Key Proofs

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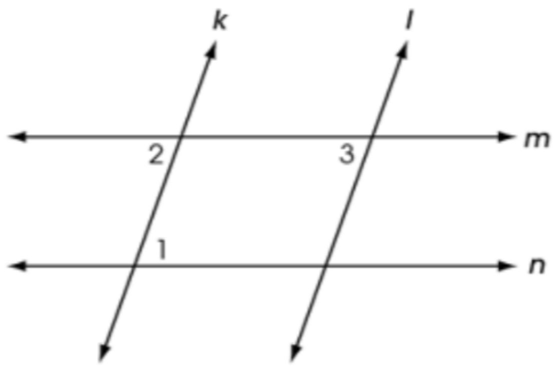
End-of-Course Exam Proofs for Math 1

Proofs.

Problem 1 *Adapted from Ohio's 2017 Geometry released item 13.*

Two pairs of parallel lines intersect to form a parallelogram as shown.



Complete the following proof that opposite angles of a parallelogram are congruent:

(a) $\angle 1 \cong \angle 2$ *as (opposite angles / alternate interior angles / corresponding angles) for parallel lines (m and n / k and l).*

(b) $\angle 3 \cong \angle 2$ *as (opposite angles / alternate interior angles / corresponding angles)for parallel lines (m and n / k and l).*

(c) *Then* $\angle 1 \cong \angle 3$ *because they are both congruent to* $\angle 2$.

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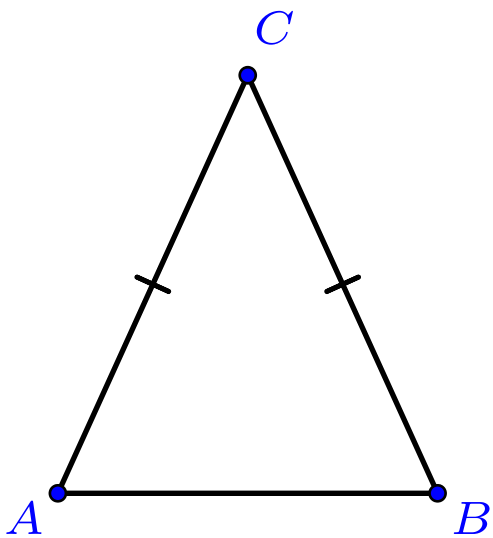
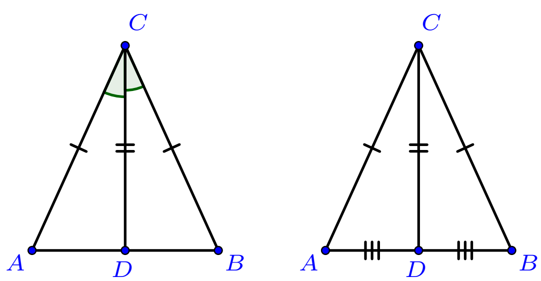
The Isosceles Triangle Theorem

Proofs.

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



(a) Angle bisector; (b) Median



(c) Altitude; (d) Overspecified perpendicular bisector

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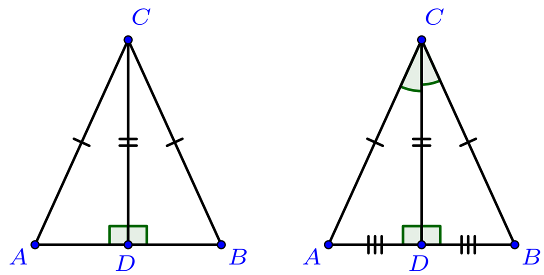
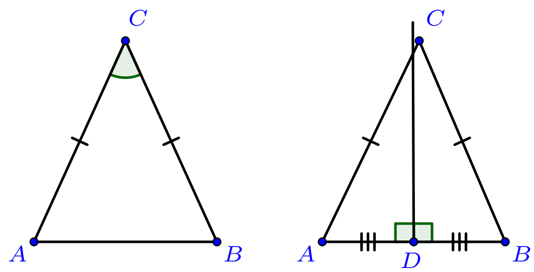


