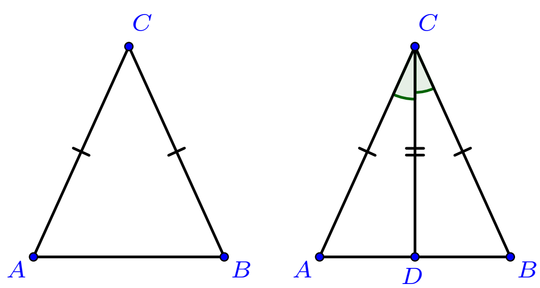
# The Isosceles Triangle Theorem

*Proofs updated.*

**Problem 1** *Prove that the base angles of an isosceles triangle are congruent.*

*Fixnote: Below are several different proofs, along with one that is not a proof. Please consider them separately.*



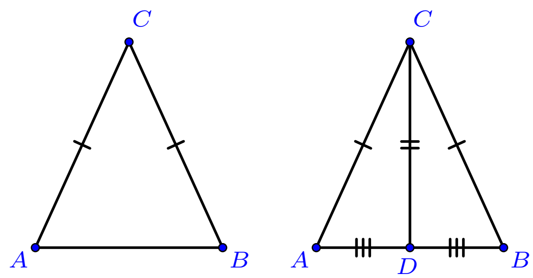

(a) *Beginning with the given figure on the left, Morgan draws $\overline{CD}$ and marks the figure intending that this new segment is a(n) (median/ angle bisector ✓/ perpendicular bisector/ altitude).*

(b) *Based on the marked figure, Morgan claims that the $\triangle ACD \cong \triangle \boxed{BCD}$ by (SAS ✓/ SSS/ SSA/ ASA/ HL).*

(c) *Finally, Morgan concludes that $\angle A \cong \angle \boxed{B}$, as they are corresponding parts of congruent triangles.*

**Problem 2** *Prove that the base angles of an isosceles triangle are congruent.*

Author(s): Brad Findell

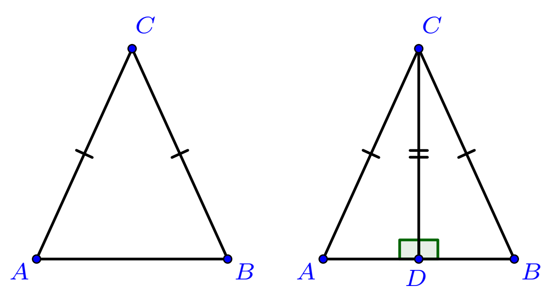



(a) *Beginning with the given figure on the left, Deja draws* $\overline{CD}$ *and marks the figure intending that this new segment is a(n) (median ✓/ angle bisector / perpendicular bisector/ altitude).*

(b) *Based on the marked figure, Deja claims that the* $\triangle ACD \cong \triangle \boxed{BCD}$ *by (SAS/ SSS ✓/ SSA/ ASA/ HL).*

(c) *Finally, Deja concludes that* $\angle A \cong \angle \boxed{B}$*, as they are corresponding parts of congruent triangles.*

**Problem 3** *Prove that the base angles of an isosceles triangle are congruent.*

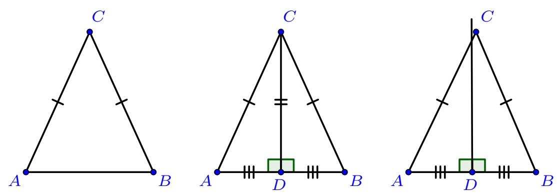



(a) *Beginning with the given figure on the left, Elle draws* $\overline{CD}$ *and marks the figure intending that this new segment is a(n) (median/ angle bisector/ perpendicular bisector/ altitude ✓).*

(b) *Based on the marked figure, Deja claims that the* $\triangle ACD \cong \triangle \boxed{BCD}$ *by (SAS/ SSS/ SSA/ ASA/ HL ✓).*

(c) *Finally, Deja concludes that* $\angle A \cong \angle \boxed{B}$*, as they are corresponding parts of congruent triangles.*

**Problem 4** *Simon and Taylor are trying to prove that the base angles of an isosceles triangle are congruent.*




Given figure Simon's figure Taylor's figure

*Beginning with the given figure on the left, Simon draws $\overline{CD}$ and marks the second figure intending that this new segment is a perpendicular bisector of $\overline{AB}$.*

*Taylor claims that a perpendicular bisector of a side of a triangle usually misses the opposite vertex. So without using other properties of isosceles triangles or perpendicular bisectors, the figure should allow for that possibility.*

*Fixnote: Taylor's claim needs some work, as is the case for the choices below.*

*Choose the best response to their argument:*

***Multiple Choice:***

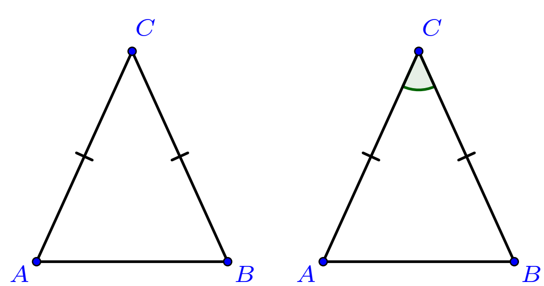
(a) *Simon is correct, and $\triangle ACD \cong \triangle BCD$ by SAS.*

(b) *Simon is correct, and $\triangle ACD \cong \triangle BCD$ by SSS*

(c) *Taylor is correct, and the perpendicular bisector cannot be used to complete this proof.* ✓

(d) *Neither of them are correct.*

**Problem 5** *Prove that the base angles of an isosceles triangle are congruent.*




Given figure

(a) *Examining the given figure on the left, Lissy notices symmetry in the triangle and claims that the triangle is congruent to itself by a (translation / reflection ✓/ rotation).*

(b) *Based on the marked figure, Lissy claims that the* $\triangle ACB \cong \triangle \boxed{BCA}$ *by (SAS ✓/ SSS/ SSA/ ASA/ HL).*

(c) *Finally, Lissy concludes that* $\angle A \cong \angle \boxed{B}$*, as they are corresponding parts of congruent triangles.*