

Name: _____

Date: _____

Geometry Notes Into to Geo Proofs - 5: Addition and Subtraction Postulates

5. **Addition Postulate:** Equal quantities may be added to both sides of an equation.

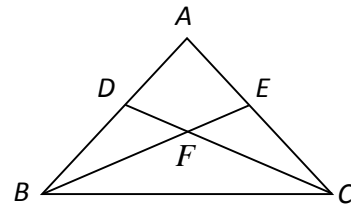
Ex: If $a = b$
and $x = y$
then

Note: In the Addition Postulate, we always add two equations to get a new equation.

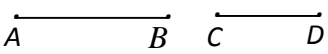
Ex: $2x + 3y = 9$
 $x - 3y = 3$

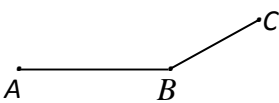
Note: Always line up the equal signs and add vertically on each side.

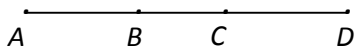
Ex: Given: \overline{ADB} , \overline{AEC}
 $\overline{AD} \cong \overline{AE}$, $\overline{DB} \cong \overline{EC}$



Note: For addition of line segments to make sense,

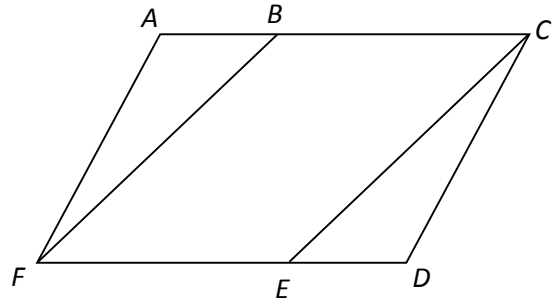
a) They must share an endpoint.  $\overline{AB} + \overline{CD} =$

b) They must be collinear.  $\overline{AB} + \overline{BC} =$

c) They must not overlap.  $\overline{AC} + \overline{BD} =$

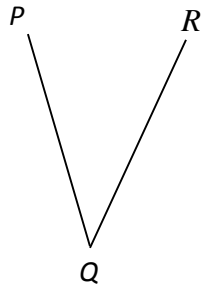
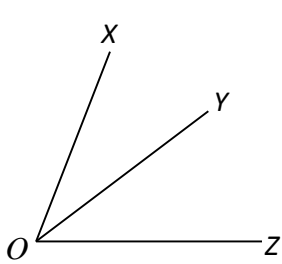
Ex: Given: $\overline{ABC}, \overline{FED}$

$$\overline{AB} \cong \overline{ED}, \overline{BC} \cong \overline{FE}$$



Ex: Given: $\angle AFB \cong \angle DCE, \angle BFE \cong \angle ECB$ (use diagram above)

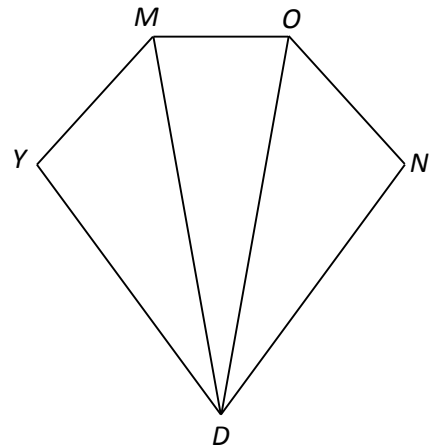
Note: For addition of angles to make sense, the angles must be adjacent (and non-overlapping).



$$\angle XOY + \angle YOZ =$$

$$\angle XOZ + \angle XOY =$$

Ex: Given: $\angle YDM \cong \angle NDO$

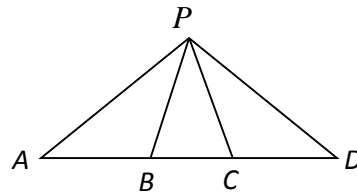


6. **Subtraction Postulate:** Equal quantities may be subtracted from both sides of an equation.

Ex: If $a = b$
 and $x = y$
 then

Note: In the Subtraction Postulate, we always subtract two equations to get a new equation.

Ex: $\overline{ABCD}, \overline{AC} \cong \overline{BD}$

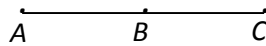


Note: For subtraction of line segments to make sense,

a) They must share an endpoint.

$$\overline{AC} - \overline{AB} =$$

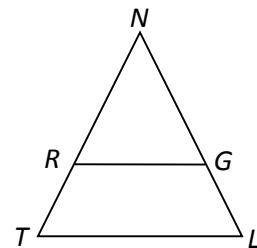
b) They must be collinear.



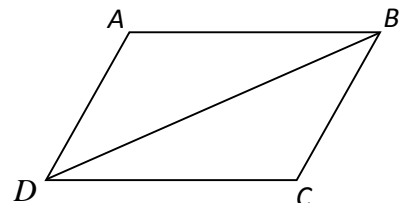
$$\overline{AC} - \overline{BC} =$$

c) They must overlap.

Ex: $\overline{NRT}, \overline{NGL}, \overline{NT} \cong \overline{NL}, \overline{RT} \cong \overline{GL}$



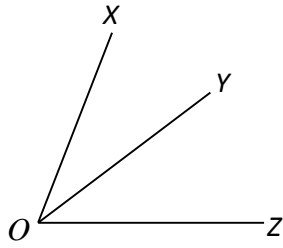
Ex: $\angle ABC \cong \angle ADC, \angle ABD \cong \angle CDB$



Note: For subtraction of angles to make sense, the angles must

a) share a ray and

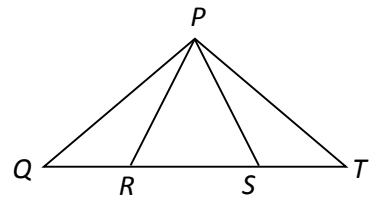
b) overlap



$$\angle XOZ - \angle XOY =$$

$$\angle XOZ - \angle YOZ =$$

Ex: Given: $\angle QPS \cong \angle TPR$



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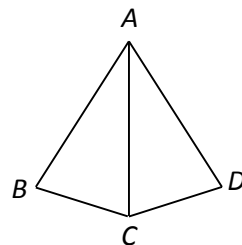
Geometry HW: Intro Geo Proofs – 5 Addition and Subtraction Postulate

For each of the following givens, state a valid conclusion based on the postulates we have covered **and tell what postulate was used**.

