Math 3 Unit 3.3 Notes   Law of Cosines and Heron's Formula

Use Law of Cosines when you have: SSS or SAS

For SAS use:

$$a = \sqrt{b^2 + c^2 - 2bc \cos A}$$

Or

$$b = \sqrt{a^2 + c^2 - 2ac \cos B}$$

Or

$$c = \sqrt{b^2 + a^2 - 2ba \cos C}$$

Then use Law of Sines to find the smaller angle

Then finish by taking 180 degrees minus to two known angles.

For SSS use:

$$A = \cos^{-1}\left(\frac{b^2 + c^2 - a^2}{2bc}\right)$$

Or

$$B = \cos^{-1}\left(\frac{a^2 + c^2 - b^2}{2ac}\right)$$

Or

$$C = \cos^{-1}\left(\frac{b^2 + a^2 - c^2}{2ba}\right)$$

Do this for the first 2 angles, then do 180 – 1st angle – 2nd angle = 3rd angle

Heron's Area Formula (SSS):

$$s = \frac{1}{2}(a + b + c) \qquad \text{(This is called the semi-perimeter)}$$

$$Area = \sqrt{s(s-a)(s-b)(s-c)}$$