

What's Going On?

Checking In

Minds on

From Triangle to Quadrilateral

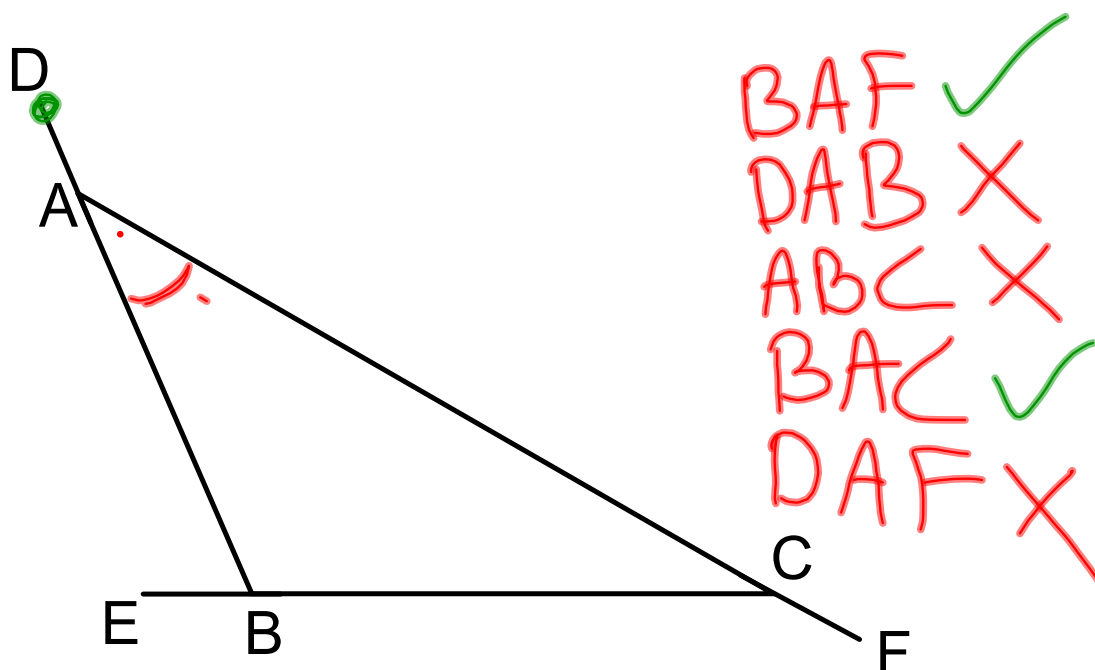
Action!

