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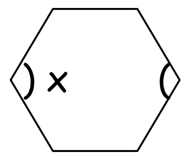
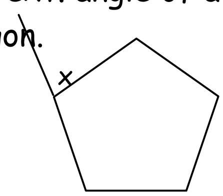
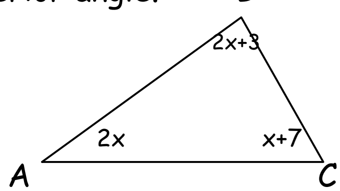
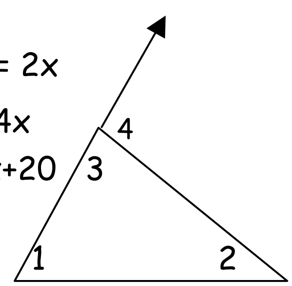
Geometry Journal: _Polygons and Congruent Triangles_

Post, Thm, or Defn	**Example/Drawing**	**Conclusion**
1. **Sum of the Interior ∠s of a Polygon = 180(n-2) where n = number of sides.**	**Find** the measure of each interior angle of a regular hexagon. 	180(n – 2) 180(6 – 2) = 720 (sum of six angles) $\frac{720}{6} = 120°$ for each angle
2. **Sum of the exterior angles** of a polygon = **360°**	**Find** the measure of one ext. angle of a regular pentagon. 	$\frac{360}{5} = 72°$ Relationship of one int. angle with its ext. angle ⇨ SUPPLEMENTARY!
3. Sum of the interior angles of a triangle – 180(n-2) = 180(3-2) = 180°	**Find** the measure of each interior angle. 	**∠A + ∠B + ∠C = 180°** 2x+3 + 2x + x+7 = 180 5x + 10 = 180 5x = 170 **x=34** so ∠A = 68 ∠B= 71 and ∠C = 41
4. Exterior angle of a triangle = **sum of remote interior angles.**	**Given**: m∠1 = 2x m∠2= 4x m∠4= 5x+20 	m∠4 = m∠1 + m∠2 2x+4x = 5x + 20 x = 20 m∠4 = 120°

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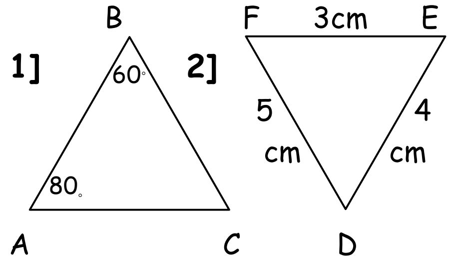
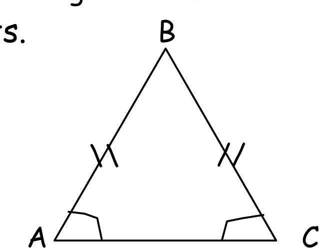
Post, Thm, or Defn	**Example/Drawing**	**Conclusion**
5. Largest/ smallest **angle** is opposite Longest/ shortest **side.**		**1]** m∠C = 40° **Draw arrow to opp sides** $\overline{BC} > \overline{AC} > \overline{AB}$ **2] draw arrows to opp. angles** ∠E > ∠F > ∠D
6. For a triangle to exist, the **sum of any 2 sides must be GREATER THAN the THIRD SIDE** {Add smallest two first}	**Can these side measures construct a triangle?** 1] 2, 3, 5 2] 4, 6, 7 3] 6, 4, 1	1] 2+3>5 NO 3+5>2 5+2>3 2] 4+6>7 6+7>4 Yes for all 7+4>6 3] 1+4>6 NO 4+6>1 6+1>4
7. **Range** of the measure of the third side (x) $\left\lvert\begin{matrix}\text{difference of 2}\\ \text{other sides}\end{matrix}\right\rvert < x < \left(\begin{matrix}\text{sum of}\\ \text{other 2 sides}\end{matrix}\right)$	If 2 sides of a Δ have measure 6cm and 4cm, can the third side measure: 1] 11cm 2] 10 cm 3] 2 cm 4] 5 cm	Inequality: 6-4 < x < 6+4 2 < x < 10 1] no (over) 2] no(on boundary) 3] no (on boundary) 4] yes (can be 5cm)
8. Isosceles Δ Thm. In a Δ, congruent sides are opp. congruent angles. Base angles of a isosceles Δ are ≅.	Given: isosceles Δ ABC with vertex angle B: name all ≅ parts. 	If $\overline{AB} \cong \overline{BC}$ then ∠A ≅ ∠C Converse: if ∠A ≅ ∠C then $\overline{AB} \cong \overline{BC}$.

