



The angle α is 30° in the example ($\pi/6$ in radians). The sine of α , which is the height of the red line, is

$$\sin \alpha = 1/2.$$

By the Theorem of Pythagoras we have $\cos^2 \alpha + \sin^2 \alpha = 1$. Thus the length of the blue line, which is the cosine of α , must be

$$\cos \alpha = \sqrt{1 - 1/4} = \frac{1}{2}\sqrt{3}.$$

This shows that $\tan \alpha$, which is the height of the orange line, is

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha} = 1/\sqrt{3}.$$

<http://www.texample.net/tikz/examples/tutorial/>