Angle Relationships in Quadrilaterals

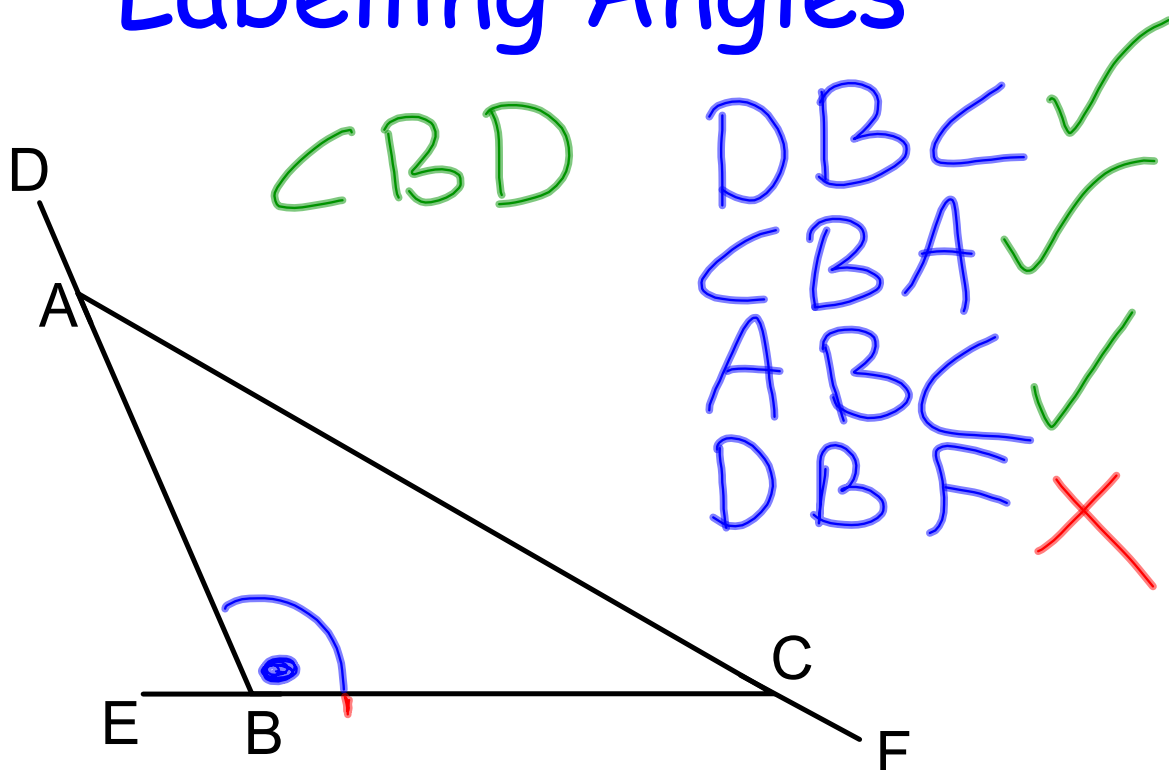
Consolidation Exit Question

Learning Goal - I will explore, discover and recognize angle relationships in quadrilaterals

