The Case of the Missing Diagram - Lesson 4-2

Here is today's warmup! See if you can draw a diagram that satisfies the following statement:

> **Two circles intersect at two points. Draw a diagram that shows that the segment joining the centers of the circles *does not necessarily* bisect the segment joining the points of intersection.**

Today, we're going to talk about how to set up proofs for which you are not given a diagram or the "given" and "prove" statements. You should be able to do these, so make sure you follow the logic here. We started with the following problem:

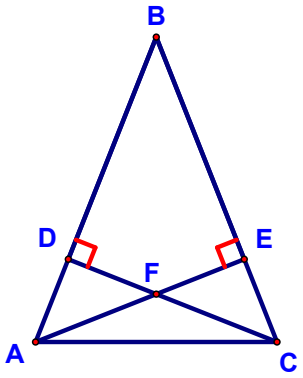
Set up the diagram, givens, and conclusion for the following:

If two altitudes of a Δ are $\cong$, then the Δ is isosceles.

Now...don't freak! Think about what we know from the statement and what we need to prove. We know that two altitudes of a triangle are congruent, right? So, that means we have a triangle and two of its altitudes in our diagram. We also know that the altitudes are congruent. From this, you should be able to come up with something like the following:

Given: $\overline{CD}$ and $\overline{AE}$ are altitudes
$\overline{CD} \cong \overline{AE}$

Prove: $\triangle ABC$ is isosceles



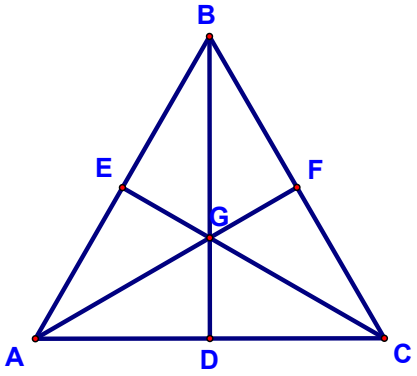
Note that, as I said in the video, I always try to start lettering the lower left corner, then continue on in a clockwise direction, labeling the triangle first, then the additional points thereafter (continuing in the clockwise direction). This is simply for consistency sake – it's not required. However, if you do this, it's way more likely that your diagrams will be close to mine and checking your classwork answers will be way easier!

There are two more examples...you should be able to follow these and the ones we had for classwork!! If you don't, then ask a friend, come see me, or study them until you do. There will be one of these on the test!!!

The medians of a $\triangle$ are $\cong$ if the $\triangle$ is equilateral.

Given: $\triangle ABC$ is equilateral
$\overline{AF}$, $\overline{BD}$, $\overline{CE}$ are medians

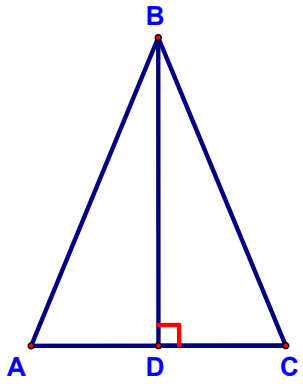
Prove: $\overline{AF} \cong \overline{BD} \cong \overline{CE}$



The altitude to the base of an isosceles △ bisects the vertex ∠.

Given: **△ABC is isosceles with vertex ∠ABC**
$\overline{BD}$ is an altitude

Prove: **$\overline{BD}$ bisects ∠ABC**



You should be able to do the proofs for these as well...in fact, they should be getting easier for you. If not, you need to practice more!!