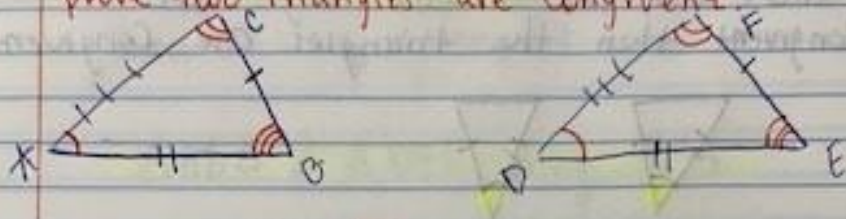
Semester 2 Notes: Week 5 – Week 10 (02/08/21 – 03/12/21)

Table of Contents: (Ch. 6 notes)

Lesson One:

Proving Triangles Congruent

• I can use congruence theorems to prove two triangles are congruent.

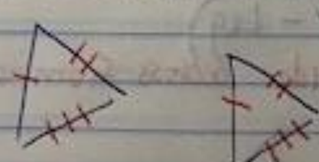


$\triangle ABC \cong \triangle DEF$

Corresponding Sides:	Corresponding Angles:
$\overline{AB} \cong \overline{DE}$	$\angle A \cong \angle D$
$\overline{AC} \cong \overline{DF}$	$\angle C \cong \angle F$
$\overline{CB} \cong \overline{FE}$	$\angle B \cong \angle E$

Methods to Prove Triangles Congruent

① SSS (Side-Side-Side): If three sides of a triangle are congruent to three sides of another triangle, the the $\triangle$'s $\cong$



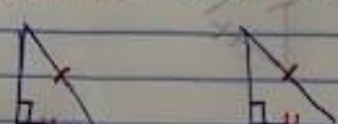
② SAS (Side-Angle-Side): If two sides and the included angle are congruent then the triangles are congruent.

③ ASA (Angle-Side-Angle): If two angles and the included side are congruent then the triangles are congruent.

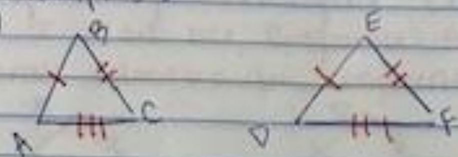
④ AAS (Angle-Angle-Side): If two angles and the non-included side are congruent, then the triangles are congruent.

⑤ HL (Hypotenuse-Leg)

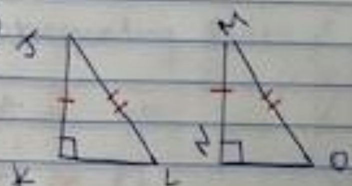
* Hypotenuse: side across from a right angle *



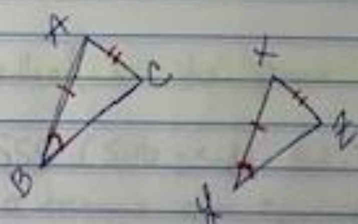
Examples:

1. 

$\triangle ABC \cong \triangle DEF$ using SSS

2. 

$\triangle JKL \cong \triangle MNO$ using H-L

3. 

$\triangle ABC \ncong \triangle XYZ$

Lesson Two

Triangle Congruence Part 2

- I can prove triangle congruence using one of the five congruence postulates.

Methods for Proving Triangle Congruence

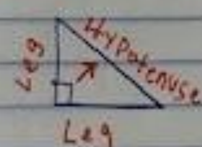
* Can work for any triangle, including right Δ's.

1. SSS
2. SAS
3. ASA
4. AAS

S = side
A = Angle

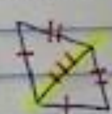
* Can ONLY work for a Right triangle

1. HL



Triangles with a shared side

* The shared side is congruent.



Perpendicular lines form two right angles

Vertical Angles are congruent

Triangle Rules

Key words to look for.

Isosceles: label the missing angles the same using the variable x. Then, add all angles together to equal $180°$.

Equilateral: Every angle $= 60°$
Set your missing angle equal to $60°$.

Lesson Three

Triangles and Angles

- I can use what I know about triangles and angles to determine if two triangles are congruent using one of five congruence postulates.

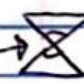
* Congruence Postulates *

- SSS, SAS, ASA, AAS, and HL

Triangles:

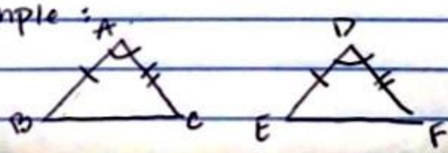
- All 3 angles in a triangle add up to 180 degrees.
- Equilateral triangle = All 3 angles are congruent and all 3 sides are ≅.
- Isosceles triangle = Only 2 sides are congruent.
- Perpendicular lines form 2 right angles.