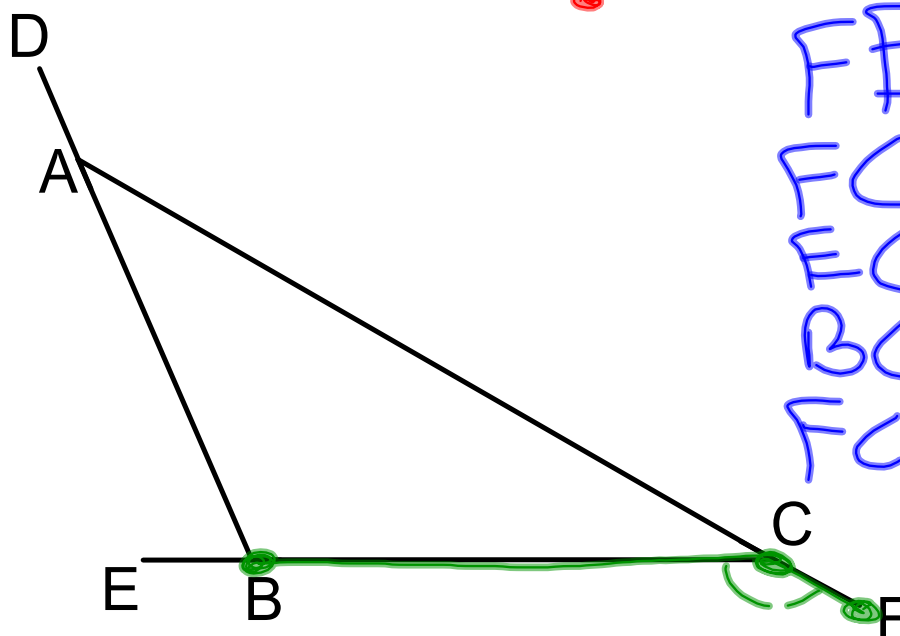
Labelling Angles



Labelling Angles



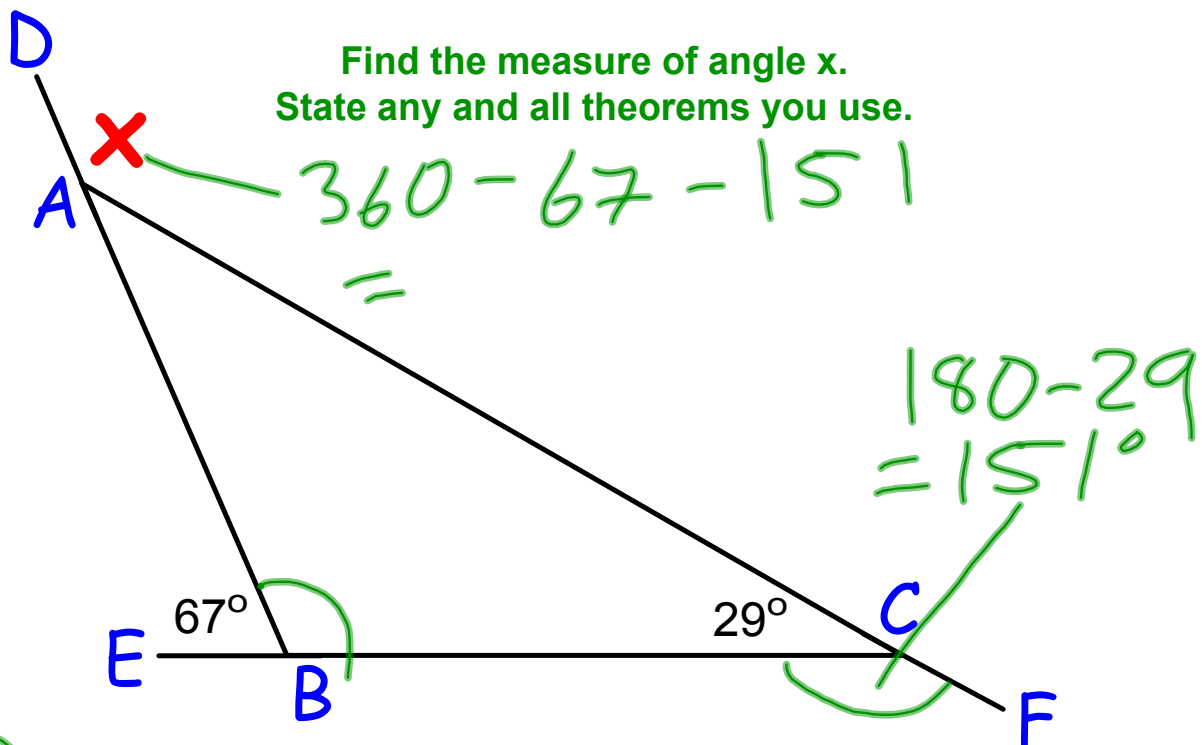
Labelling Angles



- FE X
- FCE ✓
- ECF ✓
- BCF ✓
- FCB ✓

Consolidation

