Triangle Similarity 7.3 Notes

Name Key

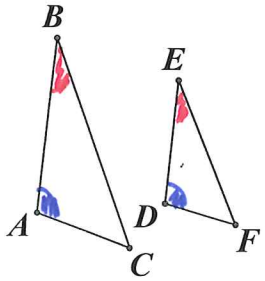
Third Angle Theorem:

If two angles of a triangle are congruent to two angles in a second triangle, then both triangles will have congruent 3rd angles as well.

Proof:

Given: <A≅<D and <B≅<E

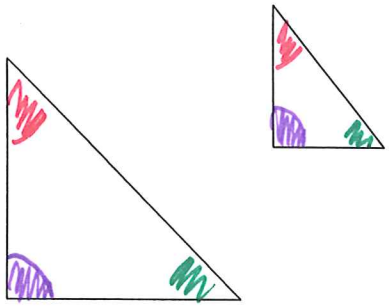
Prove: <C≅<F



1. $\angle A \cong \angle D$, $\angle B \cong \angle E$	1. given
2. $\angle A+\angle B+\angle C=180$, $\angle D+\angle E+\angle F=180$	2. Δ sum
3.) $\angle A+\angle B+\angle C=\angle D+\angle E+\angle F$	3. Substitution
4.) $\angle A+\angle B+\angle C=\angle A+\angle B+\angle F$ ($-\angle A$ $-\angle B$)	4. Substitution
5. $\angle C \cong \angle F$	5. Subtraction

AA Similarity

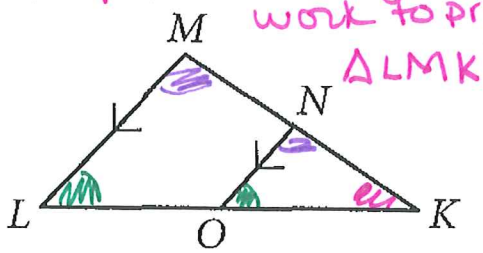
If the two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.



Remember in Δs Angles are the figures that Preserve shape not size.

Determine whether the following pairs of triangles are similar. Justify your answer.

Any 2 pair of justifications work to prove ΔLMK ~ ΔONK



$\angle L \cong \angle NOK$

$\angle M \cong \angle KNO$

$\angle K \cong \angle k$

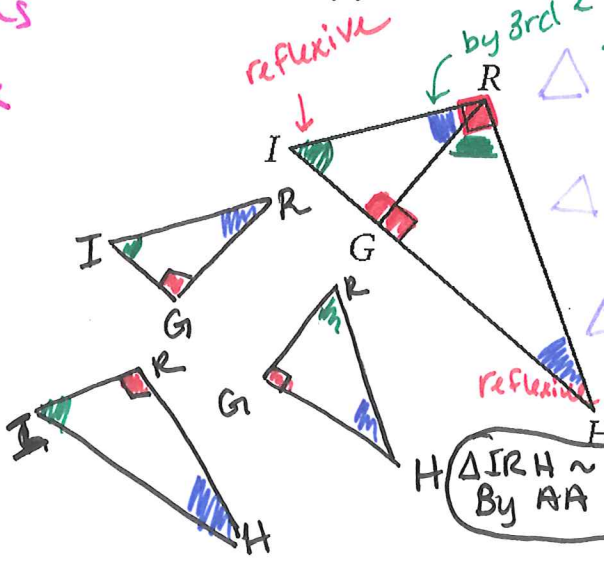
~~transitive~~ corresponding ∠s are ≅

Corresp. ∠s are ≅

reflexive

reflexive

by 3rd ∠ thm.



