

## Geometry

Using Law of Cosines when you have ALL 3 sides

### Where to begin:

1. ) Begin by choosing an ANGLE to find. This can be any of the 3 ANGLES
  2. ) Next pick the appropriate formula for the angle you chose
  3. ) Put the values of the variables into the formula
- To solve this type of problem, you have to complete the calculations individually
  - Be careful of the common mistake of solving an equation.

### Example:

Given sides 5, 6, and 7 ... find the 3 missing angles

Step #1 Choose an ANGLE to solve for ( I'll Choose Angle "A" )

Step #2 Plug the values in to the formula that begins with side "a"

$$a^2 = b^2 + c^2 - 2(b)(c)\cos A$$

$$5^2 = 6^2 + 7^2 - 2(6)(7)\cos A$$

Step #3 Square the values and multiply where appropriate

$$25 = 36 + 49 - 84 \cos A$$

Step #4 Add on the right

$$25 = 85 - 84 \cos A$$

Step #5 Subtract 85 from both sides.....

\*Common **MISTAKE**: people try to subtract 85-84. This cannot be done because 84 is being multiplied by the Cos A

Step #6 Divide BOTH sides by the value in front of the Cos

$$\frac{-60}{-84} = \frac{-84}{-84} \cos A$$

Step #7 Take the **INVERSE** Cos of the value you get on the left to find "angle A"

Step #8 NOW, use the law of Sines to find the remaining angles