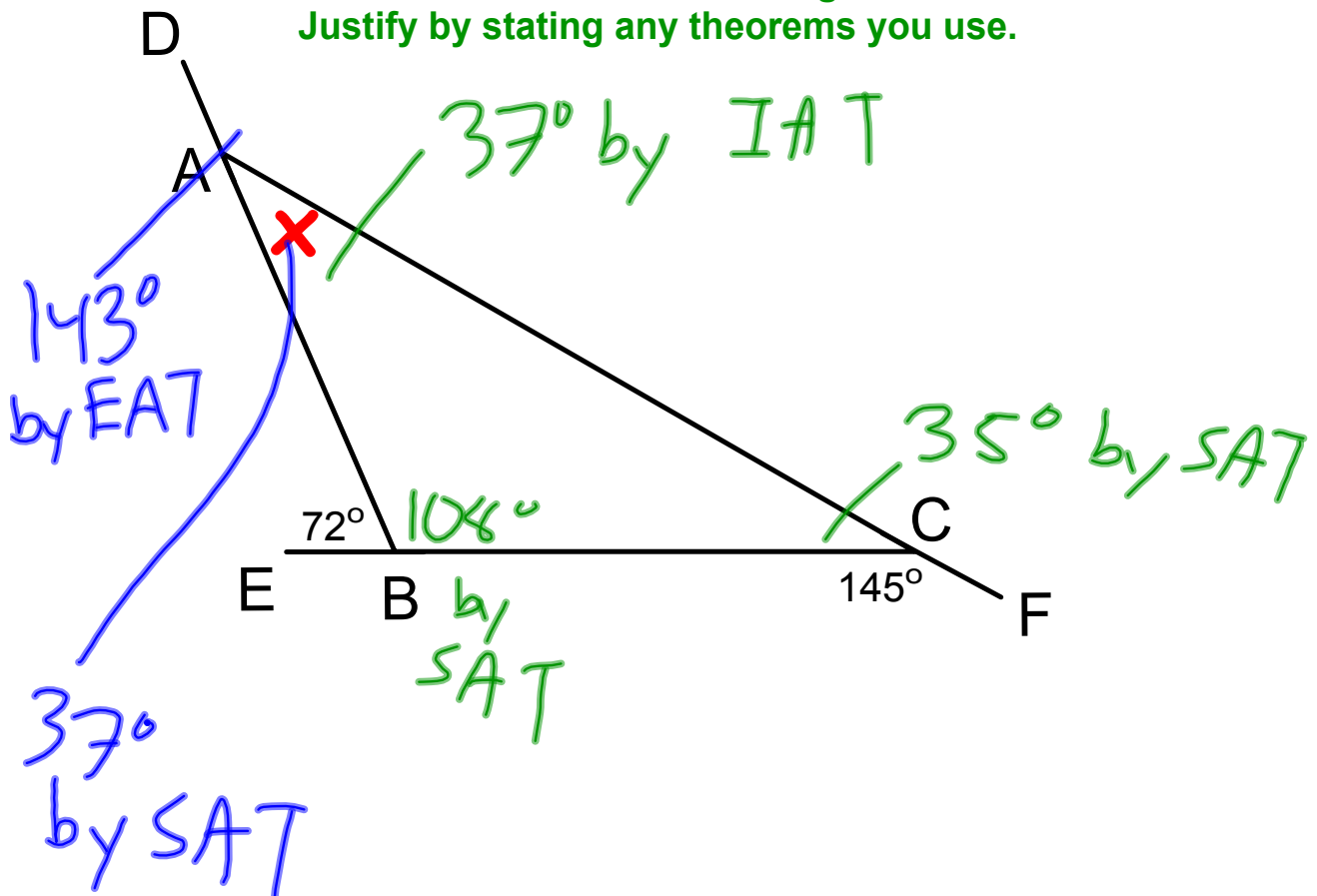
Exit Question



- ① $\angle FCB = 151^\circ$ by SAT
- ② $x = 142^\circ$ by EAT

Justify!

Find the measure of angle x.
Justify by stating any theorems you use.



