Geometry (H)
Section 3.4 – Notes

Name: KEY

(1) A **triangle** is the figure formed by 3 segments joining 3 noncollinear points.

(2) A triangle can be classified by its side lengths or angle measures.

(3) The **side classifications** are: scalene, isosceles, equilateral

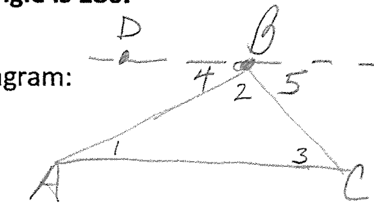
(4) The **angle classifications** are: acute, obtuse, right, equiangular

(5) **Thm: The sum of the measures of the angles of a triangle is 180.**

Given: $\triangle ABC$

Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180$

Diagram:



auxiliary

(1) Thru B, draw $\overline{BD}$ such that $\overline{BD} \parallel \overline{AC}$. $\rightarrow$ (2) $\angle 1 \cong \angle 4$ $\rightarrow$ (3) $m\angle 1 = m\angle 4$

(4) $m\angle DBC + m\angle 5 = 180$, $m\angle DBC = m\angle 2 + m\angle 4$ $\rightarrow$ (5) $m\angle 2 + m\angle 4 + m\angle 5 = 180$

(6) $m\angle 1 + m\angle 2 + m\angle 5 = 180$

(7) $\angle 3 \cong \angle 5$ $\rightarrow$ (8) $m\angle 3 = m\angle 5$

$\rightarrow$ (9) $m\angle 1 + m\angle 2 + m\angle 3 = 180$

(1) Thru a pt outside a line, there is exactly 1 line $\parallel$ to the given line

(2) 2 $\parallel$ lines & trans. $\rightarrow$ alt. int. $\angle$s $\cong$

(3) Def of $\cong$ $\angle$s

(4) Angle Addition Postulate

(5) Substitution Prop

(6) Substitution Prop

(7) 2 $\parallel$ lines & trans $\rightarrow$ alt. int $\angle$s $\cong$

(8) Def of $\cong$ $\angle$s

(9) Substitution Prop

⑥ A corollary is <u>an offshoot from a theorem; statement that can easily be proved by applying a theorem.</u>

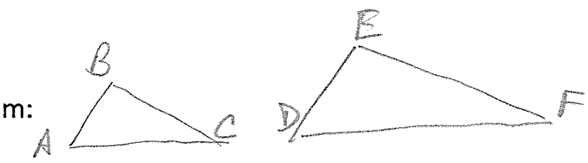
⑦ **Corollary: If 2 angles of one triangle are congruent to 2 angles of another triangle, then the 3rd angles are congruent.**

$\triangle ABC$, $\triangle DEF$

Given: $\measuredangle A \cong \measuredangle D$, $\measuredangle B \cong \measuredangle E$

Prove: $\measuredangle C \cong \measuredangle F$

Diagram:



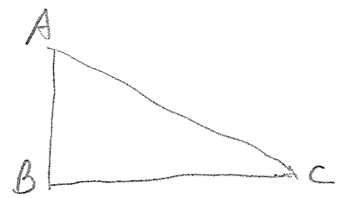
⑧ **Corollary: The acute angles of a right triangle are complementary.**

$\triangle ABC$

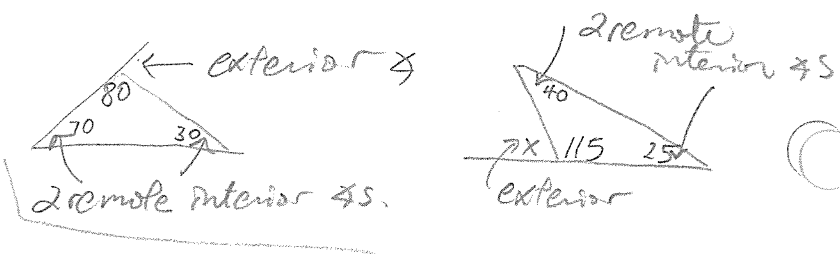
Given: $\overline{AB} \perp \overline{BC}$

Prove: $\measuredangle A$ complements $\measuredangle C$

Diagram:



⑨ **<u>Exterior angles and remote interior angles</u>:**



exterior ∡ – formed by extending one side of a $\triangle$

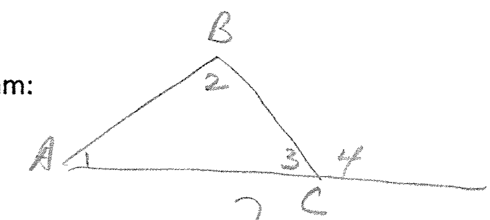
remote interior ∡s – the 2 ∡s inside the $\triangle$ <u>not</u> adjacent to the exterior ∡s.

⑩ **<u>Exterior Angle Thm</u>: The measure of an exterior angle is a triangle equals the sum of the measures of the remote interior angles.**

Given: $\triangle ABC$

Prove: $m\measuredangle 4 = m\measuredangle 1 + m\measuredangle 2$

Diagram:



① $m\measuredangle 1 + m\measuredangle 2 + m\measuredangle 3 = 180$

② $\measuredangle 3, \measuredangle 4$ linear pair → ③ $\measuredangle 3$ supp $\measuredangle 4$ → ④ $m\measuredangle 3 + m\measuredangle 4 = 180$

⑤ $m\measuredangle 1 + m\measuredangle 2 + m\measuredangle 3 = m\measuredangle 3 + m\measuredangle 4$ → ⑥ $m\measuredangle 1 + m\measuredangle 2 = m\measuredangle 4$

① Sum of meas. of ∡s of $\triangle = 180$
② Def linear pair
③ linear pair postulate
④ Def supplem. ∡s.
⑤ Substitution
⑥ Subtraction property of equality