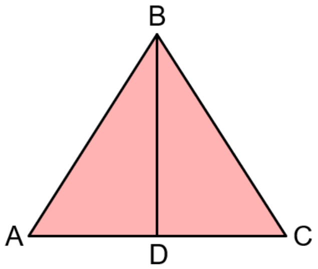
Congruent Triangle Proof

(a)

The diagram shows an equilateral triangle. BD is perpendicular to AC. Prove that triangles ABD and CBD are congruent.



Using RHS:

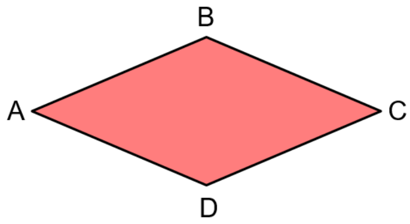
R – both have right angles

H – equilateral, so AB = BC

S – BD is common

(b)

The diagram shows a rhombus ABCD. Prove that triangles ABC and ADC are congruent.



Using ASA:

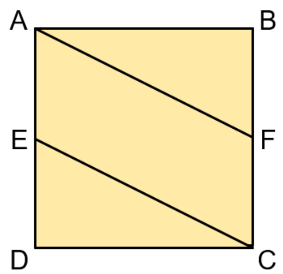
A – angle BAC and angle ACD are alternate angles

S – AC is common

A – angle BCA and angle CAD are alternate angles

(c)

ABCD is a square. E is the midpoint of AD and F is the midpoint of BC. Prove that triangles ABF and CDE are congruent.



Using SAS:

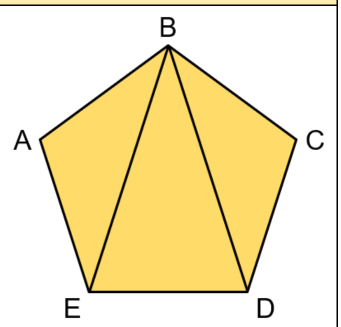
S – BF=ED as they are both half of the square side length

A – angles ABF and CDE are both right angles

S – AB=CD as opposite sides of a square

(d)

ABCDE is a regular pentagon. Prove that triangles ABE and CBD are congruent.



Using SAS:

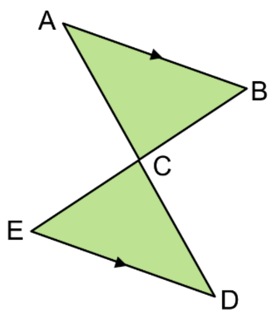
S – sides of regular shape are equal so AB=CD

A – angles in a regular shape are equal so angle BAE = angle BCD

S – AE=BC as regular polygon

(e)

In the diagram, AB and DE are parallel, and C is the midpoint of BE. Prove that triangles ABC and CDE are congruent.



Using ASA:

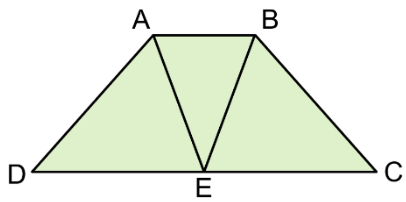
A – angles ACB and ECD are vertically opposite so equal

S – BC=CE as C is the midpoint of BE

A – angles ABC and CED are alternate angles so equal

(f)

ABCD is a trapezium. ABE is an isosceles triangle where AE = BE, and E is the midpoint of CD. Prove that triangles ADE and BCE are congruent.



Using SAS:

S – ED=EC as E is the midpoint of CD

A – angles AED and BEC are alternate angles so equal

S – AE=BE as ABE is an isosceles triangle