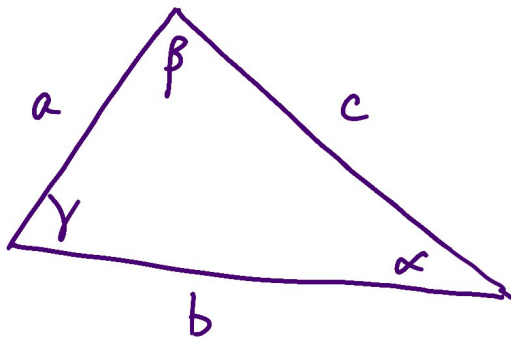
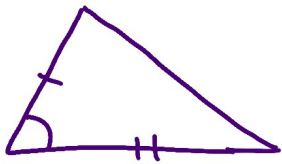


## Section 7.3 The Law of Cosines

SAS



$$a^2 = b^2 + c^2 - 2bc \cos \alpha$$

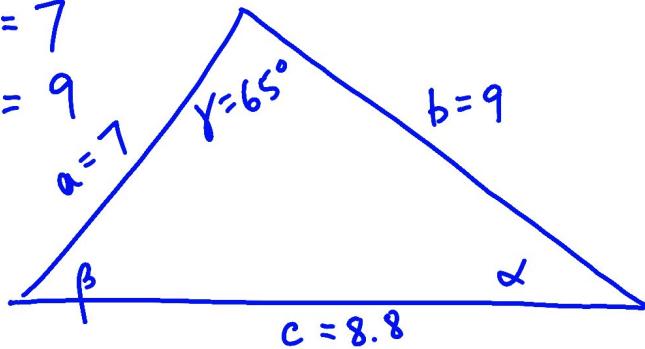
$$b^2 = a^2 + c^2 - 2ac \cos \beta$$

$$c^2 = a^2 + b^2 - 2ab \cos \gamma$$

ex:  $\gamma = 65^\circ$

$$a = 7$$

$$b = 9$$



① Find c:  $c^2 = a^2 + b^2 - 2ab \cos \gamma$

$$c^2 = 7^2 + 9^2 - 2 \cdot 7 \cdot 9 \cos 65^\circ$$

$$c^2 = 76.75$$

$$c = 8.8$$

③  $\beta = 180 - 46.1 - 65 = 68.9^\circ$

$$\alpha = \underline{46.1^\circ}$$

$$\beta = \underline{68.9^\circ}$$

$$c = \underline{8.8}$$

②  $\frac{\sin \alpha}{7} = \frac{\sin 65^\circ}{8.8}$

$$\sin \alpha = \frac{7 \sin 65^\circ}{8.8}$$

$$\sin \alpha = .7209$$

$$\alpha = \sin^{-1}(.7209)$$

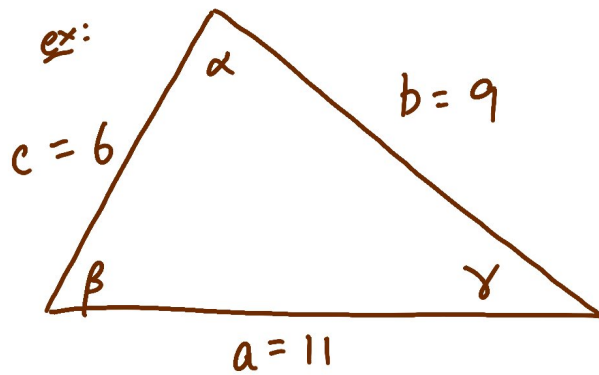
$$\alpha = 46.1^\circ$$

SSS

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc}$$

$$\cos \beta = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos \gamma = \frac{a^2 + b^2 - c^2}{2ab}$$



$$\alpha = 92.1^\circ$$

$$\beta = 54.8^\circ$$

$$\gamma = 33.1^\circ$$

① Find biggest angle first.

$$\cos \alpha = \frac{b^2 + c^2 - a^2}{2bc} = \frac{9^2 + 6^2 - 11^2}{2 \cdot 9 \cdot 6}$$

$$\cos \alpha = \frac{-4}{108}$$

$$\alpha = \cos^{-1}(-4/108)$$

$$\alpha = 92.1^\circ$$

$$\textcircled{2} \frac{\sin \beta}{9} = \frac{\sin 92.1^\circ}{11}$$

$$\sin \beta = \frac{9 \sin 92.1^\circ}{11}$$

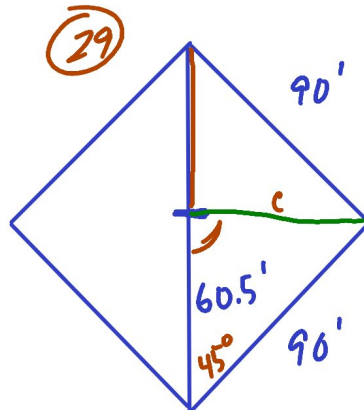
$$\sin \beta = .8176$$

$$\beta = 54.8^\circ$$

$$\textcircled{3} \gamma = 180 - 54.8 - 92.1$$

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9, 21, 26, 29, 33



$$c^2 = 60.5^2 + 90^2 - 2 \cdot 60.5 \cdot 90$$