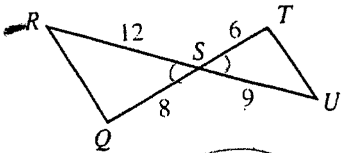
Ex 1: Can the two triangles show be proven similar? If so, write a similarity statement and tell which postulate or theorem you would use.

a.



$\frac{8}{12} \overset{?}{=} \frac{6}{9}$

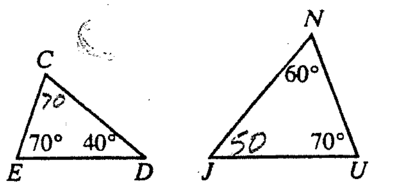
$\frac{2}{3} \overset{\checkmark}{=} \frac{2}{3}$

Yes

$\triangle QRS \sim \triangle TUS$

SAS Similarity

b.



NO

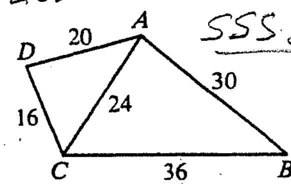
cannot be shown

c.

Yes,

$\triangle CDA \sim \triangle CAB$

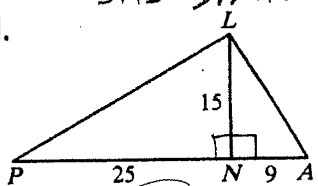
SSS Similarity



$\frac{16}{24} = \frac{20}{30} = \frac{24}{36}$

$\frac{2}{3} \overset{\checkmark}{=} \frac{2}{3} \overset{\checkmark}{=} \frac{2}{3}$

d.



$\frac{15}{9} \overset{?}{=} \frac{25}{15}$

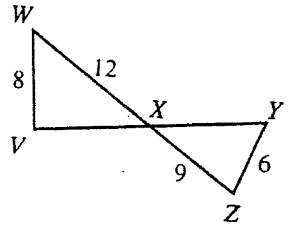
$\frac{5}{3} \overset{\checkmark}{=} \frac{5}{3}$

Yes

$\triangle PNL \sim \triangle LNA$

SAS Similarity

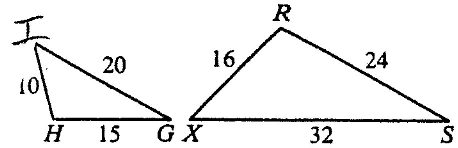
e.



NO,

cannot be proven

f.



$\frac{10}{16} = \frac{20}{32} = \frac{15}{24}$

$\frac{5}{8} = \frac{5}{8} = \frac{5}{8}$ ✓

Yes, $\triangle GHI \sim$ [illegible]

SSS Similarity

Ex 2: Prove the following.

If two triangles are similar, then the lengths of the medians are in the same ratio as the lengths of the corresponding sides.

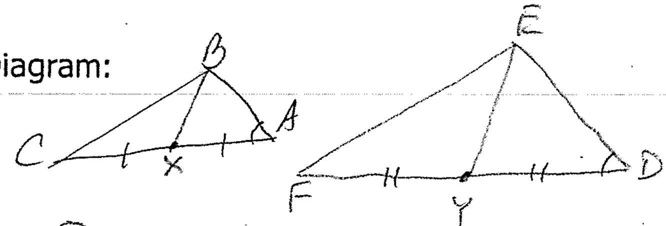
Given: $\triangle ABC \sim \triangle DEF$

$\overline{BX}$ median to $\overline{AC}$

$\overline{EY}$ median to $\overline{DF}$

Prove: $\frac{BX}{EY} = \frac{AB}{DE}$

Diagram:



① $\triangle ABC \sim \triangle DEF$ → ② $\frac{AB}{DE} = \frac{AC}{DF}$

③ $\overline{BX}$ median → ④ X midpt → ⑤ $AX = \frac{1}{2}AC$ → ⑥ $2AX = AC$

$\overline{EY}$ median → Y midpt → $DY = \frac{1}{2}DF$ → $2DY = DF$

→ ⑦ $\frac{AB}{DE} = \frac{2AX}{2DY}$ → ⑧ $\frac{AB}{DE} = \frac{AX}{DY}$

Simplification

⑨ $\angle A \cong \angle D$

⑩ $\triangle ABX \sim \triangle DEY$ → ⑪ $\frac{BX}{EY} = \frac{AB}{DE}$

① Given

② ~Δs → corresp. sides proportional

③ Given

④ def. of median

⑤ Midpt Theorem

⑥ Multiplication prop.

⑦ Substitution

⑧ Simplification

⑨ ~Δs → ∡s ≅

⑩ Def of ~Δs

⑪ ~Δs → corresp. sides proportional

$\frac{1}{2}(5) \div 5$

$\frac{1}{2}(5) \times \frac{1}{5}$

Ex 3: Prove the Midsegment Theorem.

The segment that joins the midpoints of two sides of a triangle is:

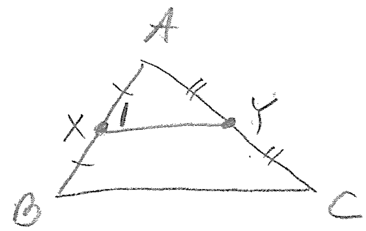
a. parallel to the 3rd side

b. half as long as the third side

Given: X midpt of $\overline{AB}$

Y midpt of $\overline{AC}$

Diagram:



Prove: $\overline{XY} \parallel \overline{BC}$

$XY = \frac{1}{2}BC$

① X midpt → ② $AX = \frac{1}{2}AB$ → ③ $2AX = AB$

Y midpt → $AY = \frac{1}{2}AC$ → $2AY = AC$

* ④ $\frac{AB}{AC} = \frac{2AX}{2AY}$ → ⑤ $\frac{AB}{AC} = \frac{AX}{AY}$ → ⑥ $\frac{AX}{AB} = \frac{AY}{AC}$ → ⑧ $\triangle AXY \sim \triangle ABC$

Division property

⑦ $\angle A \cong \angle A$

⑨ $\frac{XY}{BC} = \frac{AX}{AB}$ → ⑩ $\frac{XY}{BC} = \frac{\frac{1}{2}AB}{AB}$ → ⑪ $\frac{XY}{BC} = \frac{1}{2}$ → ⑫ $XY = \frac{1}{2}BC$

⑬ $\angle 1 \cong \angle B$ → ⑭ $\overline{XY} \parallel \overline{BC}$

Reasons

① Given

② Midpoint Theorem

③ Multiplication Property

④ Division property

⑤ Simplification

⑥ Property of proportions

⑦ Reflexive Property

⑧ Def. of similar △s

⑨ ~△s → corresp. side proportional

⑩ Substitution

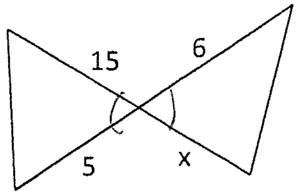
⑪ Simplification

⑫ Multiplication

⑬ ~△s → ∠s ≅.

⑭ 2 lines & corresp ∠s ≅ → 2 ∥ lines

Ex 4: Find the values of x that make the triangles similar by the SAS ~ Thm.



$\frac{5}{6} = \frac{15}{x}$

$5x = 6(15)$

$x = 18$