, since in Latin-based languages these are generally cognates. For example, in Spanish, they are *polígano, triángulo, rectángulo, pentágono, hexágono,* and *octágono*.

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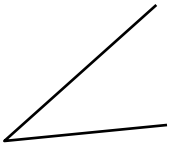
Prior to the lesson, arrange students in groups of four with a container of spaghetti for building shapes and 1 piece of dark construction paper per student.

T: Take two pieces of spaghetti of any length out of the container. Let's call these our sides. On your paper, arrange the spaghetti so that the two sides meet to make an angle.



S: (Arrange the spaghetti pieces into an open shape, shown to the right.)

T: Take another piece of spaghetti, and close the shape, creating two more corners or angles.

S: (Complete the shape.)

T: Name the shape you just made.

S: Triangle.

T: Yes. Shapes can be described with more than one name. We can also use the word **polygon** to describe the triangle. A polygon is a closed shape with three or more angles, so a triangle is the smallest polygon.

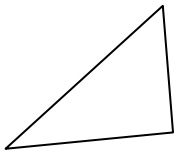
T: Can you think of other shapes that are polygons?

S: Hexagon. → Rectangle. → Square.

T: (Draw an open shape with two sides on the board, pointing to one side.) How many sides meet this one?

S: Only one.

T: Is this a polygon?



S: No! It only has one angle. → It's not closed!

T: How can we turn this into a polygon?

S: Add another side?

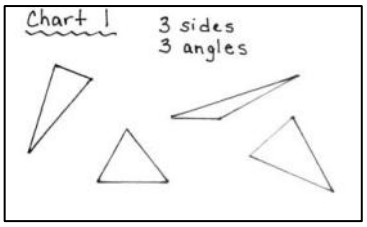
T: Yes. I can add another side to close the shape like this. (Draw a line to complete the triangle.)

T: Turn and talk: This is a polygon. How do we know?

S: It's closed. → It has three angles. → It's a triangle, and that's a polygon.

T: You're right! Today, we are going to name our shapes based on their attributes, or characteristics. (Hold up the word *triangle* on a sentence strip.) Listen carefully: *Tri-* means three. So, a triangle is a shape with …?

S: Three angles!



T: (Reveal Chart 1 from yesterday's lesson.) Here is the chart we made yesterday. A shape with three sides and three corners, or angles, can be named …?

S: A triangle!

T: (Tape the triangle sentence strip to the top of Chart 1.)

T: What do you notice about these triangles and the one on your paper?

S: They don't all look the same. → They all have three sides and three corners, or angles. → Not all triangles look like this (points to an equilateral triangle). → I noticed that not all the sides are the same length; some are long, and some are short.

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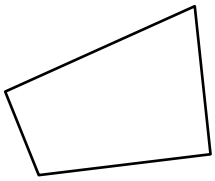
T: Good. So, even though they don't look the same, they are all triangles because they all have three sides and three corners, or angles.

T: Take another piece of spaghetti, and make a closed shape with four sides.



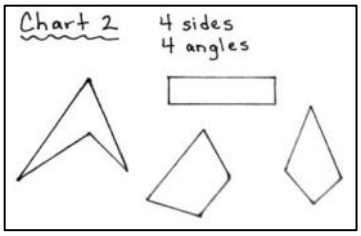
S: (Build a quadrilateral. Due to the differing lengths of spaghetti, the quadrilateral should be irregular and not as easy to name as a square or rectangle would be.)

T: Can you name the shape you made?

S: No, but it has four sides and four angles.

T: You just built another polygon, called a **quadrilateral**! (Hold up the word *quadrilateral* on a sentence strip.) *Quad-* means four. *Lateral* refers to sides. When we say quadrilateral, we're talking about a polygon with four sides.

T: (Reveal Chart 2 from yesterday's lesson.) What can we label our chart that has shapes with four sides and four angles?



S: Quadrilaterals!

MP.7

T: (Tape the quadrilateral sentence strip to the top of Chart 2.)