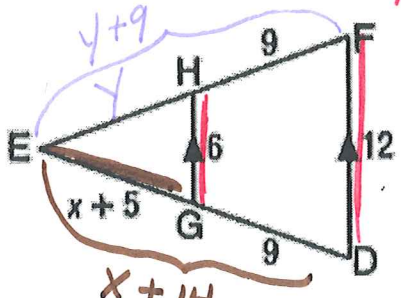
ΔIRH ~ ΔIGR ~ ΔRGH

ΔIRH ~ ΔIGR ~ ΔRGH By AA similarity

Practice Examples

Identify the Similar triangles, how you know they are similar, find the variable(s) and the measures of the indicated sides. must use full Δ sides

1. $\overline{EH}$ and $\overline{EF}$ ΔEGH ~ ΔEDF AA Similarity



$\frac{EG}{ED} = \frac{HG}{FD}$ $\quad 12(x+5) = 6(x+14)$

$\frac{x+5}{x+14} = \frac{6}{12}$ $\quad 12x+60 = 6x+84$

$6x = 24$

$\boxed{x = 4}$

$\frac{EH}{EF} = \frac{HG}{FD}$ $\quad \frac{y}{y+9} = \frac{6}{12}$ $\quad 12y = 6(y+9)$

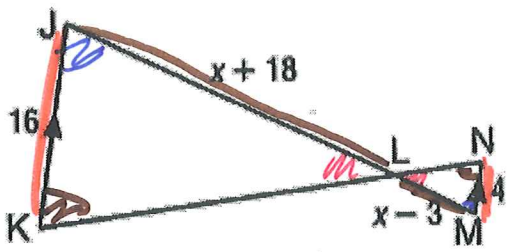
$12y = 6y + 54$

$6y = 54$

$\boxed{y = 9} \Rightarrow \boxed{EH = 9}$

$\boxed{EF = 18}$

2. $\overline{JL}$ and $\overline{LM}$ ΔJKL ~ ΔMNL AA Sim



$\frac{JL}{LM} = \frac{JK}{MN}$ $\quad \frac{x+18}{x-3} = \frac{16}{4}$

$4(x+18) = 16(x-3)$

$4x+72 = 16x-48$

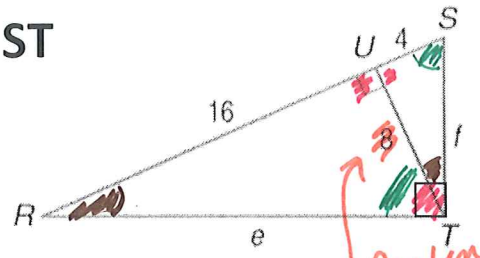
$120 = 12x$

$\boxed{10 = x}$

$\boxed{JL = 28}$

$\boxed{LM = 7}$

3. ST



Pretend 8 isn't there!

Medium/Big $\frac{RT}{RS} = \frac{RU}{RT}$ Medium/Big

$\frac{e}{20} = \frac{16}{e}$

$\sqrt{e^2} = \sqrt{320}$

$\sqrt{64}\sqrt{5}$

$\boxed{e = 8\sqrt{5}}$

little/Big $\frac{ST}{RS} = \frac{SU}{ST}$

$\frac{f}{20} = \frac{4}{f}$

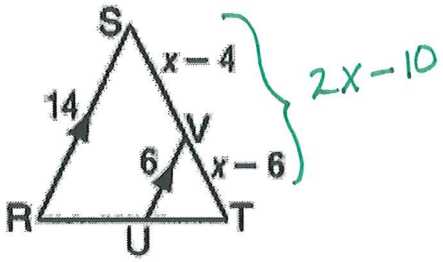
$f^2 = 80$

$\boxed{f = 4\sqrt{5}}$

$\boxed{ST = 4\sqrt{5}}$

ΔRST ~ ΔTSU ~ ΔRTU AA Similarity

4. $\overline{VT}$ and $\overline{ST}$



$\frac{VT}{ST} = \frac{UV}{SR}$

$\frac{x-6}{2x-10} = \frac{6}{14}$

$14(x-6) = 6(2x-10)$

$14x-84 = 12x-60$

$2x = 24$

$\boxed{x = 12}$

$\boxed{VT = 6}$

$\boxed{ST = 14}$

ΔTVU ~ ΔTSR AA Sim