Triangle Congruence & Similarity

eq ≅ shape size same ~ shape

I. Congruence vs. Similarity

A. Congruent means
same in both size (equal) & shape (similar)

Sides are equal Angles are equal

B. Similar means
same in shape (Dilation by scale factor)

Sides are PROPORTIONAL (equal fractions) Angles are equal

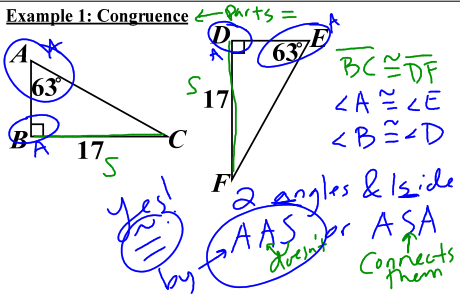
II. How to know triangles are...

Congruent	Similar
At least 3 parts that are equal	* All 3 sides are proportional
All 3 sides are the same	OR
OR	* 2 sides & 1 angle (proportional) (equal)
2 sides and 1 angle	
OR	
2 angles and 1 side	* ANY 2 angles are equal
SSA & AAA don't work!	

III. How to prove triangles are...

Congruent	Similar
SSS - All 3 sides are the same	SSS - All 3 sides are proportional
SAS - 2 sides and 1 connecting angle are the same	SAS - 2 proportional sides and 1 connecting equal angle
ASA - 2 angles and 1 connecting side are the same	AA - any 2 angles are the same
AAS - 2 angles and 1 non-connecting side are the same	
HL - 2 sides and 1 non-connecting RIGHT angle are the same	(SSA w/ a right angle)

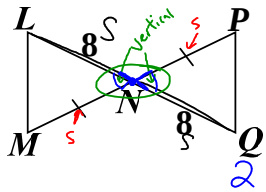
Example 1: Congruence ← parts =



$\overline{BC} \cong \overline{DF}$
$\angle A \cong \angle E$
$\angle B \cong \angle D$

yes! by AAS (2 angles & 1 side that doesn't connect them) or ASA (connects them)

Example 2: Congruence



vertical

$\overline{LN} \cong \overline{QN}$
$\overline{MN} \cong \overline{PN}$
$\angle LNM \cong \angle QNP$

2 sides & 1 angle
SSA or (SAS)
yes

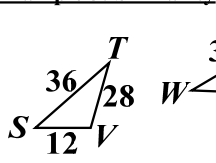
IV. Similar - How to find the scale factor:

A. Create proportions for the sides

	Small Side1	Medium1	Large1
from same Δ →	Small Side2	Medium2	Large2
from same Δ →			

B. If they are similar, all of the fractions will be equal (the sides are proportional).
That fraction is the scale factor.

Example 3: Similarity

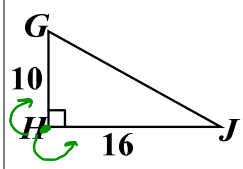


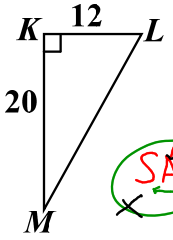
Looks Like:
3 labeled side pairs
∅ Angles
maybe SSS
So... check

	Sm	Md	Lg
△1	12÷3	28÷7	36÷9
△2	15÷3	35÷7	45÷9
	4/5 =	4/5 =	4/5

~ by SSS

Example 4: Similarity



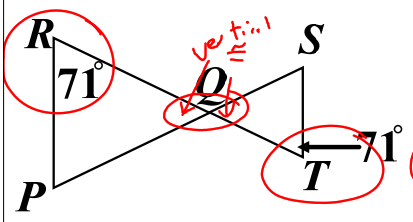


Looks Like
1 angle
2 sides
SAS or SSA
(right ~ only)

	Smaller	larger
△1	10÷2	16÷4
△2	12÷2	20÷4
	5/6 ≠	4/5

Not ~

Example 5: Similarity



∅ sides
2 angle pairs
~ by AA