T: What do you notice about these quadrilaterals and the one on your paper?

S: They all have four sides, corners, and angles. → Some look like shapes I know, but some look different. → Some have equal sides, but some don't.

T: Good. The reason why these shapes are quadrilaterals is because of their shared attributes not because of the way they look. These all have four straight sides, so they are…?

S: Quadrilaterals!

Continue to add a fifth and sixth piece of spaghetti to make a **pentagon** and then a **hexagon**. Follow the pattern above to discuss what students notice about the various shapes. Reveal Charts 3 and 4, labeling the pentagons and hexagons with the appropriate word sentence strips. You may choose to add more pieces of spaghetti, giving students the opportunity to experiment with creating even larger polygons (e.g., heptagon, octagon).

T: Now, we're going to play Complete That Shape. I am going to draw part of a shape on the board, like this (as shown to the right). Then, I will say, "Complete that pentagon." With your spaghetti, start with the part I have drawn, and add more spaghetti sides, corners, and angles until you have built the entire shape. You can break the spaghetti into smaller pieces. Let's play.

T: (Show an obtuse angle, as illustrated to the right.) Complete that quadrilateral!

S: (Add two more pieces of spaghetti of varying lengths to create a quadrilateral.)

T: How many sides and angles do you have?

S: Four!

Continue playing the game to create more triangles, quadrilaterals, pentagons, and hexagons. Once students have had a few minutes to practice building different shapes with spaghetti, instruct them to work independently on the Problem Set.

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Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first. Some problems do not specify a method for solving. Students should solve these problems using the RDW approach used for Application Problems.

Student Debrief (10 minutes)

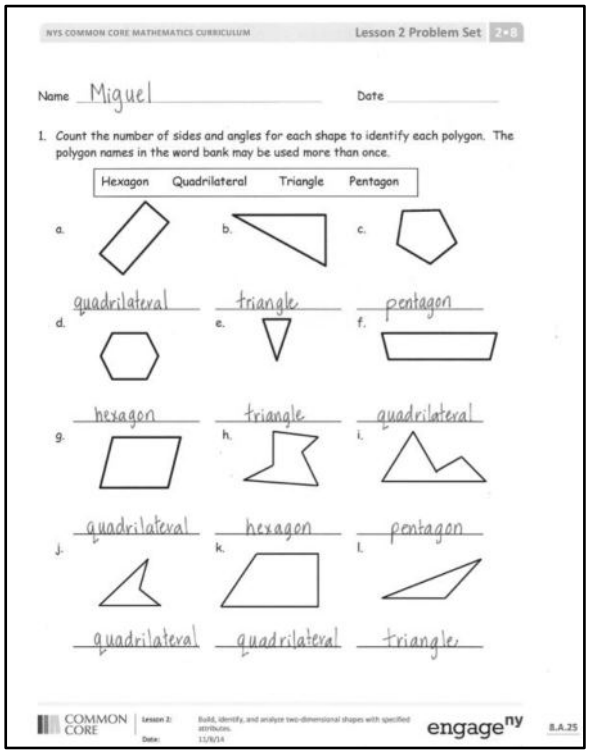
Lesson Objective: Build, identify, and analyze two-dimensional shapes with specified attributes.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- Compare your shape names on the first page of your Problem Set with your partner's. Are there any shape names you disagree on? If yes, discuss who is correct and why.
- Look at Problem 1(a) on your Problem Set. What is the name of that shape? Look at 1(c). What is the name of that shape? What is the difference between a **quadrilateral** and a **pentagon**?
- If you closed your eyes and felt a shape with four sides and four corners, could you name it? What would you name it?
- Picture a square in your head. Could you describe a square with another name?
- Could a **polygon** have only two angles? Why or why not?


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 2 Problem Set 2•8

Name Miguel Date

1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

Hexagon Quadrilateral Triangle Pentagon

a. b. c.

