Unit 5 OVERVIEW NOTES

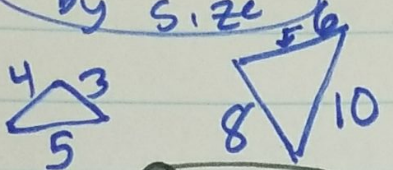
# Similar Triangles

~ $\Delta$s

(ALSO CONGRUENT ($\cong$) $\Delta$s)

## I. Matching $\Delta$ Parts

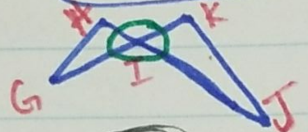
by size




| | | | |
|---|---|---|---|
| SMALLS: | 3 & 6 | | Matching parts |
| mediums: | 4 & 8 | | |
| Larges: | 5 & 10 | | |

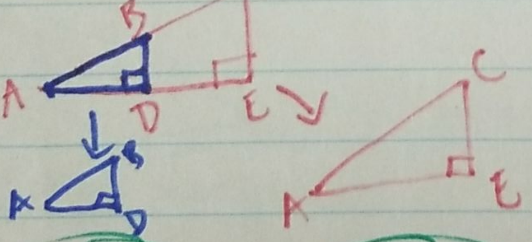
SAME $\Delta$

VISUALLY




| sides | angles |
|---|---|
| GI & JI | ∴ G & J |
| GH & JK | ∴ I & I |
| IH & IK | ∴ H & K |

ex/



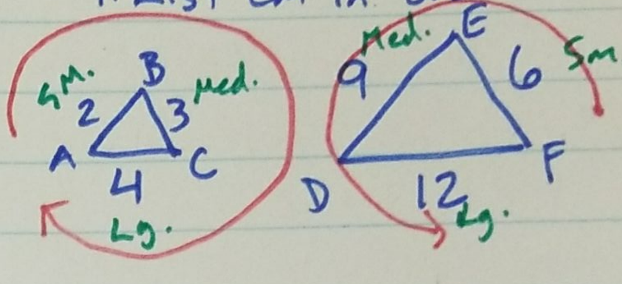

| Sides | Angles |
|---|---|
| AB & AC | ∴ A & A |
| BD & CE | ∴ D & E |
| AD & AE | ∴ B & C |

## II. Solving Matching Parts For ~ :

(A) Angle = MATCHING ANGLE

(B) * SIDES NEED FRACTIONS

1. List 'em in order




$\Delta ABC$ $\quad \Delta FED$

AB & FE $\quad \frac{AB}{BC} = \frac{FE}{ED}$

BC & ED $\quad \frac{BC}{AC} = \frac{ED}{FD}$

AC & FD $\quad \frac{AB}{AC} = \frac{FE}{FD}$

ex/ $\Delta LMN \sim \Delta PQR$, $LM = 6$, $MN = 8$, $QR = x$, & $PQ = 15$. $QR$: ?

List sides

$\frac{LM^*}{MN^*} = \frac{PQ^*}{QR^?}$

What do I have/want?

~~LN PR~~

$\frac{6}{8} = \frac{15}{x}$

$6x = 8 \cdot 15$

$6x = 120$

$x = 20$ So... $\boxed{QR = 20}$

ex/ $\Delta LMN \sim \Delta PQR$, $m\angle L = 10°$, $m\angle M = \boxed{100}$, $m\angle N = 70°$, $m\angle Q = ?$

