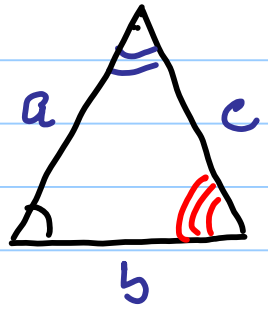
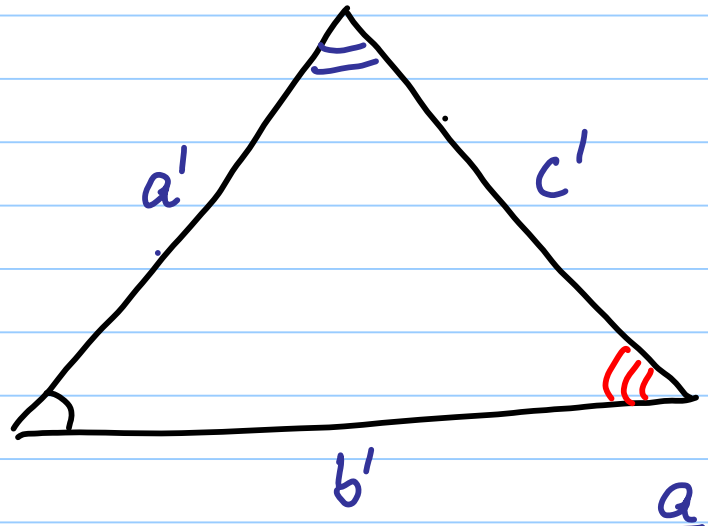
October 26, 2010

Note Title 10/26/2010

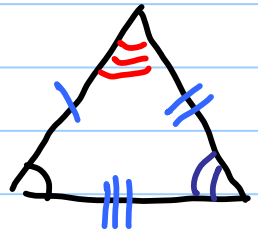
Similar triangles



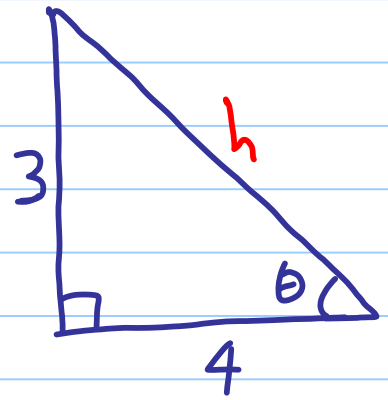


$$\frac{a}{a'} = \frac{b}{b'} = \frac{c}{c'}$$

Congruent triangles



Example



Pythagorean.

$h^2 = 3^2 + 4^2$

$h^2 = 9 + 16 = 25$

$\therefore h = 5$

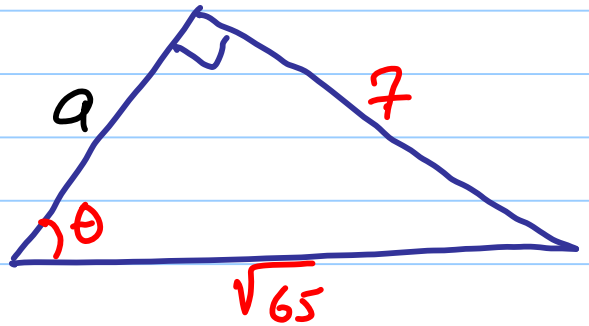
$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{3}{5}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{3}{4}$$

$$\csc\theta = \frac{\text{hypotenuse}}{\text{opposite}} = \frac{5}{3}$$

OR $$\csc\theta = \frac{1}{\sin\theta} = \frac{1}{3/5} = 1 \cdot \frac{5}{3}$$

Example



$$a^2 + 7^2 = \left(\sqrt{65}\right)^2$$

$$a^2 + 49 = 65$$

$$a^2 = 16$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \frac{4}{\sqrt{65}}$$

$$= \frac{4}{\sqrt{65}} \frac{\sqrt{65}}{\sqrt{65}}$$

$\therefore a = 4$ (adjacent)

$$= \frac{4\sqrt{65}}{65}$$

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}} = \frac{7}{4}$$

$$\sec\theta = \frac{1}{\cos\theta} = \frac{1}{\frac{4\sqrt{65}}{65}}$$

$$= \frac{65}{4\sqrt{65}} = \frac{\sqrt{65}}{4}$$

Cofunction Theorem

Given that $\sin 30° = \frac{1}{2}$ find $\cos 60°$.