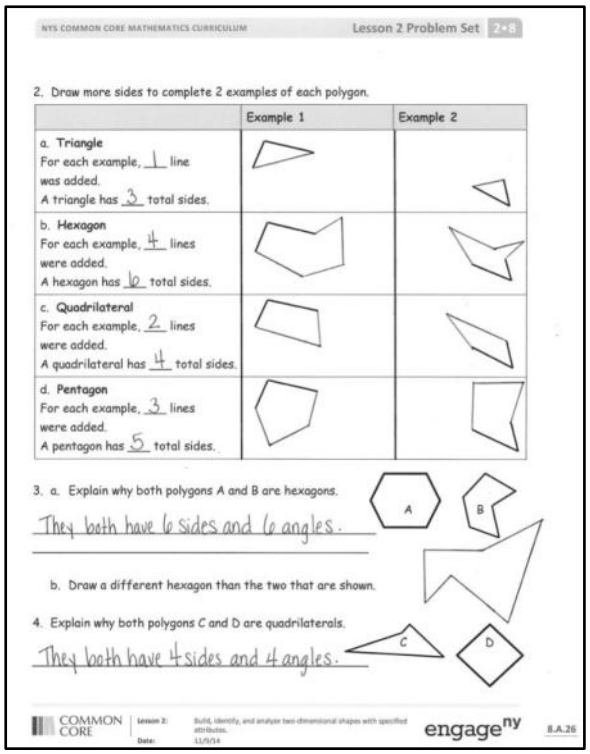
d. quadrilateral e. triangle f. pentagon

g. hexagon h. triangle i. quadrilateral

j. quadrilateral k. hexagon l. pentagon

quadrilateral quadrilateral triangle

COMMON CORE Lesson 2: Date: Build, identify, and analyze two-dimensional shapes with specified attributes. 11/8/14 engage^ny 8.A.25


NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 2 Problem Set 2•8

2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
a. **Triangle** For each example, 1 line was added. A triangle has 3 total sides.		
b. **Hexagon** For each example, 4 lines were added. A hexagon has 6 total sides.		
c. **Quadrilateral** For each example, 2 lines were added. A quadrilateral has 4 total sides.		
d. **Pentagon** For each example, 3 lines were added. A pentagon has 5 total sides.		

3. a. Explain why both polygons A and B are hexagons.

They both have 6 sides and 6 angles.

A B

b. Draw a different hexagon than the two that are shown.

4. Explain why both polygons C and D are quadrilaterals.

They both have 4 sides and 4 angles.

C D

COMMON CORE Lesson 2: Date: Build, identify, and analyze two-dimensional shapes with specified attributes. 11/8/14 engage^ny 8.A.26

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- Polygons have many angles. *Poly-* means many, and *-gon* means angle. What is the smallest number of angles a polygon can have? What do you think the largest number of angles could be?

Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

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A

Number Correct: _____

Make a Hundred to Add

1.	98 + 3 =	
2.	98 + 4 =	
3.	98 + 5 =	
4.	98 + 8 =	
5.	98 + 6 =	
6.	98 + 9 =	
7.	98 + 7 =	
8.	99 + 2 =	
9.	99 + 3 =	
10.	99 + 4 =	
11.	99 + 9 =	
12.	99 + 6 =	
13.	99 + 8 =	
14.	99 + 5 =	
15.	99 + 7 =	
16.	98 + 13 =	
17.	98 + 24 =	
18.	98 + 35 =	
19.	98 + 46 =	
20.	98 + 57 =	
21.	98 + 68 =	
22.	98 + 79 =	

23.	99 + 12 =	
24.	99 + 23 =	
25.	99 + 34 =	
26.	99 + 45 =	
27.	99 + 56 =	
28.	99 + 67 =	
29.	99 + 78 =	
30.	35 + 99 =	
31.	45 + 98 =	
32.	46 + 99 =	
33.	56 + 98 =	
34.	67 + 99 =	
35.	77 + 98 =	
36.	68 + 99 =	
37.	78 + 98 =	
38.	99 + 95 =	
39.	93 + 99 =	
40.	99 + 95 =	
41.	94 + 99 =	
42.	98 + 96 =	
43.	94 + 98 =	
44.	98 + 88 =	