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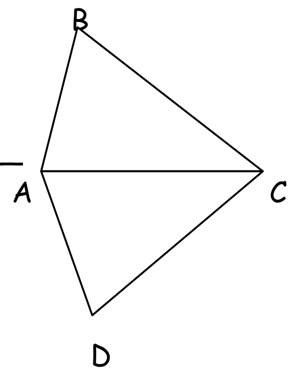
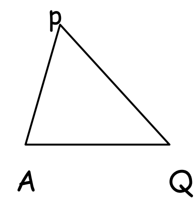
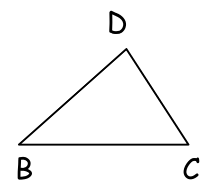
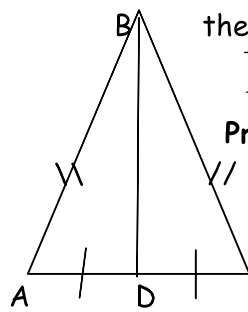
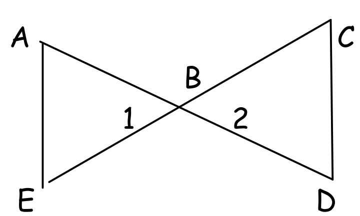
Post, Thm, or Defn	**Example/Drawing**	**Conclusion**
9. Reflexive Property **Sides are** ≅ to themselves **Angles are** ≅ to themselves	**For this diagram only** : ___ ≅ ___ 	$\overline{AC} \cong \overline{AC}$
10. Definition of congruent Triangles **(CPCTC) Corresponding parts of congruent triangles are congruent**	**Given:** $\Delta CDB \cong \Delta APQ$ 1] Name all ≅ parts 2] draw pictures with ≅ marks 3] Label vertices with correct letters.	**SIDES** $\overline{CD} \cong \overline{AP}$ $\overline{DB} \cong \overline{PQ}$ $\overline{CB} \cong \overline{AQ}$ **ANGLES** $\angle C \cong \angle A$ $\angle D \cong \angle P$ $\angle B \cong \angle Q$ 
11. SSS 2Δs 3 pairs of corr. sides are ≅, then the Δs are ≅	**Given:** $\overline{AB} \cong \overline{BC}$ and D is the midpoint of $\overline{AC}$. **Prove:** Δ ABD ≅ ΔCBD 	**plan** **Statements** **reason** S $\overline{AB} \cong \overline{BC}$ given S $\overline{AD} \cong \overline{DC}$ def. Midpt S $\overline{BD} \cong \overline{DB}$ reflex. Δ ABD ≅ ΔCBD SSS
12. SAS **2Δs** { 2 pair corr. sides ≅ 1 pr included angles ≅ } **{included** = between the two ≅ sides}	**Given** : B is the midpt of $\overline{AD}$ and $\overline{CE}$ **Prove** Δ ABE ≅ ΔDBC	**plan** **statements** **reason** B is the midpt of $\overline{AD}$ and $\overline{CE}$ given S $\overline{AB} \cong \overline{BD}$ def mdpt A ∠1 ≅ ∠2 vert.∠s S $\overline{EB} \cong \overline{BC}$ def mdpt Δ ABE ≅ ΔDBC SAS

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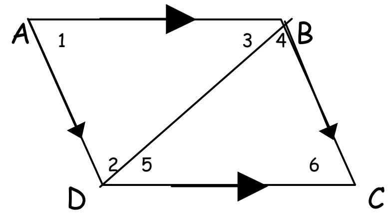
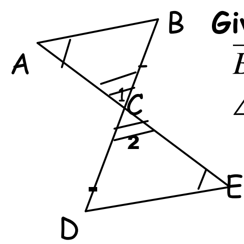
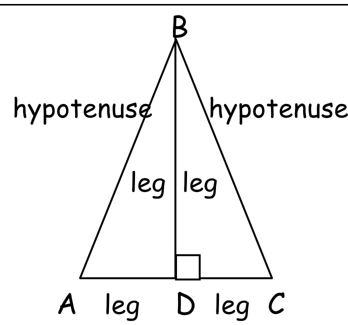
Post, Thm, or Defn	**Example/Drawing**	**Conclusion**
13 ASA in **2Δs** { 2 pair corr. ∠s ≅ 1 pr included sides ≅ } **Then the Δs are ≅.**	Given: $\overline{AB}//\overline{DC},\overline{BC}//\overline{AD}$ Prove: ΔABD ≅ Δ CDB	**plan** **statement** **reason** $\overline{AB}//\overline{DC},\overline{BC}//\overline{AD}$ Given A ∠2 ≅ ∠4 // lines AI S $\overline{DB}\cong\overline{DB}$ reflexive prop A ∠3 ≅ ∠5 // lines AI ** ΔABD ≅ Δ CDB ASA
14 AAS in **2Δs** { 2 pair corr. ∠s ≅ 1 pr non- included sides ≅ } **Then the Δs are ≅.** {non- included = not between}	**Given:** $\overline{BC}\cong\overline{DC}$ ∠A ≅ ∠E **Prove:** ΔABC ≅ Δ _____	**plan** **statements** **reason** A ∠A ≅ ∠E **given** A ∠**1** ≅ ∠2 vert. ∠s S BC ≅ DC given ** ΔABC ≅ ΔEDC AAS
15 HL In 2 rt. Δ, { 1 pr. Hypotenuses ≅ 1 pr. Of Legs are ≅ }	Given: ∠ADB & ∠CDB are rt. ∠s and $\overline{AB}\cong\overline{BC}$ Prove: ΔABD ≅ ΔCBD	**plan** **statements** **reason** rt. Δs ∠ADB & ∠CDB are rt. ∠s given H $\overline{AB}\cong\overline{BC}$ given L $\overline{BD}\cong\overline{BD}$ reflex. prop. ΔABD ≅ ΔCBD HL