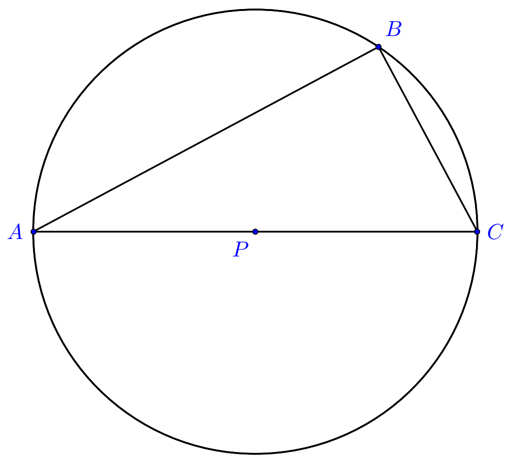
(e) Using symmetry; (f) perpendicular bisector that misses vertex;



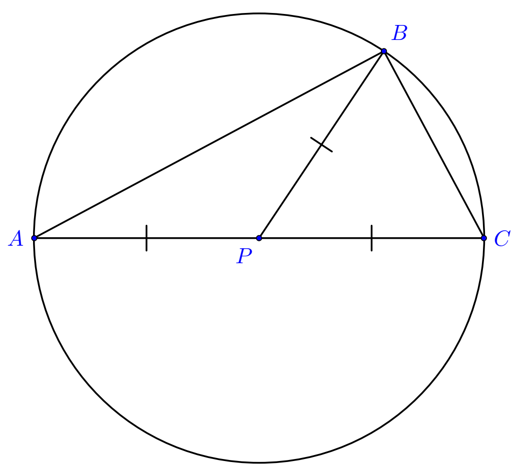
Inscribed Angles

Proofs.

In the figure below, $\overline{AB}$ is a diameter of a circle with center P. Natalia is trying to prove that $\angle B$ is a right angle.



Natalia draws $\overline{PB}$ and marks the diagram to show segments that she knows to be congruent because each one is a $\boxed{?}$ of the circle.



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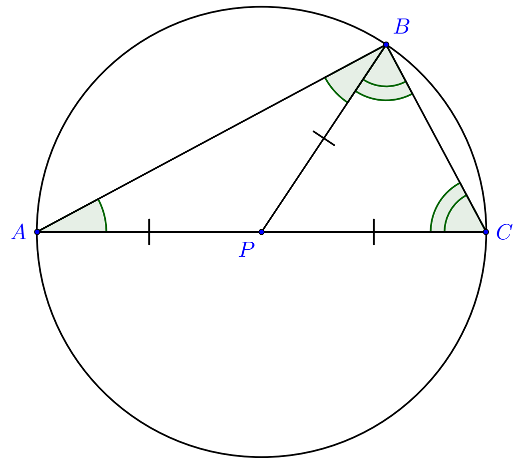
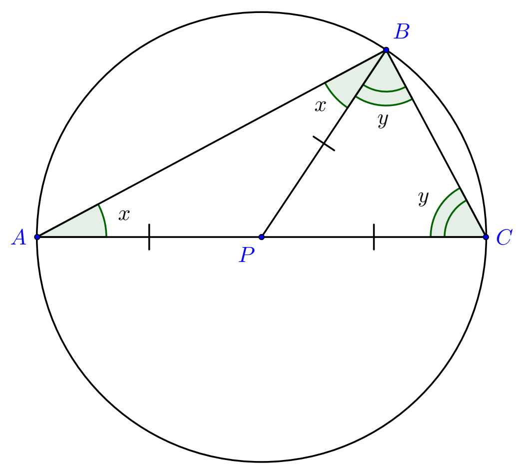
Natalia sees that $\triangle APB$ and $\triangle BPC$ are $\boxed{?}$ triangles, so she marks the figure to show congruent angles.



In order to do some algebra with these congruent angles, Natalia labels their measures x and y, as shown in the following picture:



She writes an equation for the sum of the angles of $\triangle ABC$:

$$\boxed{?} = 180^\circ$$

Since $m\angle B = \boxed{?}$, she concludes that $m\angle B = 90^\circ$.