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B

Number Correct: _____

Improvement: _____

Make a Hundred to Add

1.	99 + 2 =	
2.	99 + 3 =	
3.	99 + 4 =	
4.	99 + 8 =	
5.	99 + 6 =	
6.	99 + 9 =	
7.	99 + 5 =	
8.	99 + 7 =	
9.	98 + 3 =	
10.	98 + 4 =	
11.	98 + 5 =	
12.	98 + 9 =	
13.	98 + 7 =	
14.	98 + 8 =	
15.	98 + 6 =	
16.	99 + 12 =	
17.	99 + 23 =	
18.	99 + 34 =	
19.	99 + 45 =	
20.	99 + 56 =	
21.	99 + 67 =	
22.	99 + 78 =	

23.	98 + 13 =	
24.	98 + 24 =	
25.	98 + 35 =	
26.	98 + 46 =	
27.	98 + 57 =	
28.	98 + 68 =	
29.	98 + 79 =	
30.	25 + 99 =	
31.	35 + 98 =	
32.	36 + 99 =	
33.	46 + 98 =	
34.	57 + 99 =	
35.	67 + 98 =	
36.	78 + 99 =	
37.	88 + 98 =	
38.	99 + 93 =	
39.	95 + 99 =	
40.	99 + 97 =	
41.	92 + 99 =	
42.	98 + 94 =	
43.	96 + 98 =	
44.	98 + 86 =	

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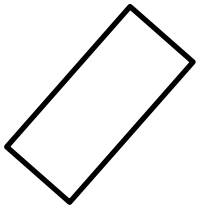
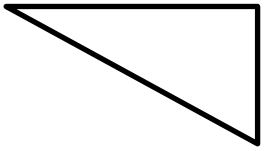
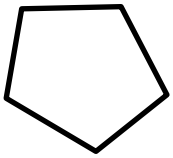
Name _____ Date _____

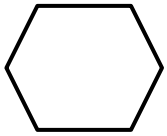
1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

Hexagon	Quadrilateral	Triangle	Pentagon

a.  _____

b.  _____

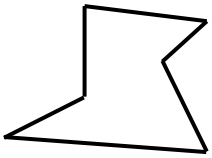
c.  _____

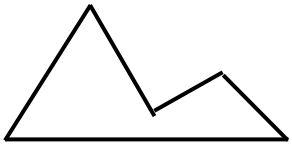
d.  _____

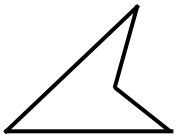
e. _____

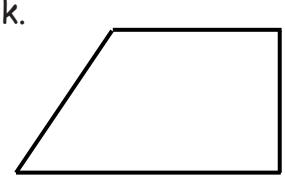
f. _____

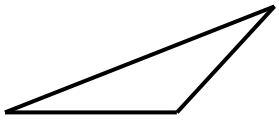
g. _____

h.  _____

i.  _____

j.  _____

k.  _____

l.  _____

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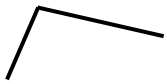
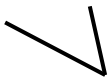
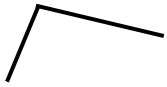
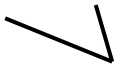
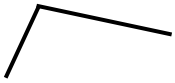
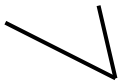
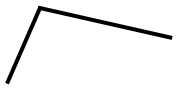
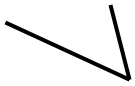
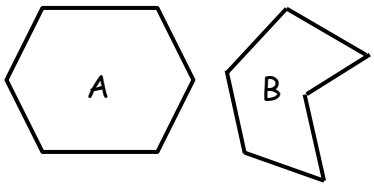
2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
a. **Triangle** For each example, _____ line was added. A triangle has _____ total sides.		
b. **Hexagon** For each example, _____ lines were added. A hexagon has _____ total sides.		
c. **Quadrilateral** For each example, _____ lines were added. A quadrilateral has _____ total sides.		
d. **Pentagon** For each example, _____ lines were added. A pentagon has _____ total sides.		