$\cos 60° = \sin 30° = \frac{1}{2}$

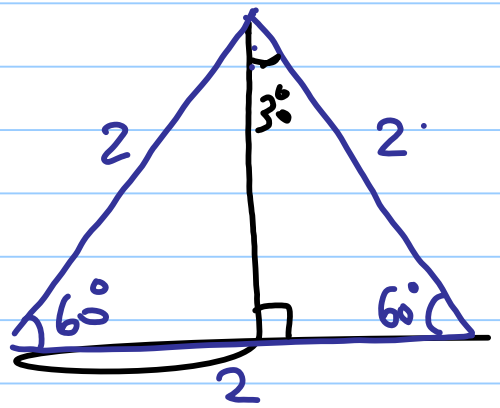
Given $\sin 45° = \frac{\sqrt{2}}{2}$ then

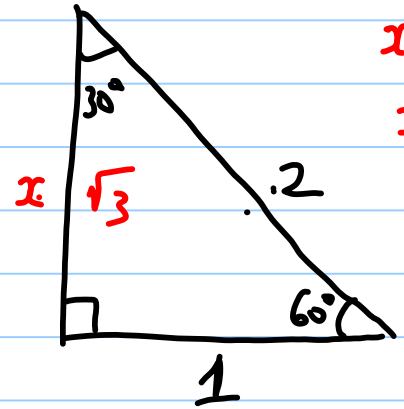
$\cos 45° = \sin 45° = \frac{\sqrt{2}}{2}$.

a) $\sin 30^\circ = \cos 60^\circ$

b) $\tan x = \cot(90^\circ - x)$

c) $\csc 40^\circ = \sec(90^\circ - 40^\circ) = \sec 50^\circ$.





$x^2 + 1^2 = 2^2$

$x^2 = 3$

$$\sin 30^\circ = \frac{\text{opp}}{\text{hyp}} = \frac{1}{2}$$

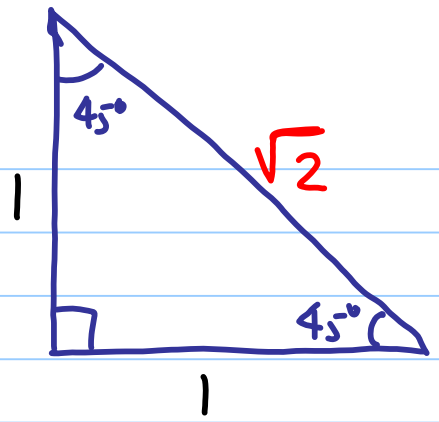
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$\csc 30^\circ = \frac{1}{\sin 30^\circ} = \frac{1}{1/2} = 2$$

$$\sec 30^\circ = \frac{1}{\cos 30^\circ} = \frac{1}{\sqrt{3}/2} = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\cot 30^\circ = \frac{1}{\tan 30^\circ} = \sqrt{3}$$



$1^2 + 1^2 = 2$

$\sin 45^\circ = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$\cos 45^\circ = \frac{\sqrt{2}}{2}$

$\tan 45^\circ = 1$

$\csc 45^\circ = \frac{1}{\sin 45^\circ} = \sqrt{2}$

$\sec 45^\circ = \frac{1}{\cos 45^\circ} = \sqrt{2}$

$\cot 45^\circ = \frac{1}{\tan 45^\circ} = 1$