

Subtraction of vectors.

Since, $\vec{A} - \vec{B} = \vec{A} + (-\vec{B})$ and $|\vec{A} + \vec{B}| = \sqrt{A^2 + B^2 + 2AB \cos \theta}$

$$\Rightarrow |\vec{A} - \vec{B}| = \sqrt{A^2 + B^2 + 2AB \cos(180^\circ - \theta)}$$

Since, $\cos(180 - \theta) = -\cos \theta$

$$\Rightarrow |\vec{A} - \vec{B}| = \sqrt{A^2 + B^2 - 2AB \cos \theta}$$

$$\tan \alpha_1 = \frac{B \sin \theta}{A + B \cos \theta}$$

and $\tan \alpha_2 = \frac{B \sin(180 - \theta)}{A + B \cos(180 - \theta)}$

But $\sin(180 - \theta) = \sin \theta$ and $\cos(180 - \theta) = -\cos \theta$

$$\Rightarrow \tan \alpha_2 = \frac{B \sin \theta}{A - B \cos \theta}$$