Angles:

- Vertical angles are congruent → 
- The measure of a straight angle is exactly 180°.

CPCTC: Corresponding Parts of Congruent Triangles are Congruent.

Example:



* If $\triangle ABC$ is congruent to $\triangle DEF$, then $\angle B \cong \angle E$, $\angle C \cong \angle F$, $\overline{BC} \cong \overline{EF}$

Lesson Four

Interior Angles of a Triangle.

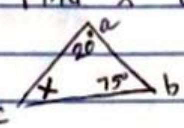
- I can use the interior angle theorem to help me find missing angle measures within a triangle.

Interior Angle Theorem: All 3 angles within a triangle add up to 180°.

Knowing this information, we can find missing angle measures.

Examples:

① Find x when $\angle a = 20°$ and $\angle b = 75°$.



step 1: set up the problem.

$\angle a + \angle b + \angle c = 180°$

step 2: plug in our info

$20° + 75° + x = 180°$

* show all work *

step 3: combine like terms

$95° + x = 180°$

step 4: Solve for x

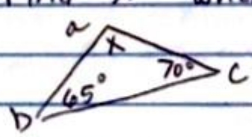
$95° + x = 180$

$-95 \quad\quad -95$

$\boxed{x = 85}$

② Try on your own:

Find x when $\angle b = 65°$ and $\angle c = 70°$



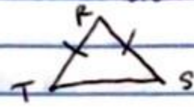
Isosceles Triangles

- I can use the Isosceles Triangle theorem to find missing angle measures.

What is an Isosceles triangle?
- A triangle with 2 Congruent sides.

★ Isosceles Triangle Theorem: If two sides of a triangle are congruent, the angles opposite the sides are congruent.

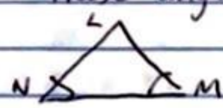
Example:



If $\overline{RT} \cong RS$ then $\angle T \cong \angle S$

★ Converse of Isosceles Triangle Theorem: If two angles are congruent then the sides opposite those angles are congruent.

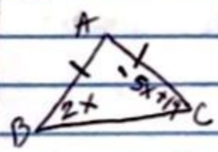
Example:



If $\angle N \cong \angle M$ then $\overline{LN} \cong LM$

Practice: (Remember all 3 angles add up to 180°)

① Find x



$m\angle B = 2x$

$m\angle C = 5x+14$

Since $\overline{AB} \cong AC$ then,

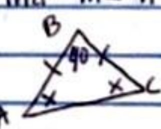
$\angle B \cong \angle C$

$2x = 5x+14$

$+5x \quad +5x$

$\frac{7x}{7} = \frac{14}{7}$ $\boxed{x=2}$

② Find $m\angle A$



$x + x + 40 = 180$

$2x + 40 = 180$

$-40 \quad -40$

$\frac{2x}{2} = \frac{140}{2}$

$x = 70$

- Since $\overline{AB} \cong \overline{BC}$, $\angle A \cong \angle C$ so lets replace with x.
- we also know that all angles add up to 180°.

Lesson Six

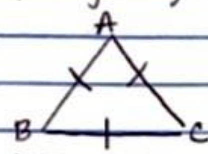
Equillateral Triangles Notes

- I can use the Equilateral and Equiangular triangle corollary's to help me find missing angle measures.

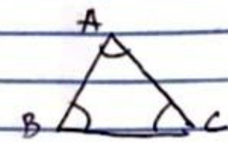
Equilateral Triangle Corollary: If a triangle is equilateral (all 3 sides are congruent), then it is equiangular (all 3 angles are congruent).

Equiangular Triangle corollary: If a triangle is equiangular, then it is equilateral

Example =



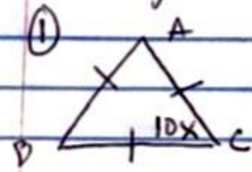
If $\overline{AB} \cong \overline{BC} \cong \overline{CA}$
then $\angle A \cong \angle B \cong \angle C$



If $\angle A \cong \angle B \cong \angle C$
then $\overline{AB} \cong \overline{BC} \cong \overline{AC}$

Practice: (Remember that the measure of each angle in an equilateral/equiangular triangle is $60°$).

(1)



Find x if $\angle C = 10x$

$60° = 10x$

$\frac{60°}{10} = \frac{10x}{10}$

$\boxed{6 = x}$

* Equilateral means $\angle A, \angle B, \angle C$ all $= 60°$ *