

Warm-up

Unit Test Thursday

Find the measure of an angle if its measure is 34 degrees more than its supplement.

 <http://kreppeltl.weebly.com/>



Geometry Notes IGP - 8: Simple Angle Theorems

A **theorem** is a statement that has been proven using definitions, postulates and/or previously proven theorems.

* Theorem: All right angles are congruent.

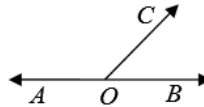
S	R
<p>Given: $\angle A$ and $\angle B$ are right angles Prove: $\angle A \cong \angle B$</p> <p>1) $\angle A$ and $\angle B$ are <u>right</u> \angles 2) $\angle A \cong \angle B$</p>	<p>1) Given 2) All right \angles are \cong</p>

* A Linear Pair is Supplementary

Theorem: All straight angles are congruent.

Theorem: If two adjacent angles form a straight line, they are supplementary.

Given: $\angle AOC$ and $\angle BOC$, \overline{AOB}
 Prove: $\angle AOC$ and $\angle BOC$ are supplementary

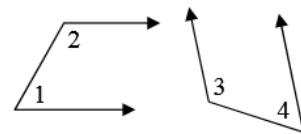


S	R
<p>1) $\angle AOC$ and $\angle BOC$ 2) $\angle AOC$ and $\angle BOC$ are Supp</p>	<p>1) given 2) A linear pair is supplementary</p>

Theorem: If two adjacent angles form a right angle, then they are complementary.

Theorem: If two angles are congruent, then their supplements are also congruent.

Given: $\angle 1 \cong \angle 4$, $\angle 2$ supp. to $\angle 1$, $\angle 3$ supp. to $\angle 4$
 Prove: $\angle 2 \cong \angle 3$



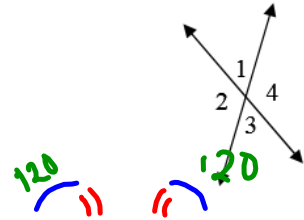
Theorem: If two angles are supplementary to the same angle, then they are congruent.

Note: The previous two theorems are still true if the words "supplements" and "supplementary" are replaced by "complements" and "complementary".

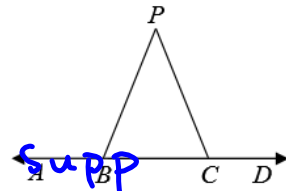
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Definition: *Vertical angles* are non-adjacent angles formed by two intersecting lines.

Theorem: Vertical angles are congruent. (Prove for HW.)



Ex: Given: \overline{ABCD} , $\angle ABP \cong \angle DCP$
 Prove: $\angle CBP \cong \angle BCP$



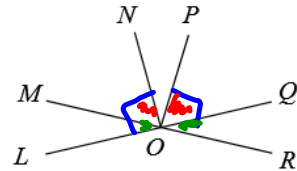
1) $\angle ABP \cong \angle DCP$ 1) given

2) $\angle ABP$ and $\angle PBC$ are supp Statement $\angle PCD$ and $\angle PCB$ are supp	2) A linear pair is supp Reason
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3) $\angle CBP \cong \angle BCP$	3) Supplements of $\cong \angle$ s are \cong *
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90

Ex: Given: \overline{MOR} , \overline{LOQ} , $\overline{NO} \perp \overline{LO}$, $\overline{PO} \perp \overline{OR}$
 Prove: $\angle MON \cong \angle QOP$



1) $\overline{NO} \perp \overline{LO}$ $\overline{PO} \perp \overline{OR}$	1) given
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2) $\angle LON$ and $\angle POR$ are right \angle s	2) \perp lines meet to form right \angle s
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3) $\angle LON \cong \angle POR$	3) All right \angle s are \cong
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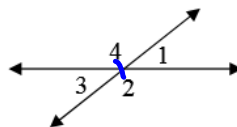
4) $\angle LOM \cong \angle ROQ$	4) All vertical \angle s are \cong
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5) $\angle MON \cong \angle QOP$	5) Subtraction
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Geometry HW: Intro Geo Proofs - 8

Do this homework neatly on SEPARATE PAPER.

- Based on the diagrams, tell whether the given angles are vertical angles.
 - $\angle 1$ and $\angle 3$ **Yes**
 - $\angle 1$ and $\angle 4$ **180**
 - $\angle 2$ and $\angle 4$ **Yes**
 - $\angle 5$ and $\angle 7$ **No**



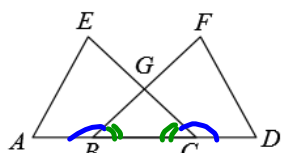
- We wish to prove the following theorem: Vertical angles are congruent.

Given: \overline{AEB} and \overline{CED}

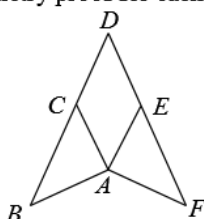
Prove: $\angle AEC \cong \angle BED$

 - Draw a diagram.
 - Outline a proof of the theorem. (There is more than one way to do this. The easiest way is to consider how $\angle AEC$ and $\angle BED$ are related to $\angle CEB$ and then use theorems covered in today's notes.)

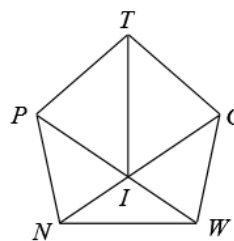
Write a complete statement-reason geometry proof for each of #1 - 4.



Problem #3



Problem #4



Problem #5

- Given: \overline{ABCD} , $\angle ABG \cong \angle DCG$
Prove: $\angle CBG \cong \angle BCG$
- Given: $\overline{AB} \perp \overline{AC}$, $\overline{AE} \perp \overline{AF}$
Prove: $\angle BAE \cong \angle FAC$
- Given: \overline{PIW} , \overline{GIN} , \overline{IT} bisects $\angle PIW$
Prove: $\angle NIT \cong \angle WIT$

The following are algebraic exercises; *not proofs*.

- If \overline{AEB} intersects \overline{CED} at E, $m\angle BEC = 5x - 25$, and $m\angle DEA = 7x - 65$, find the numerical values of the measures of all four angles.
- If \overline{AEB} intersects \overline{CED} at E, $m\angle AEC = 5(x + 15)$, and $m\angle AED = 7x - 75$, find the numerical values of the measures of all four angles.