L & P
M & Q?
N & R

$m\angle M = m\angle Q$

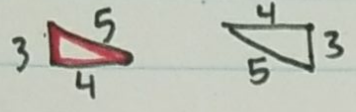
$100° = m\angle Q$

$\boxed{m\angle Q = 100°}$

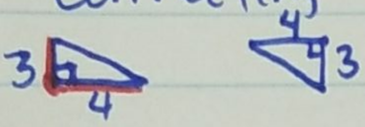
## III. Δ Properties

* ABOUT SETS of matching parts (one part on each Δ) *

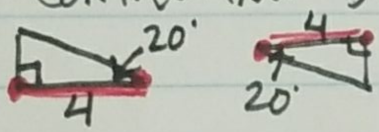
A. SSS → all sides match



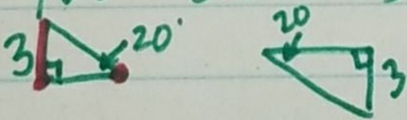

B. SAS → 2 sides & their connecting angle

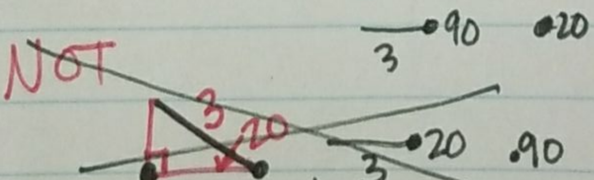



C. ASA → 2 angles & their CONNECTING side



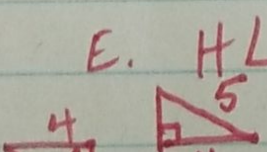

D. AAS → 2 angles & a side NOT connecting them




ORDER MATTERS!!

E. HL → hypotenuse & leg *Right Δs only*




$\boxed{\text{Those are } \cong \text{ props}}$

$\boxed{\text{These are } \sim \text{ props}}$ similarity

keep: SSS & SAS

lose: ~~ASA, AAS & HL~~

ADD: AA
↳ 2 angles

* ONLY OTHER CHANGE: SIDES (ONLY SIDES) ARE NOW IN FRACTIONS *

## IV. Scale Factor

$$\frac{\text{side on NEW } \Delta}{\text{matching side on OLD } \Delta}$$

ex/ $\Delta ABC \sim \Delta DEF$

AB / DE
BC / EF
AC / DF

only need 1 set

$\frac{AB}{BC} = \frac{DE}{EF}$

* Diagonal switch for scale *

$\frac{AB}{DE} = \frac{BC}{EF}$

* ALWAYS Δ NEW ~ Δ OLD *

Scale: $\frac{NEW}{OLD} = \frac{\Delta NEW}{\Delta OLD} = \frac{NE}{OL}$

$= \frac{EW}{LD}$

$= \frac{NW}{OD}$

→ A is old A' is new

$\boxed{\text{prime ' means new}}$

Scale: $\frac{\text{New}}{\text{old}} = \frac{A'}{A}$

ex/ $D' = (4,1)$ $D = (16,4)$

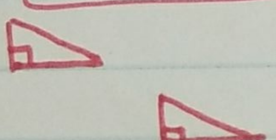
$\text{Scale} = \frac{D'}{D} = \frac{4}{16} \;\&\; \frac{1}{4}$

$= \frac{1}{4} \;\&\; \frac{1}{4}$

## V. Transformations

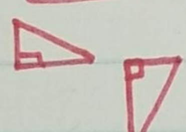
Translation

$\boxed{\text{Moves as is}}$



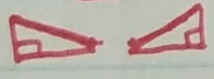
Rotation

$\boxed{\text{turns}}$



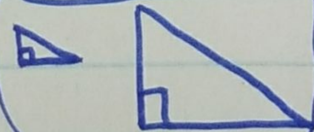
Reflection

$\boxed{\text{flips}}$



Dilations

$\boxed{\text{changes size}}$



## VI. CPCTC

A. If the $\Delta$s are the same ($\cong$), then all the parts are the same.

ex/ $\Delta ABC \cong \Delta EFD$ Given

$\overline{AC} \cong \overline{ED}$ CPCTC

B. CPCTC is the opposite of SSS, SAS, ASA, AAS & HL.

In a proof, order is EVERYTHING

$\Delta ABC \cong \Delta DEF$ ← given info

$\overline{AB} \cong \overline{DE}$ CPCTC

$\overline{BC} \cong \overline{EF}$ CPCTC

$\overline{AC} \cong \overline{DF}$ CPCTC

BUT, if the proof is written the other way...

(S) $\overline{AB} \cong \overline{DE}$

(S) $\overline{BC} \cong \overline{EF}$ ← given info

(S) $\overline{AC} \cong \overline{DF}$

$\Delta ABC \cong \Delta DEF$ SSS