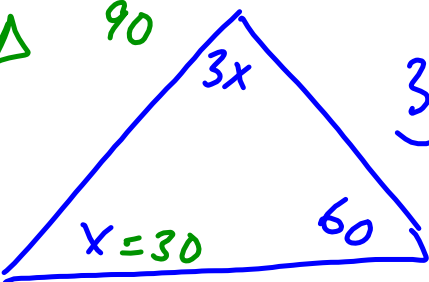


Warm -up

If the angles of a triangle are x , $3x$ and 60 . What type of triangle is it?

Right Δ 90


$$\begin{aligned} 3x + x + 60 &= 180 \\ 4x + 60 &= 180 \\ -60 & \quad -60 \\ \hline 4x &= 120 \\ \hline x &= 30 \end{aligned}$$

$x = 30$

Name _____

Geometry HW: Intro Geo Proofs – 4 Basic Postulates

For #1 - 4, name the postulate that justifies the conclusion.

1. Given: $\overline{FT} \cong \overline{RT}$, $\overline{AT} \cong \overline{AT}$
 Conclusion: $\overline{FT} \cong \overline{RT}$

Reason: Transitive

2. Given: (Diagram at right)
 Conclusion: $m\angle DBE = m\angle 4 + m\angle 2 + m\angle 5$

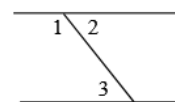
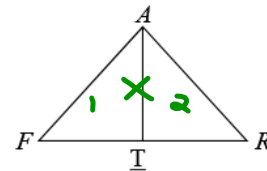
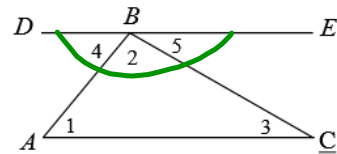
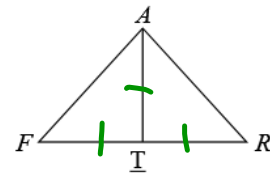
Reason: Partition

3. Given: (Diagram at right)
 Conclusion: $\overline{AT} \cong \overline{AT}$

Reason: Reflexive

4. Given: $m\angle 1 + m\angle 2 = 180^\circ$, $m\angle 2 = m\angle 3$ (Diagram at right)
 Conclusion: $m\angle 1 + m\angle 3 = 180$

Reason: Substitution

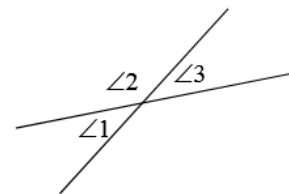


For the following, give a valid conclusion and a reason.

5. Given: $m\angle 2 + m\angle 3 = 180$; $m\angle 3 = m\angle 1$

Conclusion: $m\angle 1 + m\angle 2 = 180$

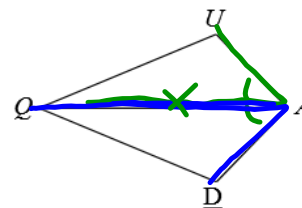
Reason: Substitution



6. Given: \overline{QA} bisects $\angle UAD$.

Conclusion: $\angle UAQ \cong \angle QAD$

Reason: A bisector cuts an \angle into 2 \cong \angle s



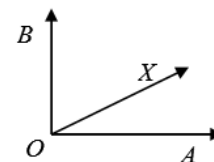
7. Given: $m\angle AOB = 90$.
 Statement: $m\angle AOB = m\angle AOX + m\angle XOB$

Conclusion: $90 = m\angle AOX + m\angle XOB$

Reason: Substitution

Conclusion: _____

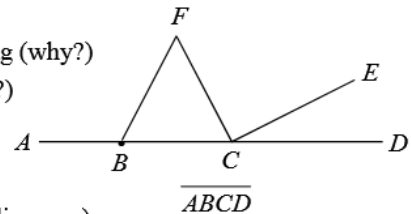
Reason: _____



You should already know the following from previous assignments but read it anyway.

If two line segments are added or subtracted, the result is another line segment. (See diagram below.)

- Ex: a. $\overline{AC} + \overline{CD} = \overline{AD}$ b. $\overline{AC} - \overline{AB} = \overline{BC}$
 c. $\overline{AB} + \overline{CD} = \text{nothing (why?)}$ d. $\overline{BC} - \overline{AB} = \text{nothing (why?)}$
 e. $\overline{AC} + \overline{BD} = \text{nothing (why?)}$ f. $\overline{BD} + \overline{AC} = \text{nothing (why?)}$
 g. $\overline{AC} + \overline{CE} = \text{nothing (why?)}$

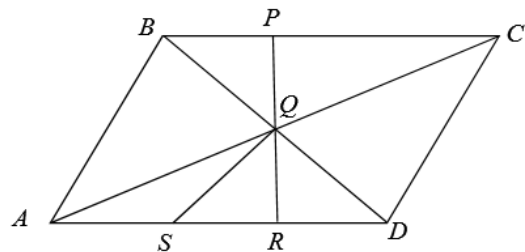


If two angles are added or subtracted, the result is another angle. (Same diagram.)

