

What's Going On?

Minds on

What Do We Know?

Action!

SATT, SAT, EAT

Consolidation

Exit Card

Learning Goal - I will be able to determine and describe the properties and relationships of the interior and exterior angles of triangles.

Unit 5: Geometric Relationships

Today's Topic

Angle Relationships in Triangles

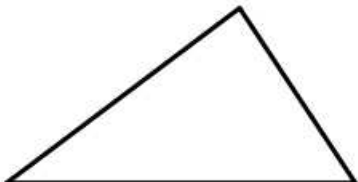
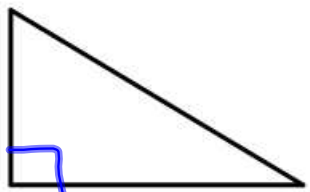
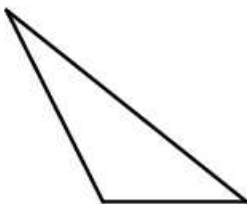
Minds on

What Do We Know?

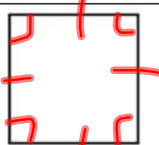
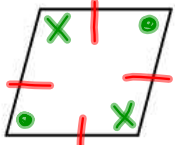
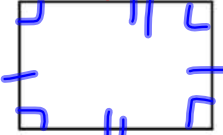
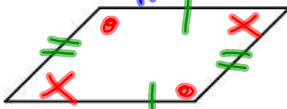
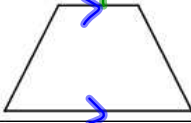
	<p>scalene</p>	<ul style="list-style-type: none"> • no equal sides • no equal angles
	<p>isosceles</p>	<ul style="list-style-type: none"> • <u>two equal sides</u> • <u>two equal angles</u>
	<p>equilateral</p>	<ul style="list-style-type: none"> • three equal sides • <u>three equal angles</u>

Minds on

What Do We Know?

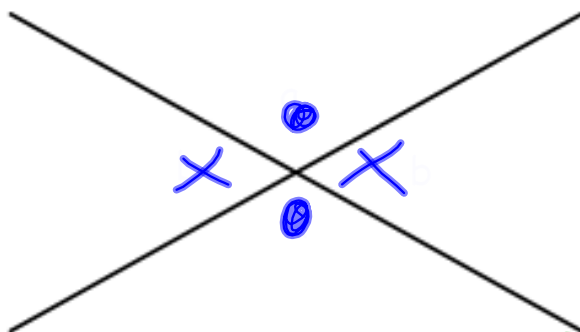
	<i>acute</i>	<ul style="list-style-type: none">• three acute angles (less than 90°)
	<i>right</i>	<ul style="list-style-type: none">• one right angle (90°)
	<i>obtuse</i>	<ul style="list-style-type: none">• one <u>obtuse</u> angle (between 90° and 180°)

Minds on

Quadrilaterals		
Diagram	Name	Properties
	Square	<ul style="list-style-type: none"> • four equal sides • four 90° angles
	Rhombus	<ul style="list-style-type: none"> • four equal sides • two sets of equal opposite angles
	rectangle	<ul style="list-style-type: none"> • two sets of equal opposite sides • four 90° angles
	parallelogram	<ul style="list-style-type: none"> • two sets of equal opposite sides • two sets of equal opposite angles
	trapezoid	<ul style="list-style-type: none"> • one set of parallel sides

Minds on

What Do We Know?



When two lines intersect, the opposite angles are equal.

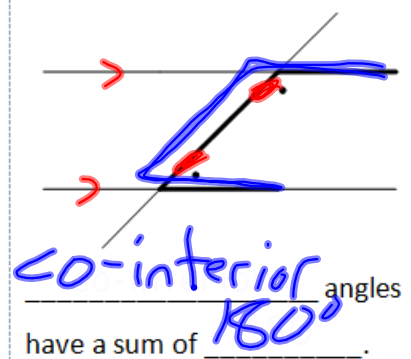
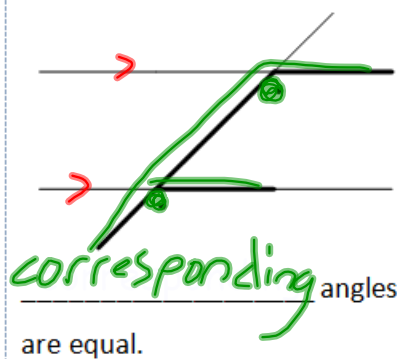
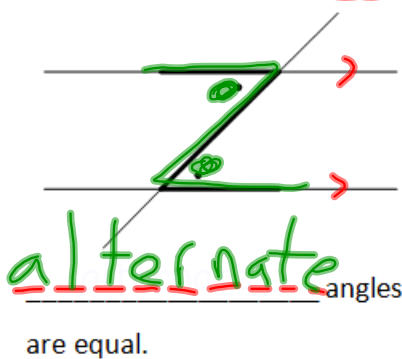
Opposite Angle Theorem
OAT

Minds on



What Do We Know?