Unit 6: Geometric Relationships

Topic #2

Angle Relationships in Quadrilaterals

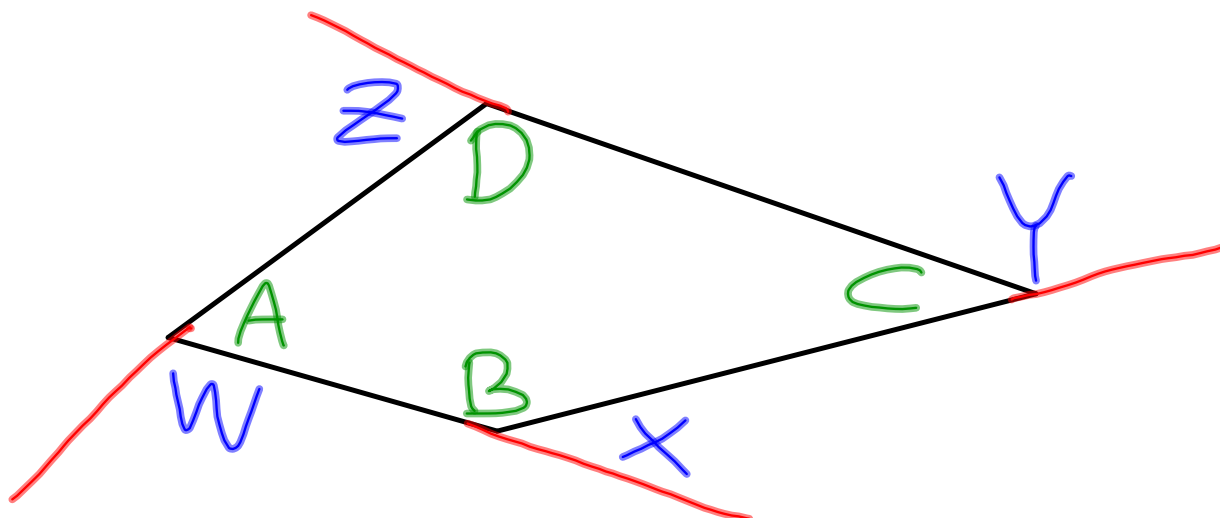
Minds on

From Triangle to Quadrilateral

1. Get a piece of paper.
2. Draw a triangle.
3. Using as few lines as possible, turn your triangle into a quadrilateral.
IF YOU HAVE A LINE THROUGH IT, THAT'S OKAY!
4. Based on your diagram, hypothesize about the interior and exterior angles of a quadrilateral.

Action!

Angle Investigation



Interior Angles

A, B, C, D sum to 360°

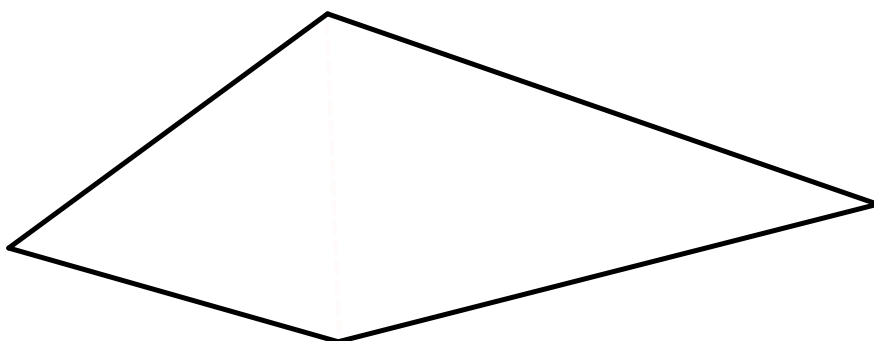
Exterior Angles

W, X, Y, Z 360°

—

Action!

Angle Investigation



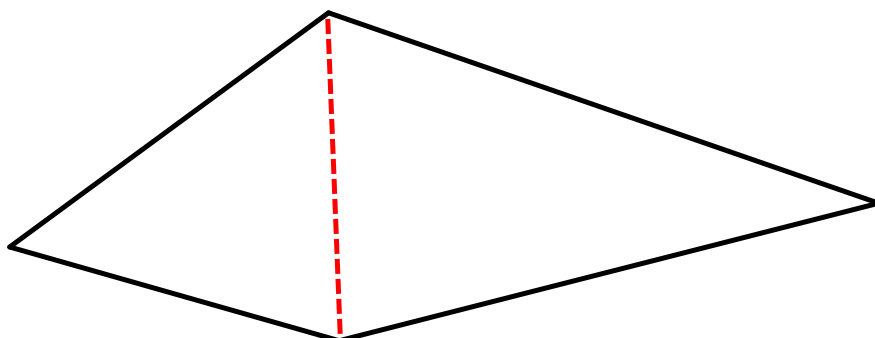
Any quadrilateral can be cut into **two triangles**

The sum of the angles in a triangle is 180°.

Therefore the sum of the angles in a quadrilateral is
 $2 \times 180^\circ = 360^\circ$

Action!