1. Given: $\overline{AB} \cong \overline{AC}$, $\overline{AC} \cong \overline{AD}$.

Conclusion: _____

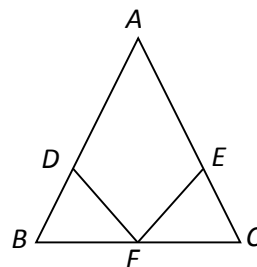
Reason: _____



2. Given: \overline{ADB} , \overline{AEC} , $\overline{AD} \cong \overline{AE}$, $\overline{DB} \cong \overline{EC}$.

Conclusion: _____

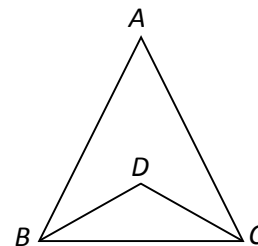
Reason: _____



3. Given: $\angle ABC \cong \angle ACB$, $\angle ABD \cong \angle ACD$

Conclusion: _____

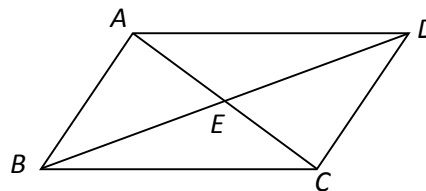
Reason: _____



4. Given: $\angle ABE \cong \angle CDE$, $\angle CBE \cong \angle ADE$

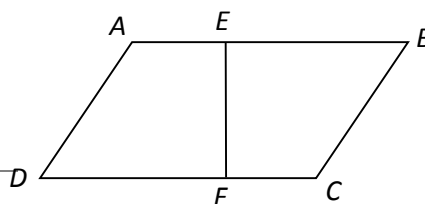
Conclusion: _____

Reason: _____



5. Given: \overline{AEB} , \overline{DFC} , $\overline{AB} \cong \overline{CD}$, $\overline{AE} \cong \overline{CF}$.

Conclusion: _____

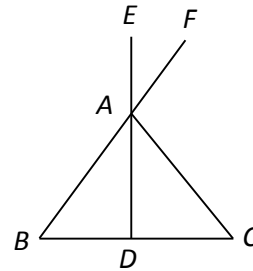


Reason: _____

6. Given: $\angle BAD \cong \angle CAD$, $\angle BAD \cong \angle FAE$

Conclusion: _____

Reason: _____

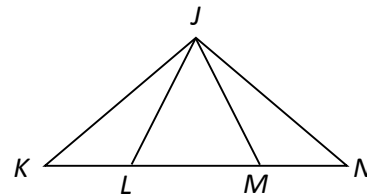


Problems #7 – 9 are simple “statement-reason” geometry proofs. For each one, fill in the missing reasons with appropriate postulates.

7. **Given:** $m\angle KJL + m\angle LJM = 90$, $m\angle KJL = m\angle MJN$

Prove: $m\angle MJN + m\angle LJM = 90$

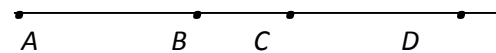
| <u>Statement</u> | <u>Reason</u> |
|-------------------------------------|---------------|
| 1. $m\angle KJL + m\angle LJM = 90$ | 1. Given |
| 2. $m\angle KJL = m\angle MJN$ | 2. Given |
| 3. $m\angle MJN + m\angle LJM = 90$ | 3. _____ |



8. **Given:** \overline{ABCD} , $\overline{AB} \cong \overline{CD}$

Prove: $\overline{AC} \cong \overline{BD}$

| <u>Statement</u> | <u>Reason</u> |
|--|---------------|
| 1. \overline{ABCD} | 1. Given |
| 2. $\overline{AB} \cong \overline{CD}$ | 2. Given |
| 3. $\overline{BC} \cong \overline{BC}$ | 3. _____ |
| 4. $\overline{AB} + \overline{BC} \cong \overline{CD} + \overline{BC}$ or $\overline{AC} \cong \overline{BD}$ | 4. _____ |



9. **Given:** $\angle KJM \cong \angle NJL$

Prove: $\angle KJL \cong \angle MJN$

Statement

Reason

1. $\angle KJM \cong \angle NJL$

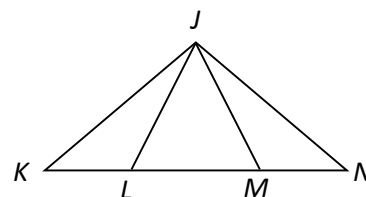
1. Given

2. $\angle LJM \cong \angle LJM$

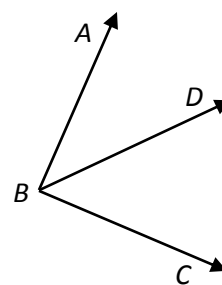
2. _____

3. $\angle KJL \cong \angle MJN$

3. _____



10. In the diagram at right, $\overrightarrow{AB} \perp \overrightarrow{BC}$, $m\angle ABD = 3x + 17$ and $m\angle CBD = 5x - 3$. Find the value of x .



11. What is the measure of the supplement of an angle that measures x degrees?