When a transversal crosses parallel lines, many pairs of angles are related.



transversal \rightarrow a line that crosses or intersects two or more lines

Minds on

What Do We Know?

What is the sum of the
angles in a triangle?

180°

Action!

What is the sum of the angles in a triangle?

180°

ALWAYS

This is actually a *theorem*... our first theorem!

The Sum of the Angles in a Triangle Theorem (**SATT**)

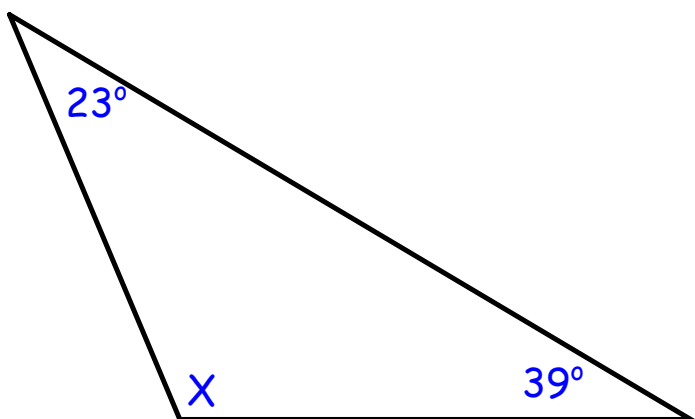
The sum of the **interior** angles of any triangle
is always 180°.

Action!

Theorems

Sum of the Angles in a Triangle Theorem (SATT)

Find the measure of angle X.



To find the measure of an interior angle given two interior angles:

1. Start with 180° .
2. Subtract each angle.
3. What remains is the measure of the missing angle.

Action!

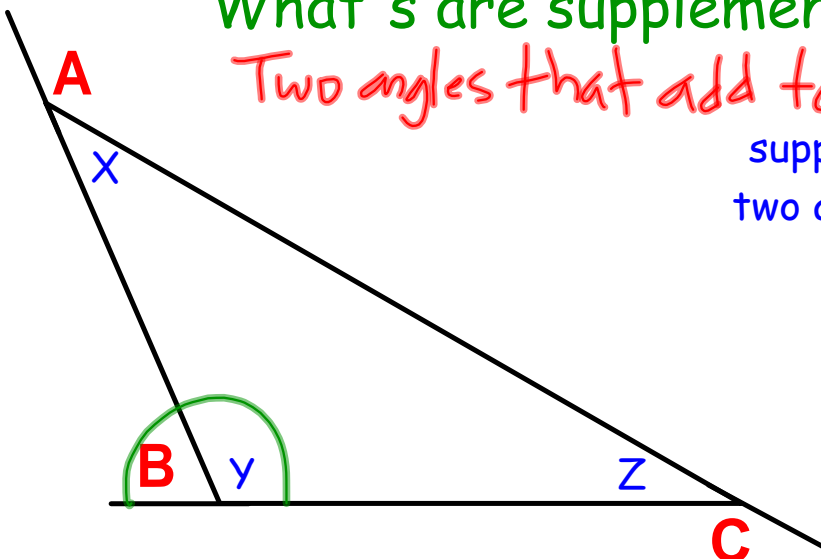
Theorems

Supplementary Angle Theorem (SAT)

What's are supplementary angles?
Two angles that add to 180° .

supplementary angles are
two angles that exist along
a straight line

A and X
B and Y
C and Z

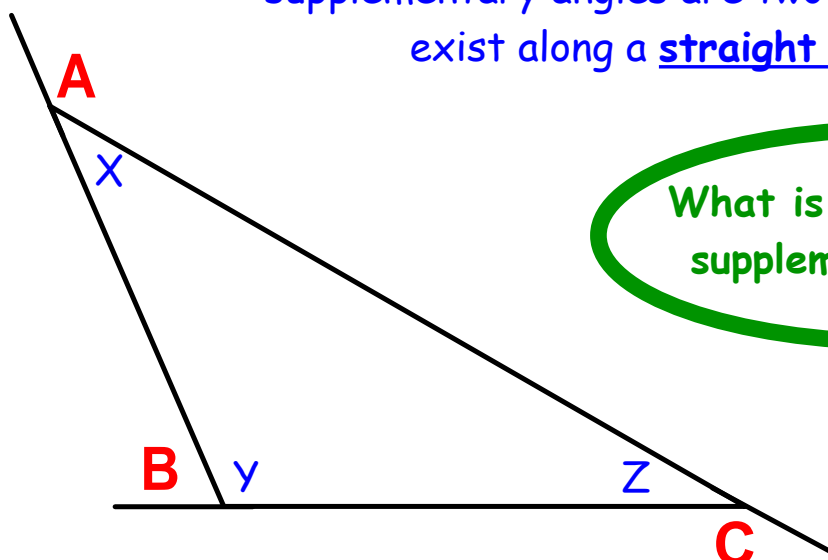


Action!