Angle Investigation



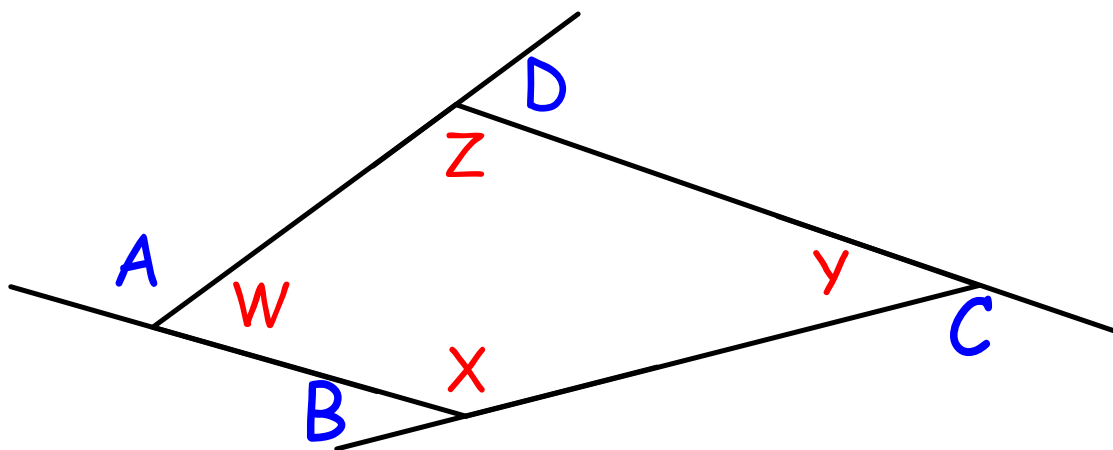
Theorem

The sum of the interior angles of a quadrilateral is always 360° .

SAQT — theorem
sum — angles — quadrilateral

Action!

What About the Exterior Angles?



W, X, Y and Z are the **interior** angles of this quadrilateral.
A, B, C and D are the **exterior** angles of this quadrilateral.

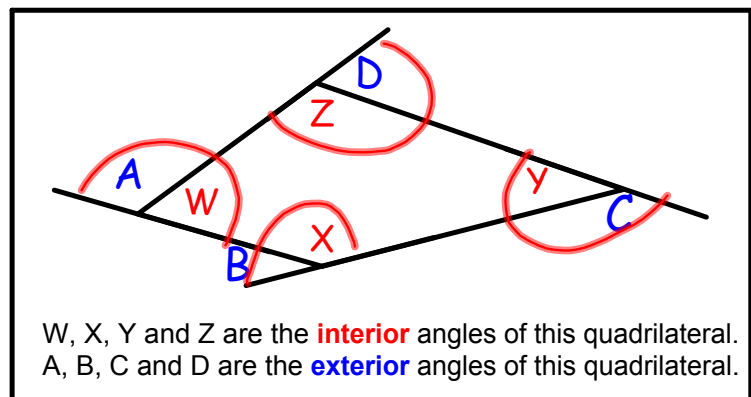
Action!We know that

$$A + W = 180^\circ \text{ BY SAT}$$

$$B + X = 180^\circ \text{ BY SAT}$$

$$C + Y = 180^\circ \text{ BY SAT}$$

$$D + Z = 180^\circ \text{ BY SAT}$$



$$\text{So: } A + W + B + X + C + Y + D + Z = 720^\circ \quad (1)$$

We also know that

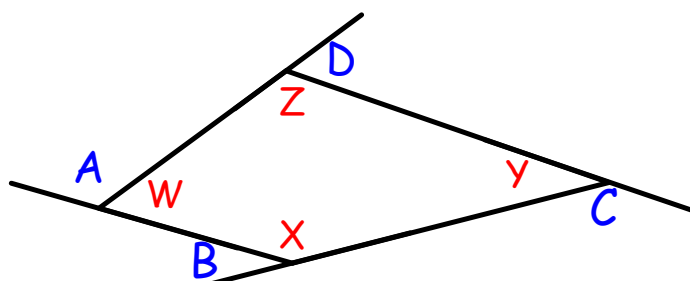
$$W + X + Y + Z = 360^\circ \text{ (the interior angles of a quadrilateral sum to } 360^\circ)$$

If we remove W, X, Y and Z from (1) we are left with A, B, C and D on the left and just 360° on the right!

$$\text{Therefore } A + B + C + D = 360^\circ$$

Action!

The Exterior Angle Theorem (EAT)



$$A + B + C + D = 360^\circ$$

The sum of the exterior angles
of a triangle OR a quadrilateral is 360° .

Action!

The Exterior Angle Theorem (EAT)

The sum of the exterior angles
of a **quadrilateral** is 360° .

HUH?!
But Mr. Gilbert, you
said...

The Exterior Angle Theorem (EAT)
The sum of the exterior angles of a
triangle is always 360° .

WHICH IS IT?!?!?!?!?