- Ex: a. $\angle FCE + \angle ECD = \angle FCD$ b. $\angle ABF + \angle DCF = \text{nothing (why?)}$
 c. $\angle BCE - \angle FCE = \angle BCF$ d. $\angle ABF - \angle FBC = \text{nothing (why?)}$

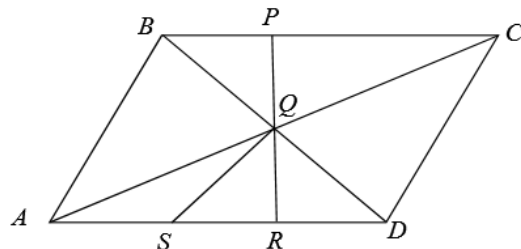
8. Use the diagram at right to answer the following:

- a. $\overline{BP} + \overline{PC} = \underline{\hspace{2cm}}$ b. $\overline{AS} + \overline{SD} = \underline{\hspace{2cm}}$
 c. $\overline{AS} + \overline{RD} = \underline{\hspace{2cm}}$ d. $\overline{AQ} + \overline{QD} = \underline{\hspace{2cm}}$
 e. $\overline{BD} - \overline{BQ} = \underline{\hspace{2cm}}$ f. $\overline{AD} - \overline{AS} = \underline{\hspace{2cm}}$
 g. $\overline{AD} - \overline{SR} = \underline{\hspace{2cm}}$ h. $\overline{AR} - \overline{RD} = \underline{\hspace{2cm}}$

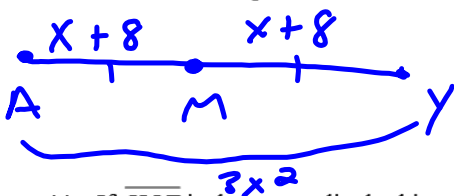


9. Use the same diagram to answer the following:

- a. $\angle ABD + \angle DBC = \underline{\hspace{2cm}}$
 b. $\angle AQR + \angle DQR = \underline{\hspace{2cm}}$
 c. $\angle RDQ + \angle RSQ = \underline{\hspace{2cm}}$
 d. $\angle BQC - \angle BQP = \underline{\hspace{2cm}}$
 e. $\angle CQS - \angle CQD = \underline{\hspace{2cm}}$
 f. $\angle DCQ - \angle PCQ = \underline{\hspace{2cm}}$



10. If M is the midpoint of \overline{AY} , $AM = x + 8$ and $AY = 3x^2$, find the numerical length of \overline{AY} .



$$x + 8 + x + 8 = 3x^2$$

$$2x + 16 = 3x^2$$

$$-2x - 16 = 3x^2$$

$$3x^2 - 2x - 16 = 0$$

11. If \overline{HOT} is the perpendicular bisector of \overline{DOG} , $HO = 2x + 1$, $OT = 3x - 2$, $DO = 4x - 5$, and $OG = 2x + 3$, find the numerical length of \overline{HOT} .

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.

** Two little parts*

Ex: If $a = b$

and $x = y$

then $a + x = b + y$

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

Ex: $2x + 3y = 9$

$x - 3y = 3$

$3x = 12$

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

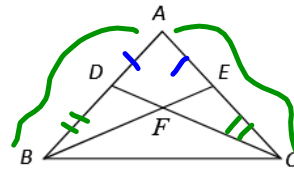
Ex: Given: $\overline{ADB}, \overline{AEC}$

$\overline{AD} \cong \overline{AE}, \overline{DB} \cong \overline{EC}$

conclusion: $\overline{AB} \cong \overline{AC}$

Reason: Addition

$\overline{AD} = \overline{AB} + \overline{BC} + \overline{CD}$



Note: For addition of line segments to make sense,

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

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

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

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

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

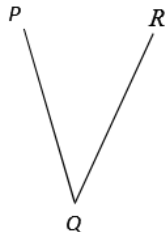
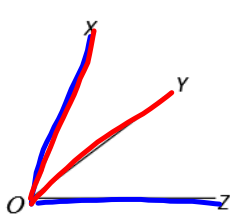
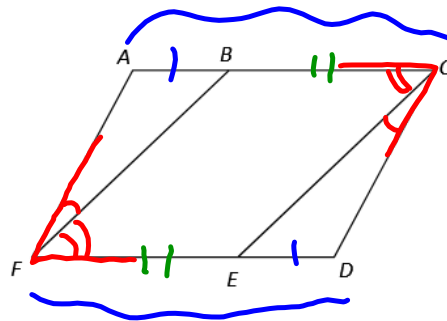
Conclusion: $\overline{AB} + \overline{BC} = \overline{FE} + \overline{ED}$

→ $\overline{AC} \cong \overline{FD}$
Reason: Addition

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

Conclusion: $\angle AFE \cong \angle BCD$ Reason: Addition

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

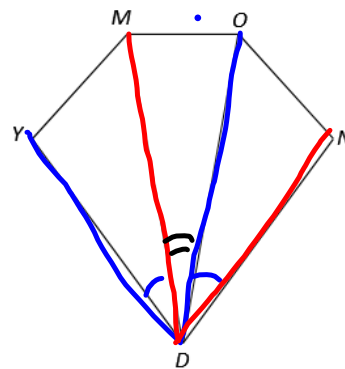


$\angle XOY + \angle YOZ = \angle XOZ$

$\angle XOZ + \angle XOY = \text{None sense}$

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

Statements	Reasons
1) $\angle YDM \cong \angle NDO$	1) Given
2) $\angle MDO \cong \angle MDO$	2) Reflexive
$\angle YDM + \angle MDO = \angle NDO + \angle MDO$	
3) $\angle YDO \cong \angle NDM$	3) Addition