Theorems

Supplementary Angle Theorem (SAT)

supplementary angles are two angles that exist along a straight line



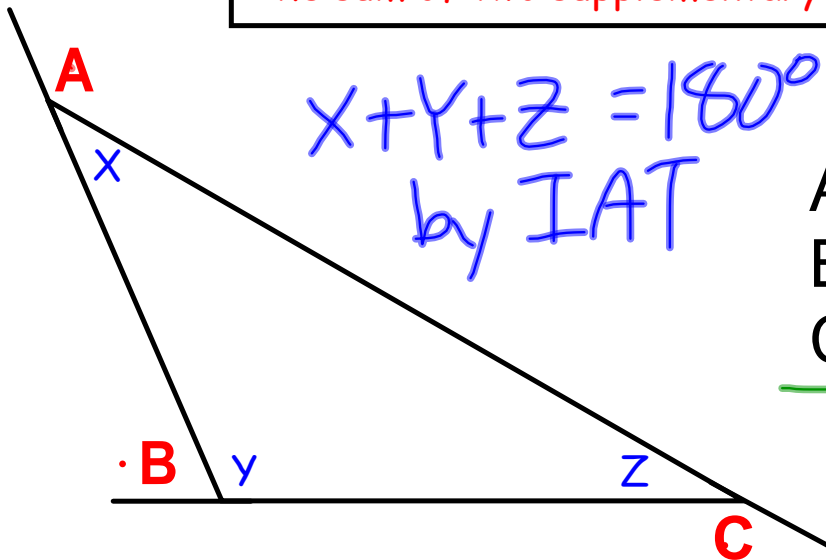
What is the sum of two supplementary angles?

Action!

Theorems

Supplementary Angle Theorem (SAT)

The sum of two supplementary angles is 180° .



$$X + Y + Z = 180^\circ$$

by IAT

$$A + X = 180^\circ \text{ by SAT}$$

$$B + Y = 180^\circ \text{ by SAT}$$

$$C + Z = 180^\circ \text{ by SAT}$$

$$A + X + B + Y + C + Z = 540^\circ$$

$$A + B + C + (X + Y + Z) = 540^\circ$$

$$\boxed{A + B + C} + 180 = 540$$

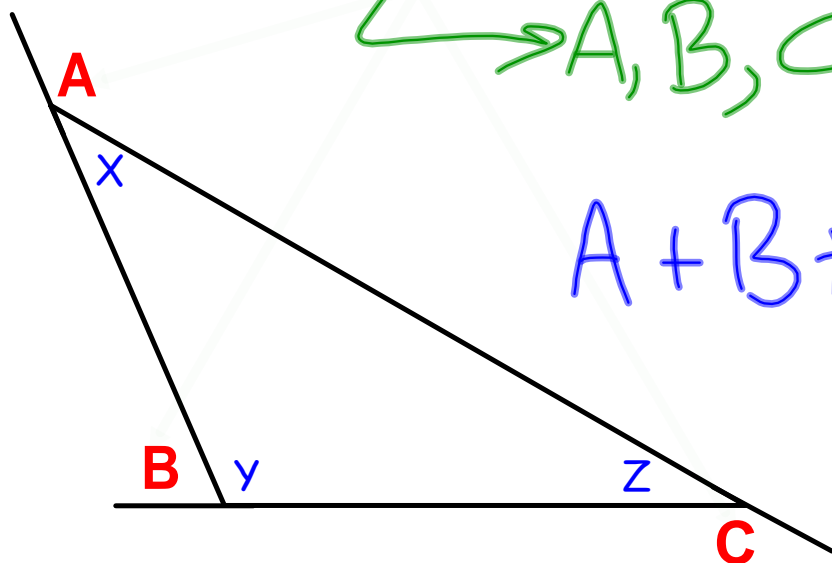
$$A + B + C = 360^\circ$$

Action!

Theorems

What about the
exterior angles of a triangle?

$\rightarrow A, B, C$



$$A + B + C = 180^\circ$$

$$270^\circ$$

$$360^\circ$$

Action!

