Special Parallelograms

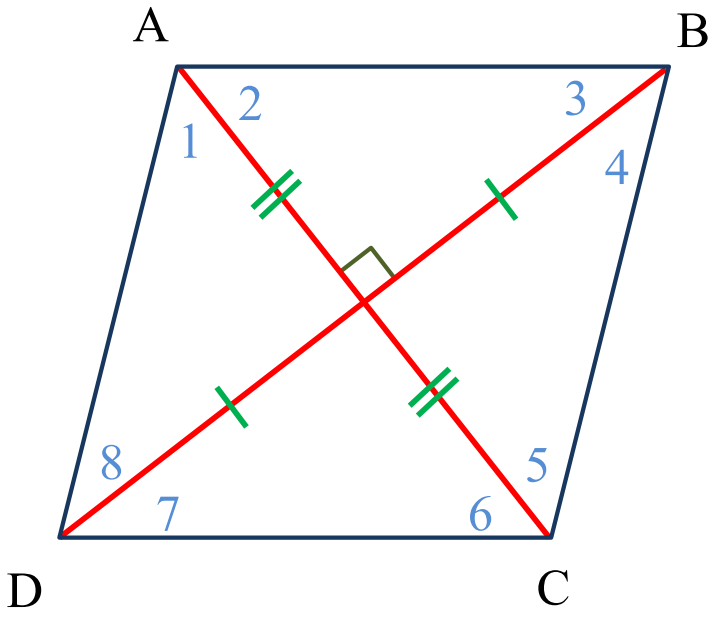
Rhombus

Rectangle

Square

This is a Rhombus

What makes it a Rhombus?



$$\overline{AB} \cong \overline{BC} \cong \overline{DC} \cong \overline{AD}$$

$$\angle 1 \cong \angle 2$$

$$\angle 3 \cong \angle 4$$

$$\angle 5 \cong \angle 6$$

$$\angle 7 \cong \angle 8$$

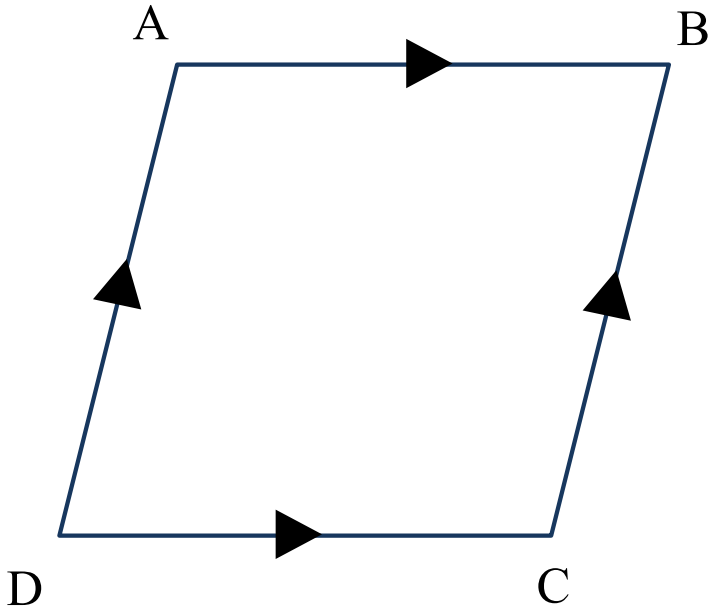
All four sides are congruent

Both diagonals are perpendicular bisectors

Both diagonals are angle bisectors

This is a Rhombus

What makes it a Rhombus?



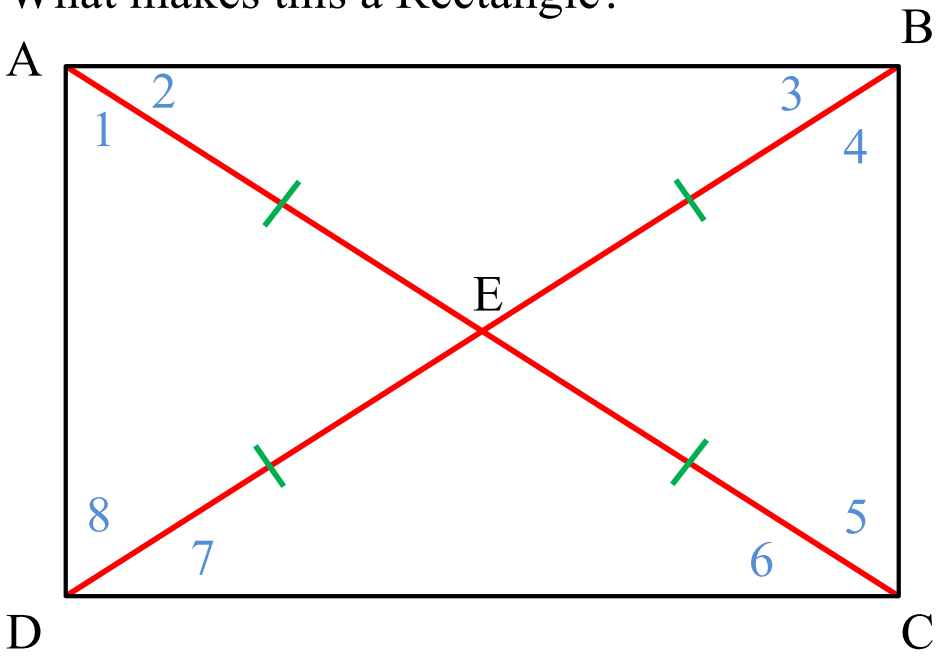
$$\overline{AB} \cong \overline{BC}$$

Since all four sides are congruent and it's already known to be a parallelogram,

we only need to show that two consecutive sides are congruent

This is a Rectangle

What makes this a Rectangle?