* Too much info

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

Ex: If $a = b$

and $x = y$

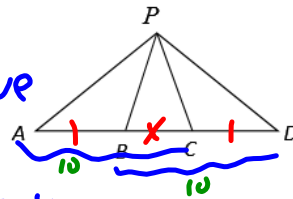
then $a - x = b - y$ S | R

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

Ex: $\overline{ABCD}, \overline{AC} \cong \overline{BD}$ 1) $\overline{AC} \cong \overline{BD}$ 1) Given

2) $\overline{BC} \cong \overline{BC}$ 2) Reflexive

3) $\overline{AB} \cong \overline{CD}$ 3) Subtraction

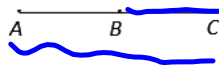


Note: For subtraction of line segments to make sense,

a) They must share an endpoint.

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

b) They must be collinear.



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

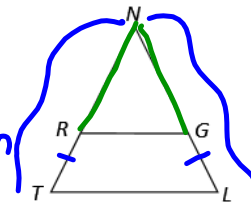
c) They must overlap.

S | R
 1) $\overline{NT} \cong \overline{NL}$ 1) Given

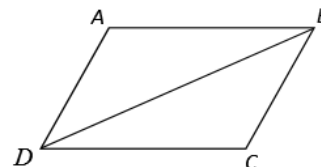
Ex: $\overline{NRT}, \overline{NGL}, \overline{NT} \cong \overline{NL}, \overline{RT} \cong \overline{GL}$

$$\overline{RT} \cong \overline{GL}$$

2) $\overline{NR} \cong \overline{NG}$ 2) Subtraction



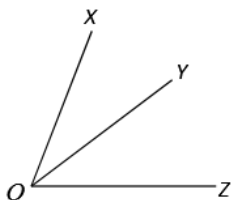
Ex: $\angle ABC \cong \angle ADC, \angle ABD \cong \angle CDB$



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

a) share a ray and

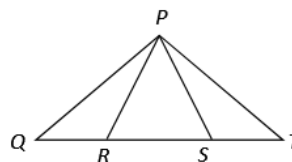
b) overlap



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

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

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



Name _____

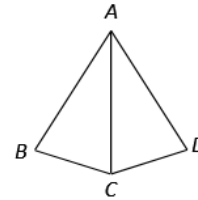
Geometry HW: Intro Geo Proofs – 5 Addition and Subtraction Postulate

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: _____

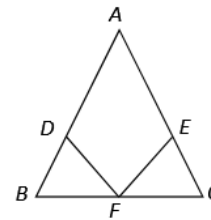
Reason: _____



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

Conclusion: _____

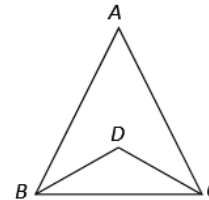
Reason: _____



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

Conclusion: _____

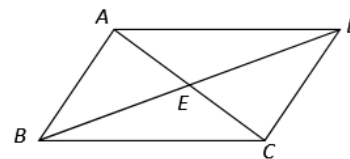
Reason: _____



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

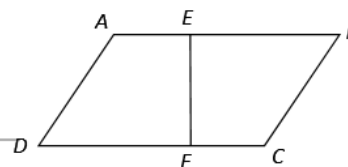
Conclusion: _____

Reason: _____



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

Conclusion: _____

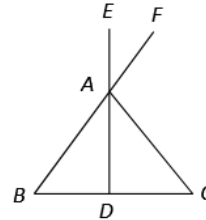


Reason: _____

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

Conclusion: _____

Reason: _____

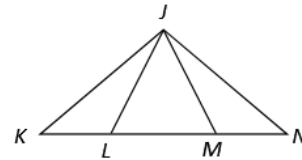


Problems #7 – 9 are simple “statement-reason” geometry proofs. For each one, fill in the missing reasons with appropriate postulates.

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

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

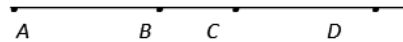
<u>Statement</u>	<u>Reason</u>
1. $m\angle KJL + m\angle LJM = 90$	1. Given
2. $m\angle KJL = m\angle MJN$	2. Given
3. $m\angle MJN + m\angle LJM = 90$	3. _____



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. $\angle KJM \cong \angle NJL$

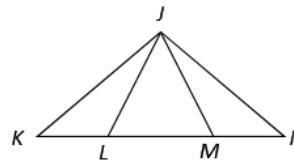
1. Given

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

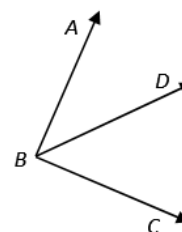
2. _____

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?