3.

a. Explain why both polygons A and B are hexagons.



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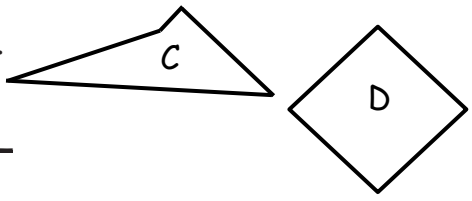
b. Draw a different hexagon than the two that are shown.

4. Explain why both polygons C and D are quadrilaterals.



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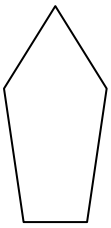
Name _____ Date _____

Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

Hexagon	Quadrilateral	Triangle	Pentagon

1. 

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2.

_____

3.

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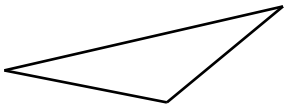
4. 

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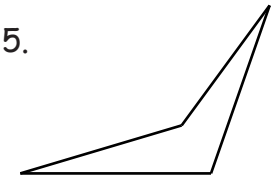
5. 

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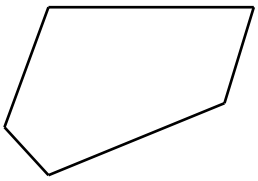
6. 

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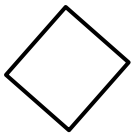
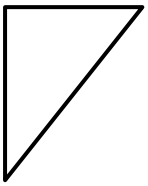
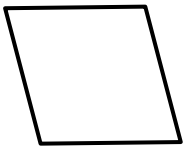
Name _____ Date _____

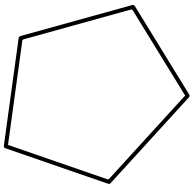
1. Count the number of sides and angles for each shape to identify each polygon. The polygon names in the word bank may be used more than once.

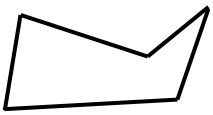
Hexagon	Quadrilateral	Triangle	Pentagon

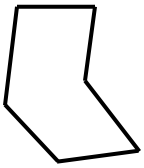
a.  _____

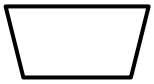
b.  _____

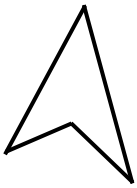
c.  _____

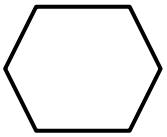
d.  _____

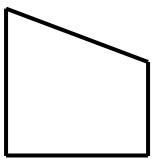
e.  _____

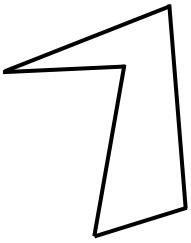
f.  _____

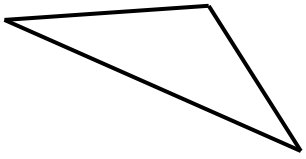
g.  _____

h.  _____

i.  _____

j.  _____

k.  _____

l.  _____

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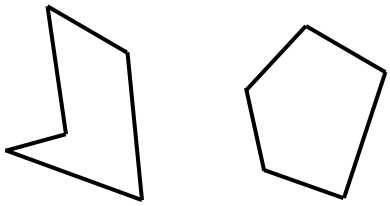
2. Draw more sides to complete 2 examples of each polygon.

	Example 1	Example 2
a. **Quadrilateral** For each example, ___ lines were added. A quadrilateral has ___ total sides.		
b. **Pentagon** For each example, ___ lines were added. A pentagon has ___ total sides.		
c. **Triangle** For each example, ___ line was added. A triangle has ___ total sides.		
d. **Hexagon** For each example, ___ lines were added. A hexagon has ___ total sides.		

3. Explain why both polygons A and B are pentagons.



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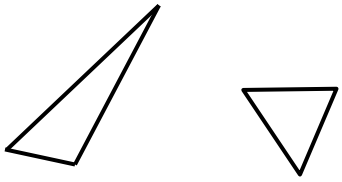
4. Explain why both polygons C and D are triangles.