$\overline{AC} = \overline{BD}$

Do the diagonals bisect each other?

Since it is a parallelogram, yes.

More than that,

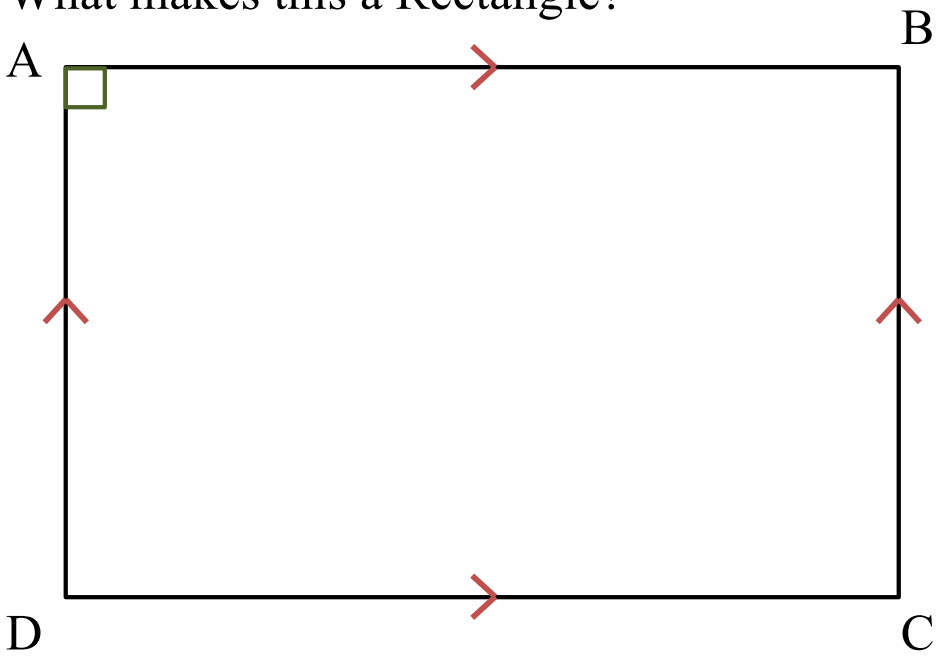
$\overline{AE} \cong \overline{CE} \cong \overline{BE} \cong \overline{DE}$

$m\angle 1 \neq m\angle 2$

It should be noted that the diagonals do not necessarily bisect the angles.

This is a Rectangle

What makes this a Rectangle?



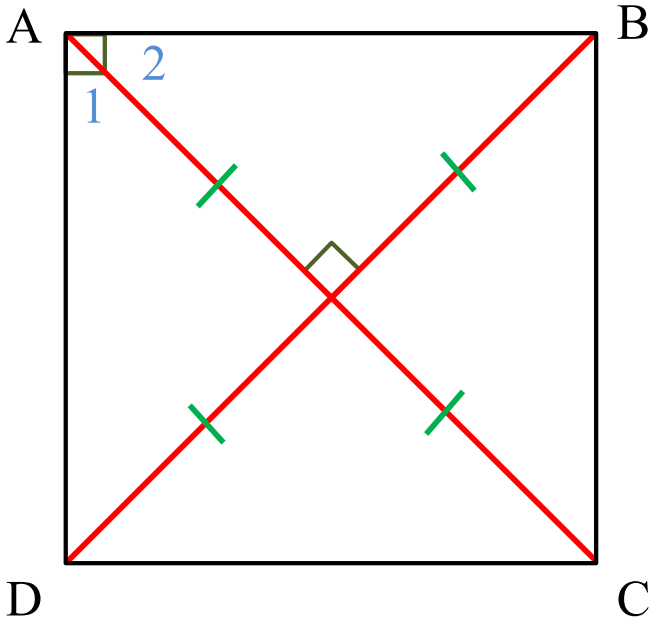
One right angle

All you have to show here is one of them

See the theorems that start on Pg. 388

This is a Rectangle

What makes this a Square?



All four sides are congruent

Both diagonals are perpendicular bisectors

Both diagonals are angle bisectors

It is already a rectangle

$\overline{AC} = \overline{BD}$

$\overline{AB} \cong \overline{BC} \cong \overline{DC} \cong \overline{AD}$

$m\angle 1 = m\angle 2$

The diagonals bisect the opposite angles which means that…

It is also a rhombus

…and a *rectangular rhombus* is also known as a *square*

By the way,

$m\angle 1 = m\angle 2 = 45°$

This is a Rectangle

All Quadrilaterals