**Activity 4.3.3 The SSS Similarity Theorem**



Prove the **SSS Similarity Theorem:** If three sides of one triangle are proportional to three sides of another triangle, then the two triangles are similar.

Given ∆*ABC* and ∆*DEF*
with $\frac{DF}{AC}=\frac{EF}{BC}=\frac{DE}{AB}$.

Prove ∆*ABC*$ \~ $∆*DEF*.

Construction steps:

1. Draw a circle with center *F* and radius *CA* to intersect $\vec{DF}$ at point *G*.
2. Draw a circle with center *F* and radius *CB* to intersect $\vec{DE}$ at point *H*.
3. Draw segment $\overbar{FG}$ and hide the circles.

Proof steps:

1. Prove that ∆*GHF* ~ ∆*DEF* using one of the similarity theorems we have already proved. Show steps here:
2. Prove that *GH* = *AB* using the given information. Show steps here:
3. Prove that ∆*GHF* $≅$ ∆*ABC* and consequently m$∠GFE $= m$∠ACB$. Show steps here:
4. Now show that ∆*ABC* ~ ∆*DEF.*