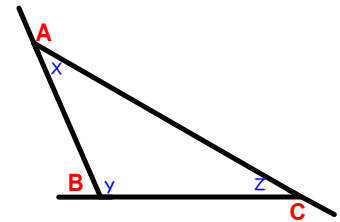
We know that

$$\underbrace{(A + X)}_{\text{SAT } 180^\circ} + \underbrace{(B + Y)}_{\text{SAT } 180^\circ} + \underbrace{(C + Z)}_{\text{SAT } 180^\circ} = 540^\circ$$

AND

$$X + Y + Z = 180^\circ$$

SATT



So...

$$A + X + B + Y + C + Z = 540^\circ$$

If we remove X, Y and Z we are taking away 180° worth of angles.

What do we have left?

We only have A, B and C left (the exterior angles!)

And we have to take 180° from 540° ...

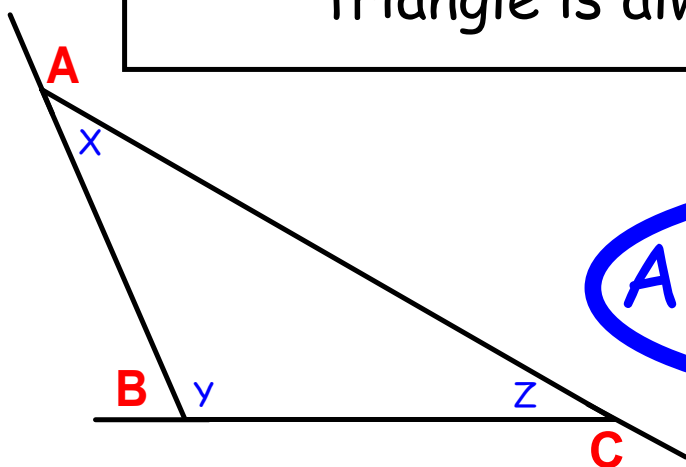
$$540^\circ - 180^\circ = 360^\circ$$

Action!

Theorems

The Exterior Angle Theorem (EAT)

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

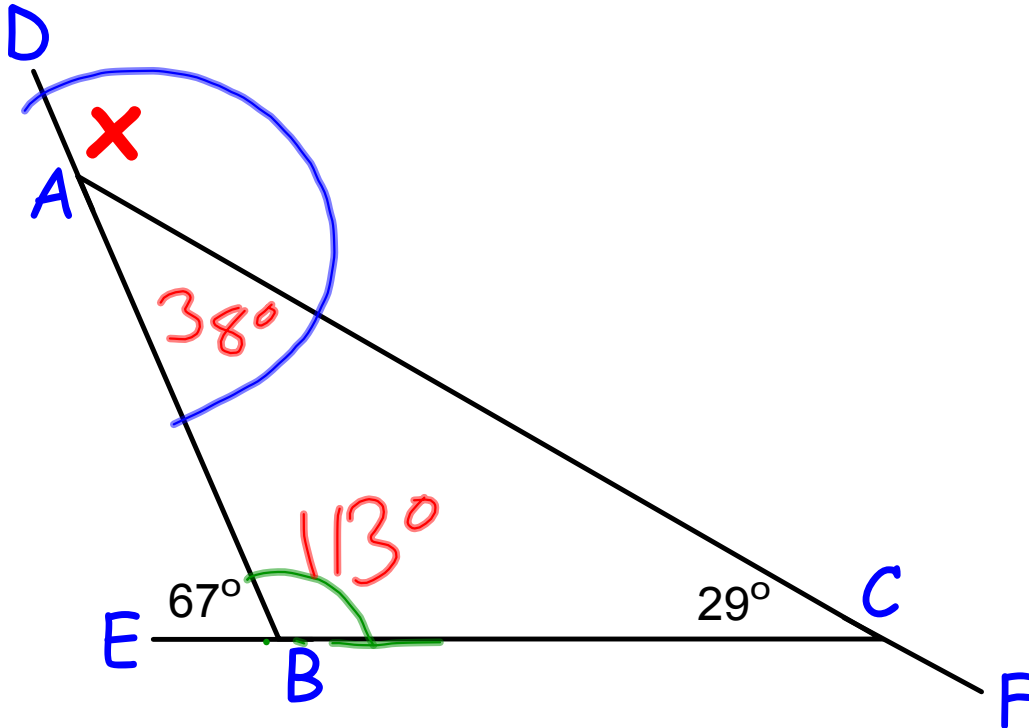


$$A + B + C = 360^\circ$$

Consolidation

Exit Question

Find the measure of angle x.
State any and all theorems you use.



$$\angle ABC = 113^\circ \text{ by } \underline{\text{SAT}}$$

$$\angle BAC = 38^\circ \text{ by } \underline{\text{IAT}}$$

$$\therefore \angle X = 142^\circ \text{ by } \underline{\text{SAT}}$$

Pg 371 #1-6

USE JUSTIFICATION