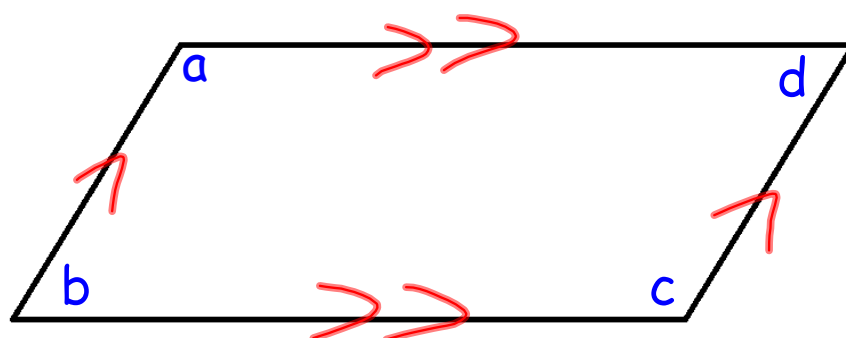
BOTH!!

Action!

Geometer's Sketch Pad Demo

Action!

Let's Get Parallel!



(beside)
a and d are adjacent angles
a and b are adjacent angles

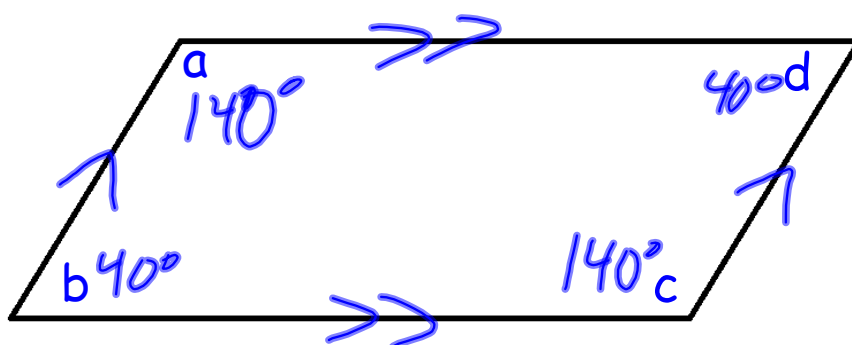
a and c are opposite angles
 b and d are opposite angles

What other angles are adjacent?

b and c
 c and d

Action!

Let's Get Parallel!



Adjacent angles are adjoining, or next to one another.

Adjacent angles in a parallelogram are Supplementary.

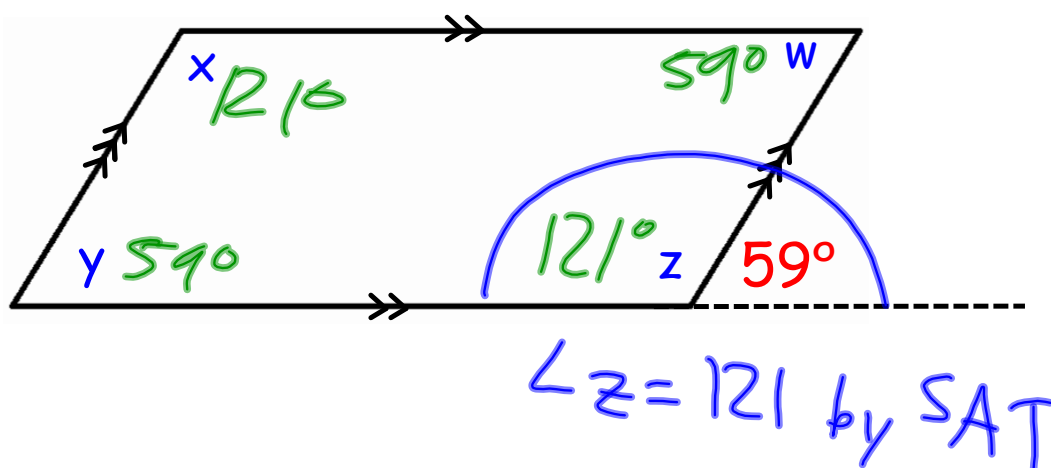
Opposite angles in a parallelogram are equal.

Supplementary angles add to 180°.

Consolidation

Exit Question

Find the measure of angles w , x , y and z .



Consolidation

Homework

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#1cd, 3, 5c, 7, 10, 12