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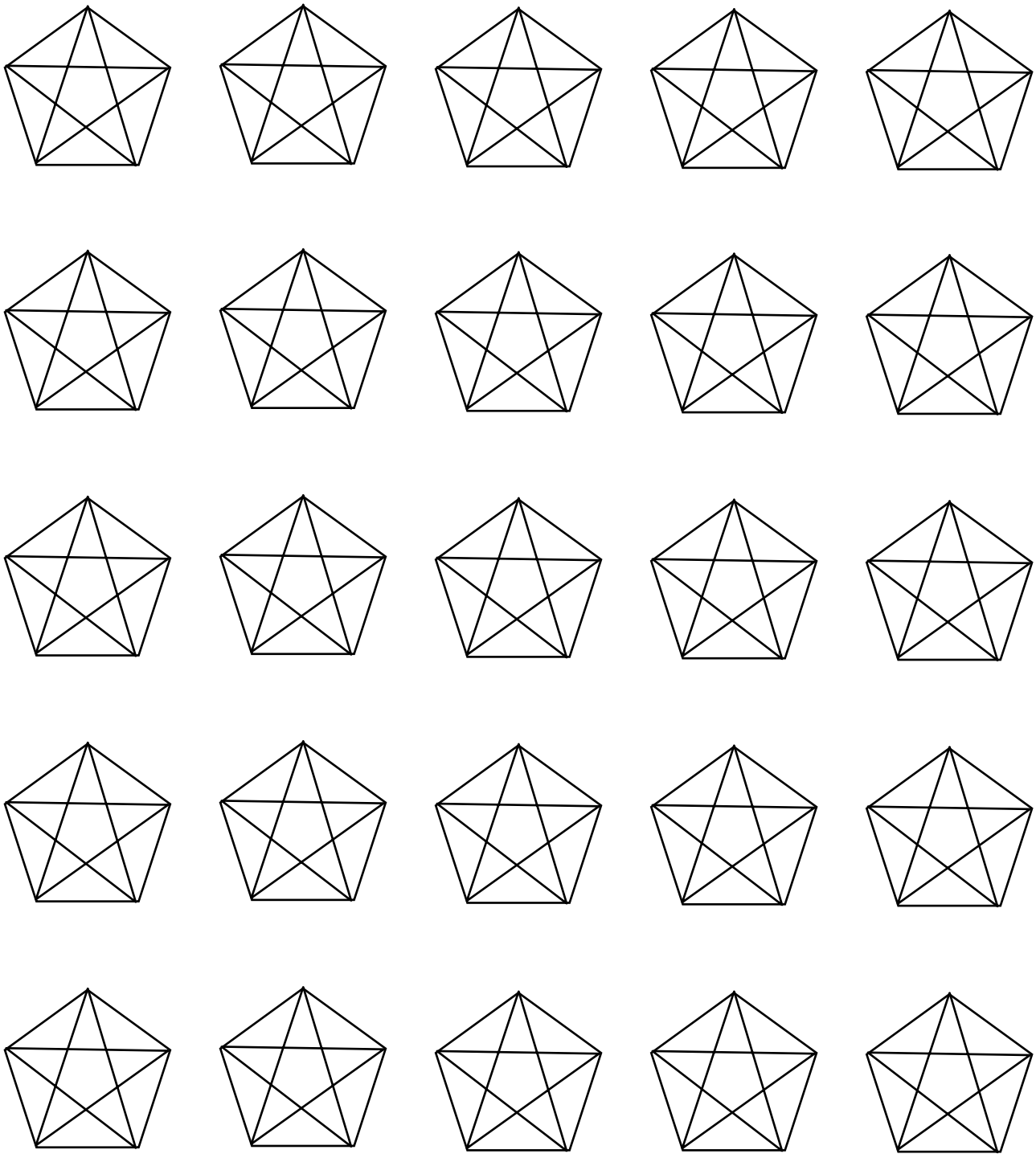

