

Law of Cosine (LoC)

**These are not right triangles!!!

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

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

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

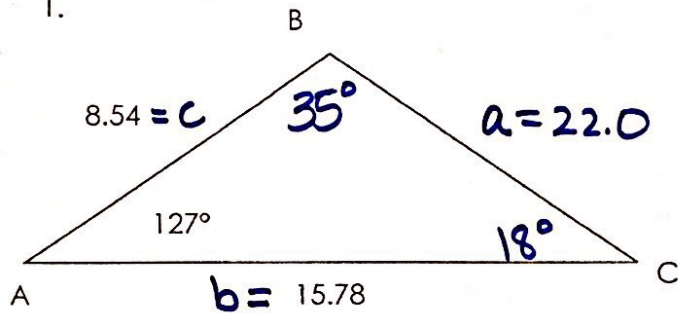
Use when.....

1. **SAS**

2. **SSS**

Ex: Solve each triangle. Round answers to the nearest tenth.

1.



$$a^2 = 15.78^2 + 8.54^2 - 2(15.78)(8.54)\cos 127$$

$$\sqrt{a^2} = \sqrt{484.14}$$

$$\boxed{a = 22.0}$$

$$15.78^2 = 22.0^2 + 8.54^2 - 2(22.0)(8.54)\cos B$$

$$249.0084 = 556.9316 - 375.76 \cos B$$

$$-556.9316 \quad -556.9316$$

$$\hline -307.9232 = -375.76 \cos B$$

$$0.8195 = \cos B$$

$$\boxed{\cos^{-1} B = 35^\circ}$$

$$\angle C = 180 - 35 - 127 = \boxed{18^\circ}$$

2. $c = 16, a = 20, b = 32$

$$32^2 = 16^2 + 20^2 - 2(16)(20)\cos B$$

$$1024 = 656 - 640 \cos B$$

$$368 = -640 \cos B$$

$$-0.575 = \cos B$$

$$\boxed{\cos^{-1} B = 125.1^\circ}$$

$$20^2 = 16^2 + 32^2 - 2(16)(32)\cos A$$

$$400 = 1280 - 1024 \cos A$$

$$-880 = -1024 \cos A$$

$$0.8594 = \cos A$$

$$\boxed{\cos^{-1} A = 30.8^\circ}$$

$$\angle C: 180 - 125.1 - 30.8 = \boxed{24.1^\circ}$$