Sin

$$\cos^2(\alpha) + \sin^2(\alpha) = 1$$

$$\cos(2\alpha) = -(\cos^2(\alpha) - \sin^2(\alpha))$$

$$\cos(2\alpha) = -(\cos^2(\alpha) - \sin^2(\alpha)) \leftrightarrow \cos(2\alpha) = \cos^2(\alpha) + \sin^2(\alpha)$$

$$1 - \cos(\alpha) = 1 - \cos^2\left(\frac{\alpha}{2}\right) + \sin^2\left(\frac{\alpha}{2}\right)$$

$$1 - \cos(\alpha) = 1 - \cos^2\left(\frac{\alpha}{2}\right) - \sin^2\left(\frac{\alpha}{2}\right) \leftrightarrow 1 - \cos(\alpha) = \sin^2\left(\frac{\alpha}{2}\right) + \sin^2\left(\frac{\alpha}{2}\right)$$

$$1 - \cos(\alpha) = \sin^2\left(\frac{\alpha}{2}\right) + \sin^2\left(\frac{\alpha}{2}\right)$$

$$1 - \cos(\alpha) = 2\sin^2\left(\frac{\alpha}{2}\right)$$

$$\frac{2\sin^2\left(\frac{\alpha}{2}\right)}{2} = \frac{1 - \cos(\alpha)}{2} \leftrightarrow \sin^2\left(\frac{\alpha}{2}\right) = \frac{1 - \cos(\alpha)}{2}$$

$$\sqrt{\sin^2\left(\frac{\alpha}{2}\right)} = \pm\sqrt{\frac{1 - \cos(\alpha)}{2}} \leftrightarrow \sin\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1 - \cos(\alpha)}{2}}$$

$$\sin\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1 - \cos(\alpha)}{2}}$$

Cos

$$\cos^2(\alpha) + \sin^2(\alpha) = 1$$

$$\sin^2(\alpha) = 1 - \cos^2(\alpha)$$

$$\cos(2\alpha) = \cos^2(\alpha) - \sin^2(\alpha)$$

$$\cos(2\alpha) = \cos^2(\alpha) - (1 - \cos^2(\alpha))$$

$$cos(2\alpha) = cos^2(\alpha) - 1 + \cos^2(\alpha) \leftrightarrow \cos(\alpha) = 2\cos^2\left(\frac{\alpha}{2}\right) - 1$$

$$\cos(\alpha) = 2\cos^2\left(\frac{\alpha}{2}\right) - 1$$

$$1 + \cos(\alpha) = 2\cos^2\left(\frac{\alpha}{2}\right)$$

$$\frac{1+\cos(\alpha)}{2}=\frac{2\cos^2\left(\frac{\alpha}{2}\right)}{2}\leftrightarrow\frac{1+\cos(\alpha)}{2}=\cos^2\left(\frac{\alpha}{2}\right)$$

$$\sqrt{\cos^2\left(\frac{\alpha}{2}\right)}=\pm\sqrt{\frac{1+\cos(\alpha)}{2}}$$

$$\cos\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{1+\cos(\alpha)}{2}}$$

Tan

$$\tan\left(\frac{\alpha}{2}\right)=\frac{\sin\left(\frac{\alpha}{2}\right)}{\cos\left(\frac{\alpha}{2}\right)}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{\frac{1-\cos(\alpha)}{2}}{\frac{1+\cos(\alpha)}{2}}}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}}\cdot\pm\sqrt{\frac{1-\cos(\alpha)}{1-\cos(\alpha)}}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{(1-cos(\alpha))^2}{1-\cos^2(\alpha)}}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{(1-cos(\alpha))^2}{\sin^2(\alpha)}}$$

$$\tan\left(\frac{\alpha}{2}\right)=\frac{1-\cos(\alpha)}{\sin(\alpha)}$$

$$\tan\left(\frac{\alpha}{2}\right)=\pm\sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}}\cdot\pm\sqrt{\frac{1+\cos(\alpha)}{1+\cos(\alpha)}}$$

$$\tan\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{1-\cos^2(\alpha)}{(1+\cos(\alpha))^2}}$$

$$\tan\left(\frac{\alpha}{2}\right) = \pm\sqrt{\frac{\sin^2(\alpha)}{(1+\cos(\alpha))^2}}$$

$$\tan\left(\frac{\alpha}{2}\right) = \frac{\sin(\alpha)}{1+\cos(\alpha)}$$

$$\tan\left(\frac{\alpha}{2}\right) = \frac{\sin(\alpha)}{1+\cos(\alpha)} = \frac{1-\cos(\alpha)}{\sin(\alpha)}$$

Halveringslinje teorem:

$$\frac{a_1}{a_2} = \frac{c}{b}$$

$$a_1 \cdot b = a_2 \cdot c$$

$$\frac{a_2}{b} = \tan\left(\frac{\alpha}{2}\right) = \frac{\sin\left(\frac{\alpha}{2}\right)}{\cos\left(\frac{\alpha}{2}\right)} = \pm\sqrt{\frac{\frac{1-\cos(\alpha)}{2}}{\frac{1+\cos(\alpha)}{2}}} \leftrightarrow \sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}}$$

$$\sqrt{\frac{1-\cos(\alpha)}{1+\cos(\alpha)}} \leftrightarrow \sqrt{\frac{1-\frac{b}{c}}{1+\frac{b}{c}}} = \sqrt{\frac{c-b}{c+b}}$$

$$c^2 = b^2 + (a_1+a_2)^2$$

$$(a_1+a_2)^2 = c^2 - b^2 = (c-b)\cdot(c+b)$$

$$c - b = \frac{(a_1+a_2)^2}{c+b}$$

$$\sqrt{\frac{\frac{(a_1+a_2)^2}{(c+b)}}{c+b}} = \sqrt{\frac{(a_1+a_2)^2}{(c+b)^2}} = \frac{a_1+a_2}{c+b}$$

$$\frac{a_2}{b} = \frac{a_1+a_2}{c+b} \leftrightarrow a_2\cdot c + a_2\cdot b = a_1\cdot b + a_2\cdot b$$

$$a_2 \cdot c + a_2 \cdot b = a_1 \cdot b + a_2 \cdot b \leftrightarrow a_2 \cdot c = a_1 \cdot b$$

$$\frac{a_2 \cdot c}{a_2 + b} = \frac{a_1 \cdot b}{a_2 + b}$$

$$\frac{c}{b} = \frac{a_1}{a_2}$$