find the triangles

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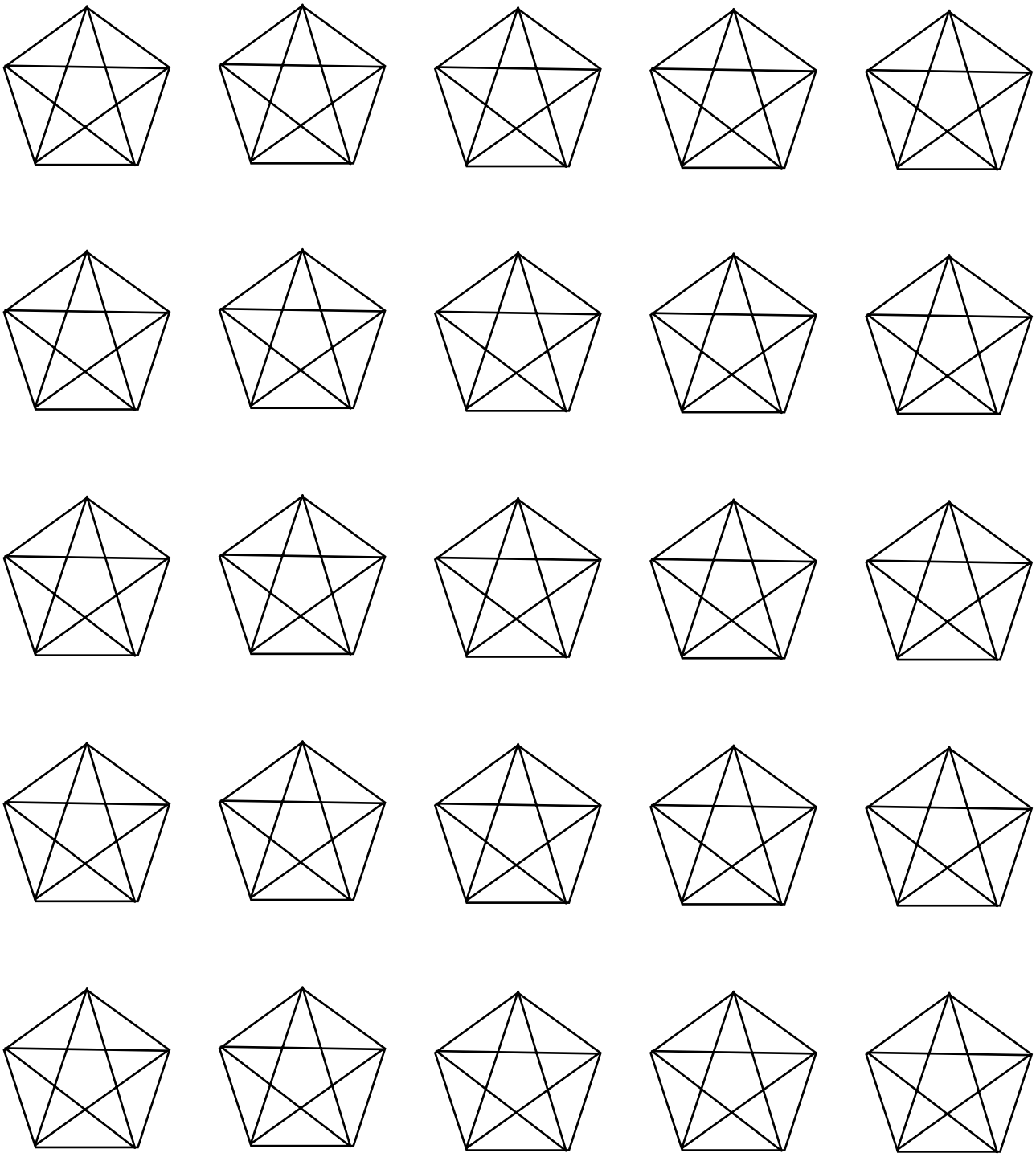

find the triangles

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